

Math  
Vertical Alignment by Grade  
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Strand: Real/Complex Numbers (Place Value)

TEK: the student analyzes real-world numerical data using a variety of quantitative measures and numerical processes	TEK:	TEK:	TEK:	TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations TEK: the student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation	TEK:	TEK: the student understands that different forms of numbers are appropriate for different situations
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade												
SE: <b>AQR.2B</b> – solve problems involving large quantities that are not easily measured	SE:	SE:	SE:	SE: <b>ALGII.2B – (S)</b> use complex numbers to describe the solutions of quadratic equations graphically, tabular, and in real world application <b>ALGII.8B – (S)</b> analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula	SE:	SE: <b>8.1A-(R)</b> compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals <b>8.1D – (S)</b> express numbers in scientific notation, including negative exponents, in appropriate problem situations <b>8.1E</b> – compare and order real numbers with a calculator												
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TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations TEK: the student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation	TEK:	TEK: the student understands that different forms of numbers are appropriate for different situations	TEK: the student represents and uses numbers in a variety of equivalent forms	TEK: the student represents and uses rational numbers in a variety of equivalent forms
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Algebra II	Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>ALGII.2B – (S)</b> use complex numbers to describe the solutions of quadratic equations graphically, tabular, and in real world application <b>ALGII.8B – (S)</b> analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula	SE:	SE: <b>8.1A-(R)</b> compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals <b>8.1D – (S)</b> express numbers in scientific notation, including negative exponents, in appropriate problem situations <b>8.1E –</b> compare and order real numbers with a calculator	SE <b>7.1A-(S)</b> compare and order integers and positive rational numbers <b>7.1B-(R)</b> convert between fractions, decimals, whole numbers, and percents mentally, on paper or with a calculator	SE <b>6.1A-(S)</b> compare and order non-negative rational numbers <b>6.1B-(R)</b> generate equivalent forms of rational numbers including whole numbers, fractions, and decimals <b>6.1C-(S)</b> use integers to represent real-life situations
Specifics (description of lesson, include any “tricks”)	Specifics	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
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			<p>-comparing negative integers is introduced in 7<sup>th</sup> grade</p> <p>-percent in decimal forms &lt; or &gt; one hundred</p> <p>-include proportions and denominators of 100 to work with %</p> <p>-connect fraction models to percents (models other than 100)</p> <p>-converting percents is a new concept for 7<sup>th</sup> grade</p>	<p>-use examples such as temperature, loss/gain, above/below sea-level, up/down elevations, deposit/withdrawal</p> <p>-write number sentences that connects to problem situation</p> <p>-integer: any whole number and its opposite (this does not include fractions/ decimals)</p> <p>-integers are introduced in 6<sup>th</sup> grade</p> <p>-operations with integers are not introduced until 7<sup>th</sup> grade</p>																																																				
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The water levels of five Texas lakes were measured on the same day in 2010. The table below shows the number of feet above or below normal level for each lake.

Water Levels of Texas Lakes	
Lake	Number of Feet Above or Below Normal Level
Comroe	0.10
Amistad	-2.65
Richard Chamberlain	0.16
Possum Kingdom	-1.43
Travis	0.07

Which list shows the numbers in the table from greatest to least?

- F -2.65, -1.43, 0.16, 0.10, 0.07  
 G 0.16, 0.10, 0.07, -1.43, -2.65  
 H 0.16, 0.10, 0.07, -2.65, -1.43  
 J -2.65, -1.43, 0.07, 0.10, 0.16

The average distance from Earth to the sun is about  $9.3 \times 10^7$  miles. The average distance from Mars to the sun is about  $1.4 \times 10^8$  miles. When both planets are at their average distance from the sun, how much farther is Mars from the sun than Earth?

- F 79,000,000 mi  
 G 47,000,000 mi  
 H 107,000,000 mi  
 J 233,000,000 mi

The box below contains equivalent values.

$3\frac{14}{40}$	335%
3.35	$3\frac{70}{200}$
	$\frac{335}{100}$

Which number is equivalent to the values in the box?

- A  $\frac{67}{20}$   
 B 3.35%  
 C  $6\frac{7}{20}$   
 D 335

Which two values are both equivalent to 240%?

- F 2.4 and  $2\frac{2}{25}$   
 G 2.4 and  $2\frac{2}{5}$   
 H 0.24 and  $2\frac{2}{5}$   
 J 0.24 and  $2\frac{2}{25}$

Which number is equivalent to  $\frac{13}{2}$ ?

- A 6.1, because  $13 \div 2 = 6$  with a remainder of 1  
 B  $\frac{26}{2}$ , because  $13 \times 2 = 26$ , and  $2 \times 1 = 2$   
 C  $6\frac{1}{2}$ , because  $13 \div 2 = 6$  with a remainder of 1  
 D 6.05, because  $13 \div 2 = 6\frac{1}{2}$ , and  $\frac{1}{2} = 0.05$

A king snake is  $\frac{31}{50}$  m long. What is an equivalent length of this king snake in meters?

- F 0.31 m  
 G  $3\frac{1}{50}$  m  
 H 0.062 m

J Not here  
 At 8:00 a.m., 26 children were at a day care. By 3:00 p.m., 12 of these children were no longer at the day care. Which integer best represents the change in the number of children at the day care from 8:00 a.m. to 3:00 p.m.?

- F +26  
 G +12  
 H -26  
 J -12

Math  
Vertical Alignment by Grade

Strand: Real/Complex Numbers (Place Value)

TEK: the student represents and uses rational numbers in a variety of equivalent forms	TEK: the student uses place value to represent whole number and decimals	TEK: the student uses place value to represent whole numbers and decimals	TEK: the student uses place value to communicate about increasingly large numbers in verbal and written form, including money
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
<p>SE</p> <p><b>6.1A-(S)</b>compare and order non-negative rational numbers</p> <p><b>6.1B-(R)</b> generate equivalent forms of rational numbers including whole numbers, fractions, and decimals</p> <p><b>6.1C-(S)</b>use integers to represent real-life situations</p>	<p>SE</p> <p><b>5.1A-(S)</b>use place value to read, write, compare, and order whole numbers through the 999,999,999,999</p> <p><b>5.1B-(S)</b>use place value to read, write, compare, and order decimals through the thousandths place</p>	<p>SE</p> <p><b>4.1A-(S)</b>use place value to read, write, compare, and order whole numbers through 999,999,999</p> <p><b>4.1B – (R)</b>use place value to read, write, compare and order decimals involving tenths and hundredths, including money, using concrete objects and pictorial models</p>	<p>SE</p> <p><b>3.1A-(S)</b>use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999</p> <p><b>3.1B-(S)</b>use place value to compare and order whole numbers through 9,999</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Practice place value with oral choral reading of the numbers	Practice place value with oral choral reading of the numbers	Practice place value with oral choral reading of the numbers Emphasis on number sense and understanding values of numbers instead of using tricks to understand symbols. Read <, >, = symbols as we would read book, from left to right Only use ‘alligator eats the bigger number’ as a last intervention Promote number sense No ‘naked’ numbers...numbers should always have a label (unit)	Practice place value with oral choral reading of the numbers Emphasis on number sense and understanding values of numbers instead of using tricks to understand symbols. Read <, >, = symbols as we would read book, from left to right Only use ‘alligator eats the bigger number’ as a last intervention Promote number sense The decimal is the only place where ‘and’ is spoken (ex: 6,128 is read ‘six thousand, one hundred twenty-eight’... not ‘six thousand, one hundred AND twenty-eight’...this means \$6,100.28) No ‘naked’ numbers...numbers should always have a label (unit) Use number lines for comparing numbers
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
<ul style="list-style-type: none"> <li>-Include decimals less than / greater than 1</li> <li>-Include fractions such as unit fractions, proper fractions, improper and mixed #s</li> <li>-Relate concrete models of decimal to fraction conversions / connect to algorithms</li> <li>-Change whole numbers to equivalent improper fractions</li> <li>-Students need to understand / explain that <math>9/5</math> is <math>&gt; 1 / &lt; 2</math>; specifically <math>1\ 4/5</math> or <math>1.8</math></li> </ul>	<ul style="list-style-type: none"> <li>-Convert from standard to written</li> <li>-Convert from written to standard</li> <li>-Include expanded notation</li> <li>-Convert from expanded to standard / standard to expanded</li> <li>-Describe place and value</li> <li>-Use symbols and words for greater than <math>&gt;</math>, equal to <math>=</math>, and less than <math>&lt;</math></li> <li>-Sequence numbers/ words from least to greatest</li> </ul>	<ul style="list-style-type: none"> <li>-Convert from standard to written</li> <li>-Convert from written to standard</li> <li>-Record numbers in expanded notation</li> <li>-Describe place and value (such as 31,465; the four is in the hundred place and the value is 400)</li> <li>-Use symbols and words for greater than <math>&gt;</math>, equal to <math>=</math>, and less than <math>&lt;</math></li> <li>-Compare and order groups of numbers</li> <li>-Sequence numbers/words such as populations and</li> </ul>	<ul style="list-style-type: none"> <li>-Convert from standard to written</li> <li>-Convert from written to standard – word to digits (This is introduced in 3<sup>rd</sup> grade)</li> <li>-Write numbers in expanded notation – Ex: <math>357 = 300 + 50 + 7</math> (This is introduced in 3<sup>rd</sup> grade)</li> <li>-Read and describe place and value (such as 31,465; the four is in the hundreds place and the value is 400)</li> </ul>

-Use numbers appropriate for real life application  
 -Include changing decimals to fractions / fractions to decimals  
 -use examples such as temperature, loss /gain, above/below sea-level, up/down elevations, deposit/withdrawal  
 -write number sentences that connects to problem situation  
 -integer: any whole number and its opposite (this does not include fractions/ decimals)  
 -integers are introduced in 6<sup>th</sup> grade  
 -operations with integers are not introduced until 7<sup>th</sup> grade

-Sequence within a given range  
 -Included non-examples  
 -Compare and order groups of decimal numbers using numbers in a table and number lines  
 -Write in standard form from pictorial models  
 -Thousandths is introduced in 5<sup>th</sup> grade

names of cities from least to greatest  
 Include non-examples – “which of these does NOT make the sentence true? – What could you do to make this true? –Why is this not true?”  
 -Number lines do not always begin with “0”  
 -Concepts of point on a line  
 -Use pictorial representations  
 -tables that include data in various orders (descending, ascending, and no order)  
 -include equivalent decimals 0.1=0.10 concrete objects and pictorially  
 -decimals are introduced in 4<sup>th</sup> grade

-Use symbols and words for “greater than” >, “less than” <, and “equal” =  
 -Compare and order groups of numbers, include numbers with units Ex: 4 ft and 6 ft  
 -Sequence numbers/ words such as populations and names of cities, from least to greatest  
 -Use Tables (vertical and horizontal) that include data in various orders (descending, ascending, and no order)  
 -Use number lines, money, concrete models, pictorial models, words, numbers and groups of numbers  
 -Include non-examples

Vocabulary  
 Rational numbers, generate, equivalent, integer, conversions

Vocabulary  
 Hundred billion, Ten billion, Billions, Hundred million, Ten million, Millions, Hundred thousands, Ten thousands, Thousands, hundreds, tens, ones, greater than, less than, equal to, standard form, written form, expanded form, number lines, comma, decimal point, tenths, hundredths, thousandths, digit, numeral, value

Vocabulary  
 Hundred million, Ten million, Millions, Hundred thousands, Ten thousands, Thousands, hundreds, tens, ones, greater than, less than, equal to, standard form, written form, expanded form, number lines, comma, decimal point, tenths, hundredths, digit, numeral, value

Vocabulary  
 Hundred thousands, Ten thousands, Thousands, hundreds, tens, ones, greater than, less than, equal to, standard form, written form, expanded form, number lines, comma, place value, digit, numeral, value

STAAR 2012

SE	# of Questions	Percent	Dual Coded
1A	1	37%	
1B	3	38%	11A,13A

STAAR 2012

SE	# of Questions	Percent	Dual Coded
1A	1	71%	

STAAR 2012

SE	# of Questions	Percent	Dual Coded
1A	1	56%	14B
1B	3	77%	14A

STAAR 2012

SE	# of Questions	Percent	Dual Coded
1B	1	58%	14B

STAAR 2013

SE	# of Questions	Percent	Dual Coded
1A	1	50%	13A
1B	3	43%	13B
1C	1	80%	12A

STAAR 2013

SE	# of Questions	Percent	Dual Coded
1B	1	60%	14A

STAAR 2013

SE	# of Questions	Percent	Dual Coded
1A	1	76%	
1B	3	68%	14A,14D

STAAR 2013

SE	# of Questions	Percent	Dual Coded
1A	1	69%	

The numbers in each set shown below have a common characteristic.

Set S

0.8	$\frac{60}{100}$
$\frac{5}{9}$	0.57

Set T

0.4	$\frac{20}{100}$
$\frac{4}{9}$	0.04

Which statement best describes a common characteristic of the numbers in Set S or Set T?

F Each number in Set T is less than  $\frac{1}{4}$ .

G Each number in Set S is less than 0.65.

H Each number in Set T is greater than  $\frac{1}{2}$ .

J Each number in Set S is greater than 0.5.

Alberto ran a race in 17.6 seconds. Jake ran the race in 18.307 seconds. Which race time is greater than 17.6 seconds but less than 18.307 seconds?

A 17.054 s

B 18.4 s

C 17.39 s

D 18.21 s

A total of 7,093,502 people watched a soccer game on television. Which of the following has the same value as 7,093,502?

F  $7,000,000 + 900,000 + 30,000 + 5,000 + 200$

G  $7,000,000 + 90,000 + 3,000 + 50 + 2$

H  $7,000,000 + 900,000 + 3,000 + 500 + 2$

J  $7,000,000 + 90,000 + 3,000 + 500 + 2$

The number of people living in a city has a 3 in the hundreds place and a 1 in the ten-thousands place. Which number has a 3 in the hundreds place and a 1 in the ten-thousands place?

F 318,297

G 791,326

H 219,305

J 536,812

Each of three students wrote an equation.

- Nikole wrote  $5\frac{2}{8} = \frac{21}{4}$ .
- Erik wrote  $5.14 = \frac{21}{4}$ .
- Keisha wrote  $4\frac{1}{5} = \frac{21}{4}$ .

Which of these students wrote an equation that is true?

- F Nikole only  
 G Nikole and Erik only  
 H Keisha only  
 J Nikole, Erik, and Keisha

Which number is equivalent to  $\frac{13}{2}$ ?

- A 6.1, because  $13 \div 2 = 6$  with a remainder of 1  
 B  $\frac{26}{2}$ , because  $13 \times 2 = 26$ , and  $2 \times 1 = 2$   
 C  $6\frac{1}{2}$ , because  $13 \div 2 = 6$  with a remainder of 1  
 D 6.05, because  $13 \div 2 = 6\frac{1}{2}$ , and  $\frac{1}{2} = 0.05$

A king snake is  $\frac{31}{50}$  m long. What is an equivalent length of this king snake in meters?

- F 0.31 m  
 G  $3\frac{1}{50}$  m  
 H 0.062 m  
 J Not here

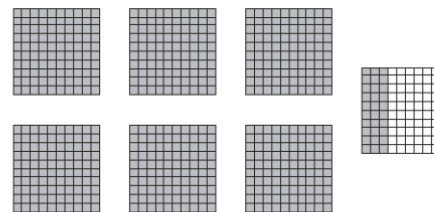
At 8:00 A.M., 26 children were at a day care. By 3:00 P.M., 12 of these children were no longer at the day care. Which integer best represents the change in the number of children at the day care from 8:00 A.M. to 3:00 P.M.?

- F +26  
 G +12  
 H -26  
 J -12

Each picture below represents a different amount of money. In which amount of money is the digit 9 in the hundredths place?



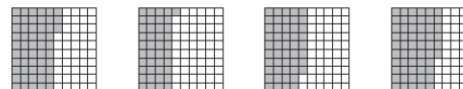
The model below is shaded to represent a decimal.



How is this decimal written in words?

- A Six and thirty hundredths  
 B Six hundred three  
 C Six and thirty tenths  
 D Six and three hundredths

The shaded models below represent four different decimal numbers.



Which list shows these decimal numbers in order from least to greatest?

- A 0.53 0.41 0.48 0.56  
 B 0.41 0.48 0.53 0.56  
 C 0.56 0.53 0.48 0.41  
 D 0.41 0.53 0.56 0.48

Math  
Vertical Alignment by Grade

Strand: Real/Complex Numbers (Place Value)

TEK: the student uses place value to communicate about increasingly large numbers in verbal and written form, including money	TEK: the student understands how place value is used to represent whole numbers	TEK: the student uses whole numbers to describe and compare quantities	TEK: the student uses numbers to name quantities
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3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
<p>SE</p> <p><b>3.1A-(S)</b>use place value to read, write (in symbols and words), and describe the value of whole numbers through 999,999</p> <p><b>3.1B-(S)</b>use place value to compare and order whole numbers through 9,999</p>	<p>SE</p> <p><b>2.1A-(S)</b>use concrete models of hundreds, tens, and ones to represent a given whole number (up to 999) in various ways</p> <p><b>2.1B-(R)</b>use place value to read, write, and describe the value of whole numbers to 999</p> <p><b>2.1C-(R)</b>use place value to compare and order whole numbers to 999 and record the comparisons using numbers and symbols (&lt;,&gt;)</p>	<p>SE</p> <p><b>1.1A-(S)</b>compare and order whole numbers up to 99 (less than, greater than, or equal to) using sets of concrete objects and pictorial models</p> <p><b>1.1B-(S)</b>create sets of tens and ones using concrete objects to describe, compare, and order whole numbers</p> <p><b>1.1D-(R)</b>read and write numbers to 99 to describe sets of concrete objects</p>	<p>SE</p> <p><b>K.1A-(R)</b>use one-to-one correspondence and language such as more than, same number as, or two less than to describe relative sizes of sets of concrete objects</p> <p><b>K.1B-(R)</b>use sets of concrete objects to represent quantities given in verbal or written form (through 20)</p> <p><b>K.1C-(R)</b>use numbers to describe how many objects are in a set (through 20) using verbal and symbolic descriptions</p> <p><b>K.6B-(R)</b>count by ones to 100</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
<p>Practice place value with oral choral reading of the numbers</p> <p>Emphasis on number sense and understanding values of numbers instead of using tricks to understand symbols.</p> <p>Read &lt;,&gt; symbols as we would read book, from left to right</p> <p>Only use ‘alligator eats the bigger number’ as a last intervention</p> <p>Promote number sense</p> <p>The decimal is the only place where ‘and’ is spoken (ex: 6,128 is read ‘six thousand, one hundred twenty-eight’... not ‘six thousand, one hundred AND twenty-eight’...this means \$6,100.28)</p> <p>No ‘naked’ numbers...numbers should always have a label (unit)</p> <p>Use number lines for comparing numbers</p>	<p>Practice place value with oral choral reading of the numbers</p> <p>The decimal is the only place where ‘and’ is spoken (ex: 6,128 is read ‘six thousand, one hundred twenty-eight’... not ‘six thousand, one hundred AND twenty-eight’...this means \$6,100.28)</p> <p>No ‘naked’ numbers...numbers should always have a label (unit)</p> <p>Read &lt;,&gt; symbols as we would read book, from left to right</p> <p>Only use ‘alligator eats the bigger number’ as a last intervention.</p> <p>Using 2 dots for the bigger number and one dot for the smaller number is another strategy for comparison symbols</p> <p>Hold students accountable for letter/number reversals (such as: 16 for 61)</p> <p>Use number lines for comparing numbers</p>	<p>Practice place value with oral choral reading of the numbers</p> <p>The decimal is the only place where ‘and’ is spoken (ex: 6,128 is read ‘six thousand, one hundred twenty-eight’... not ‘six thousand, one hundred AND twenty-eight’...this means \$6,100.28)</p> <p>No ‘naked’ numbers...numbers should always have a label (unit)</p> <p>Read &lt;,&gt; symbols as we would read book, from left to right</p> <p>Only use ‘alligator eats the bigger number’ as a last intervention</p> <p>Using 2 dots for the bigger number and one dot for the smaller number is another strategy for comparison symbols</p> <p>Hold students accountable for letter/number reversals (such as: 16 for 61)</p> <p>Use number lines for comparing numbers</p>	<p>Practice place value with oral choral reading of the numbers</p> <p>The decimal is the only place where ‘and’ is spoken (ex: 6,128 is read ‘six thousand, one hundred twenty-eight’... not ‘six thousand, one hundred AND twenty-eight’...this means \$6,100.28)</p> <p>No ‘naked’ numbers...numbers should always have a label (unit)</p>
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<p>-Convert from standard to written</p> <p>-Convert from written to standard – word to digits (This is introduced in 3<sup>rd</sup> grade)</p> <p>-Write numbers in expanded notation – Ex: 357 =</p>	<p>-Students should be able to make sets of hundreds and tens when provided any manipulative.</p> <p>-Represent the number 28 using 2 ten rods</p>	<p>-Always used concrete objects or pictorial models</p> <p>-Show two sets of concrete items – students determine which set is greater</p> <p>-Students “build” the given numbers using base</p>	<p>-One-to-one correspondence</p> <p>-Using the terminology “greater than, less than, and equal to” is introduced in 1<sup>st</sup> grade</p> <p>-The TEKS specifies concrete objects.</p>

<p>300 + 50 + 7 (This is introduced in 3<sup>rd</sup> grade)                      -Read and describe place and value (such as 31,465; the four is in the hundreds place and the value is 400)                      -Use symbols and words for “greater than” &gt;, “less than” &lt;, and “equal” =                      -Compare and order groups of numbers, include numbers with units Ex: 4 ft and 6 ft                      -Sequence numbers/ words such as populations and names of cities, from least to greatest                      -Use Tables (vertical and horizontal) that include data in various orders (descending, ascending, and no order)                      -Use number lines, money, concrete models, pictorial models, words, numbers and groups of numbers                      -Include non-examples</p>	<p>and 8 units; 1 ten rod and 18 units; and 28 units                      -Use manipulatives to build the numbers such as 624 and then describe the value of each of the numbers. Ex: 6 hundreds + 2 tens + 4 ones and write as (600+20+4)                      -Writing using numerals, not words.                      Number words are introduced in the 3<sup>rd</sup> grade TEKS</p>	<p>ten blocks and then order them from least to greatest (or greatest to least)                      -The comparative symbols &lt; &gt; = are not introduced until 2<sup>nd</sup> grade                      -Emphasize a larger quantity does not always reflect a greater value – value dependent on unit name (6 unit pieces are not greater than 1 ten unit)                      -Given the number 46, the student can count out that many objects, given 46 objects the student can count and write the numerical symbol that represents the quantity.                      -Compare and order whole numbers up to 75 using various tools including a 100s chart                      -Students compare numbers when keeping the ten value the same and change the ones ex. 87 and 83                      -When given numbers such as 34, 35, and 36, in random order students are able to order the numbers.</p>	<p>-While students should orally count to 100, they only write, find, and show to 20.                      -Teacher shows an objects or a set of objects and students writes the number (not the word), verbally responds or find the matching number</p>								
<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>								
<p>Hundred thousands, Ten thousands, Thousands, hundreds, tens, ones, greater than, less than, equal to, standard form, written form, expanded form, number lines, comma, place value, digit, numeral, value</p>	<p>Hundreds, tens, ones, greater than, less than, equal to, HTO chart, hundreds chart, base ten pieces, standard form, expanded form, number lines</p>	<p>Whole number, digit, hundreds chart, objects, manipulatives, tens, ones, pictorial models, base ten pieces, value, relationship</p>	<p>Zero, number, set, ten rod, hundreds chart, objects, number line, manipulatives</p>								
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Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Fractions)

TEK:	TEK:	TEK:	TEK:	TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations -the student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation	TEK:	TEK: the student understands that different forms of numbers are appropriate for different situations
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade								
SE:	SE:	SE:	SE:	SE: <b>ALGII.2B – (S)</b> use complex numbers to describe the solutions of quadratic equations graphically, tabular, and in real world application <b>ALGII.8B – (S)</b> analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula	SE:	SE: <b>8.1A-(R)</b> compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals 8.1B – select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships								
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Rationale	Rationale	Rationale	Rationale	Rationale (clarification of TEKS/SE)	Rationale	Rationale (clarification of TEKS/SE)								
						-decimals-less than and greater than one, negative and positive -fractions-proper fractions, improper, mixed fractions (like and unlike denominators, positive and negative) -Percents – such as 150%, 33 1/3%, 73.1% -Squares (up to 20) and square roots (up to 400) -use numbers appropriate for real life application -arrange in order or place on number line -use a combination of the various forms of rational numbers including square roots								
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				<p>The roots of a quadratic equation are given by the expression below.</p> $\frac{-25 \pm \sqrt{-100}}{25}$ <p>Which of the following is an equivalent expression?</p> <p>A <math>-1 \pm \frac{2i}{5}</math></p> <p>B <math>-1 \pm 2i</math></p> <p>C <math>-25 \pm \frac{2i}{5}</math></p> <p>D <math>-25 \pm 2i</math></p>		<p>Which numbers from this list are less than <math>-0.94</math>?</p> $-\frac{15}{16}, 0.24, -2.23, 97\%, -2\frac{2}{5}, -0.95$ <p>F <math>-\frac{15}{16}, -2.23,</math> and <math>-0.95</math></p> <p>G <math>-2.23, -2\frac{2}{5},</math> and <math>-0.95</math></p> <p>H <math>0.24, \frac{15}{16},</math> and <math>-0.95</math></p> <p>J <math>-\frac{15}{16}, 0.24,</math> and <math>-2.23</math></p>																				
				<p>What is the solution set for <math>x^2 + 4 = 6x</math>?</p> <p>A <math>\{-3 \pm i\sqrt{14}\}</math></p> <p>B <math>\{-3 \pm \sqrt{5}\}</math></p> <p>C <math>\{3 \pm i\sqrt{14}\}</math></p> <p>D <math>\{3 \pm \sqrt{5}\}</math></p>		<p>There are four students working on an assignment in a class. Mike has completed <math>\frac{1}{9}</math> of the assignment, Gwen has completed 11% of the assignment, Jorge has completed 0.12 of the assignment, and Tai has completed <math>\frac{1}{3}</math> of the assignment. Which of the following lists the students in order from least to greatest by the amount of the assignment they completed?</p> <p>F Gwen, Mike, Jorge, Tai</p> <p>G Tai, Jorge, Mike, Gwen</p> <p>H Gwen, Jorge, Mike, Tai</p> <p>J Tai, Mike, Gwen, Jorge</p>																				
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						<p>The average distance from Earth to the sun is about <math>9.3 \times 10^7</math> miles. The average distance from Mars to the sun is about <math>1.4 \times 10^8</math> miles. When both planets are at their average distance from the sun, how much farther is Mars from the sun than Earth?</p> <p>F 79,000,000 mi</p> <p>G 47,000,000 mi</p> <p>H 107,000,000 mi</p> <p>J 233,000,000 mi</p>																				

Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Fractions)

TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations -the student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation	TEK:	TEK: the student understands that different forms of numbers are appropriate for different situations	TEK: the student represents and uses numbers in a variety of equivalent forms	TEK: the student represents and uses rational numbers in a variety of equivalent forms
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Algebra II	Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>ALGII.2B – (S)</b> use complex numbers to describe the solutions of quadratic equations graphically, tabular, and in real world application <b>ALGII.8B – (S)</b> analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula	SE:	SE: <b>8.1A-(R)</b> compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals <b>8.1B –</b> select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships	SE <b>7.1B-(R)</b> convert between fractions, decimals, whole numbers, and percents mentally, on paper or with a calculator <b>7.2A – (S)</b> represent multiplication and division situations involving fractions and decimals with models, including concrete objects, pictures, words and numbers <b>7.2B – (R)</b> use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals	SE <b>6.1B-(R)</b> generate equivalent forms of rational numbers including whole numbers, fractions, and decimals <b>6.2A – (S)</b> model addition and subtraction situations involving fractions with objects, pictures, words and numbers <b>6.2B – (R)</b> use addition and subtraction to solve problems involving fractions and decimals
Specifics	Specifics	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
		Solving proportions using equivalent fractions		Spiral fractions from 5 <sup>th</sup> grade into the beginning of the year
Rationale	Rationale	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
		-decimals-less than and greater than one, negative and positive -fractions-proper fractions, improper, mixed fractions (like and unlike denominators, positive and negative) -Percents – such as 150%, 33 1/3%, 73.1% -Squares (up to 20) and square roots (up to 400) -use numbers appropriate for real life application -arrange in order or place on number line -use a combination of the various forms of	-fractions – unit fractions, proper fractions, improper, mixed numbers (with like and unlike denominators no larger than 12 without a calculator -include proportions and denominators of 100 to work with %s -connect fraction models to percents (models other than 100) -converting percents is a new concept for 7 <sup>th</sup> grade -introducing using concrete models and tie the algorithm to the model	-Include decimals < and > one -Include fractions such as unit fractions, proper fractions, improper and mixed numbers -Relate concrete models of decimal to fraction conversions / connect to algorithms -Change whole numbers to equivalent improper fractions -Students need to understand / explain that 9/5 is > 1 / < 2; specifically 1 4/5 or 1.8 -Use numbers appropriate for real life application

		rational numbers including square roots	-include numbers greater and less than one -model, record, draw and verbal/written description of the situation -multiplying and dividing fractions is a new concept in 7 <sup>th</sup> grade	-Include changing decimals to fractions / fractions to decimals -using like and unlike denominators 12 or less (w/o technology) -model, record, draw, mathematically describe (verbally/written) and evaluate the situations including proportions used/taken and portions remaining -require students to estimate before computing -add/subtract fractions and mixed numbers with like and unlike denominators 12 or less -connect algorithm to pictorial models -use strategies when adding and subtracting fractions including regrouping mixed numbers and converting to improper fractions -6 <sup>th</sup> grade does not multiply/divide fractions																																													
Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary																																													
		Rational numbers, integers, percents, positive, negative, proportional relationships	Convert, percent, proportions, reciprocal	Equivalent, generate, common denominators																																													
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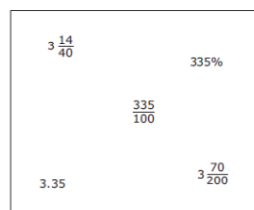
What is the solution set for  $x^2 + 4 = 6x$ ?

- A  $\{-3 \pm i\sqrt{14}\}$   
 B  $\{-3 \pm \sqrt{5}\}$   
 C  $\{3 \pm i\sqrt{14}\}$   
 D  $\{3 \pm \sqrt{5}\}$

There are four students working on an assignment in a class. Mike has completed  $\frac{1}{3}$  of the assignment, Gwen has completed 11% of the assignment, Jorge has completed 0.12 of the assignment, and Tai has completed  $\frac{1}{8}$  of the assignment. Which of the following lists the students in order from least to greatest by the amount of the assignment they completed?

- F Gwen, Mike, Jorge, Tai  
 G Tai, Jorge, Mike, Gwen  
 H Gwen, Jorge, Mike, Tai  
 J Tai, Mike, Gwen, Jorge

The box below contains equivalent values.



Which number is equivalent to the values in the box?

- A  $\frac{67}{20}$   
 B 3.35%  
 C  $6\frac{7}{20}$   
 D 335

Which number is equivalent to  $\frac{13}{2}$ ?

- A 6.1, because  $13 \div 2 = 6$  with a remainder of 1  
 B  $\frac{26}{2}$ , because  $13 \times 2 = 26$ , and  $2 \times 1 = 2$   
 C  $6\frac{1}{2}$ , because  $13 \div 2 = 6$  with a remainder of 1  
 D 6.05, because  $13 \div 2 = 6\frac{1}{2}$ , and  $\frac{1}{2} = 0.05$

A king snake is  $\frac{31}{50}$  m long. What is an equivalent length of this king snake in meters?

- F 0.31 m  
 G  $3\frac{1}{50}$  m  
 H 0.062 m  
 J Not here

The water levels of five Texas lakes were measured on the same day in 2010. The table below shows the number of feet above or below normal level for each lake.

Lake	Number of Feet Above or Below Normal Level
Conroe	0.10
Amistad	-2.65
Richard Chambers	0.16
Possum Kingdom	-1.43
Travis	0.07

Which list shows the numbers in the table from greatest to least?

- F -2.65, -1.43, 0.16, 0.10, 0.07  
 G 0.16, 0.10, 0.07, -1.43, -2.65  
 H 0.16, 0.10, 0.07, -2.65, -1.43  
 J -2.65, -1.43, 0.07, 0.10, 0.16

Which two values are both equivalent to 240%?

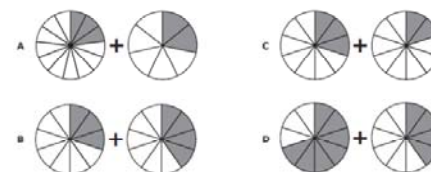
- F 2.4 and  $2\frac{2}{25}$   
 G 2.4 and  $2\frac{2}{5}$   
 H 0.24 and  $2\frac{2}{5}$   
 J 0.24 and  $2\frac{2}{25}$

Mr. Stein is purchasing 2.25 pounds of meat that costs \$2.80 per pound. How much change should Mr. Stein receive if he gives the cashier \$20.00?

- F \$6.30  
 G \$13.70  
 H \$14.95  
 J \$2.52

Which model is shaded to best represent the expression below?

$$\frac{3}{10} + \frac{2}{5}$$



Mia is  $2\frac{1}{2}$  years older than Chloe. Allen is  $\frac{1}{2}$  years younger than Chloe. Mia is 12 years old. What is Allen's age?

- F  $14\frac{1}{2}$  years  
 G 3 years  
 H 8 years  
 J  $10\frac{1}{2}$  years

Mr. Atkinson has  $\frac{1}{4}$  lb of dry fish food. He will put an equal amount of food into 3 containers. How much fish food will be in each container?

- A  $\frac{2}{3}$  lb  
 B  $1\frac{3}{4}$  lb  
 C  $2\frac{1}{4}$  lb  
 D  $8\frac{3}{4}$  lb

Maria bought 8 cups of strawberries. She used  $1\frac{1}{2}$  cups of the strawberries to make a salad and  $3\frac{3}{8}$  cups of the strawberries to make a pie. She needs 4 cups of strawberries to make milk shakes. Does Maria have enough strawberries left to make the milk shakes?

- A No, because  $8 - (1\frac{1}{2} + 3\frac{3}{8}) = 3\frac{1}{8}$ , and  $3\frac{1}{8} < 4$   
 B Yes, because  $8 - 3\frac{3}{8} = 4\frac{5}{8}$ , and  $4\frac{5}{8} > 4$   
 C No, because  $(8 - 3\frac{3}{8}) - 4 = \frac{5}{8}$ , and  $\frac{5}{8} < 4$   
 D Yes, because  $8 + 3\frac{3}{8} + 1\frac{1}{2} = 12\frac{7}{8}$ , and  $12\frac{7}{8} > 4$

Scott was  $61\frac{3}{8}$  inches tall when he started seventh grade and  $65\frac{1}{4}$  inches tall when he started eighth grade. How many inches did he grow during this time?

- A  $2\frac{5}{8}$  in.  
 B  $3\frac{3}{4}$  in.  
 C  $2\frac{1}{2}$  in.  
 D  $1\frac{7}{8}$  in.

Mr. Lee mailed 3 packages. The greatest amount he paid to mail one of these packages was \$3.60. The least amount he paid to mail one of these packages was \$1.70. What could be the total amount Mr. Lee paid to mail the 3 packages?

- A \$8.30  
 B \$11.50  
 C \$5.10  
 D \$10.80

Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Fractions)

TEK: the student represents and uses rational numbers in a variety of equivalent forms	TEK: the student uses fractions in problem-solving situations	TEK: the student describes and compares fractional parts of whole objects or sets of objects	TEK: the student uses fraction names and symbols (with denominators of 12 or less) to describe fractional parts of whole objects or sets of objects
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
<p>SE <b>6.1B-(R)</b> generate equivalent forms of rational numbers including whole numbers, fractions, and decimals <b>6.2A – (S)</b> model addition and subtraction situations involving fractions with objects, pictures, words and numbers <b>6.2B – (R)</b> use addition and subtraction to solve problems involving fractions and decimals</p>	<p>SE <b>5.2A – (R)</b> generate a fraction equivalent to a given fraction such as <math>\frac{1}{2}</math> and <math>\frac{3}{6}</math> or <math>\frac{4}{12}</math> and <math>\frac{1}{3}</math> <b>5.2B – (S)</b> generate a mixed number equivalent to a given improper fraction or generate an improper fraction equivalent to a given mixed number <b>5.2C – (R)</b> compare two fractional quantities in problem-solving situations using a variety of methods, including common denominators <b>5.2D – (S)</b> use models to relate decimals to fractions that name tenths, hundredths, and thousandths <b>5.3E – (S)</b> model situations using addition &amp; subtraction involving fractions with like denominators using concrete objects, pictures, word, and numbers</p>	<p>SE <b>4.2A – (S)</b> use concrete objects and pictorial models to generate equivalent fractions <b>4.2B – (S)</b> model fraction quantities greater than one using concrete objects and pictorial models <b>4.2C – (S)</b> compare and order fractions using concrete objects and pictorial models <b>4.2D – (R)</b> relate decimals to fractions that name tenths and hundredths using concrete objects and pictorial models</p>	<p>SE <b>3.2A –</b> construct concrete models of fractions <b>3.2B –</b> compare fractional parts of whole objects or set of objects in a problem situation using concrete models <b>3.2C – (R)</b> use fraction names and symbols to describe fractional parts of whole objects or sets of objects <b>3.2D –</b> construct concrete models of equivalent fractions for fractional parts of whole objects</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Spiral fractions from 5 <sup>th</sup> grade into the beginning of the year	Spiral fractions from 4 <sup>th</sup> grade into the beginning of the year	Always relate fractions back to is it closer to $\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , etc. when comparing fractions Compare fractional parts Relate fractions to decimals	Always relate fractions back to is it closer to $\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , etc. when comparing fractions Label number lines with $0/4$ , $1/4$ , $2/4$ ( $1/2$ ), $3/4$ , $4/4$ $\frac{1}{2}$ - the line is called the division bar
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
<ul style="list-style-type: none"> <li>-Include decimals &lt; and &gt; one</li> <li>-Include fractions such as unit fractions, proper fractions, improper and mixed numbers</li> <li>-Relate concrete models of decimal to fraction conversions / connect to algorithms</li> <li>-Change whole numbers to equivalent improper fractions</li> <li>-Students need to understand / explain that <math>9/5</math> is <math>&gt; 1 / &lt; 2</math>; specifically <math>1 \frac{4}{5}</math> or 1.8</li> <li>-Use numbers appropriate for real life</li> </ul>	<ul style="list-style-type: none"> <li>-generate a pattern of concrete fractions</li> <li>-students should explain the relationship between the concrete patterns</li> <li>-students should record the abstract fractions after the relationship is understand</li> <li>-solve problems/compare pairs of fractions and recognize simplified fractions</li> <li>-recognize fractions equal to, less than, and greater than one whole</li> <li>-Include parts of a whole and sets of objects</li> <li>-journals will assist in making the connection</li> </ul>	<ul style="list-style-type: none"> <li>-students generate a pattern of concrete fractions</li> <li>-explain the relationship between the concrete patterns</li> <li>-record the abstract fractions after the relationship is understood</li> <li>-solve problems/compare pairs of fractions and recognize equivalent fractions in simplest form</li> <li>-use non-examples</li> <li>-students need to relate the pictorial model to the abstract number</li> </ul>	<ul style="list-style-type: none"> <li>-include halves, thirds, fourths, fifths, sixths, eighths, tenths, twelfths-</li> <li>-students must draw pictures of the models they construct and write the fraction symbol of the drawing</li> <li>-“constructing” fractions is a new concept...in previous grades, fractions have been pre-constructed</li> <li>-the fraction symbol is new to 3<sup>rd</sup> grade</li> <li>-compare fractions using the terminology and</li> </ul>

<p>application -Include changing decimals to fractions / fractions to decimals -using like and unlike denominators 12 or less (w/o technology) -model, record, draw, mathematically describe (verbally/written) and evaluate the situations including proportions used/taken and portions remaining -require students to estimate before computing -add/subtract fractions &amp; mixed numbers with like &amp; unlike denominators 12 or less -connect algorithm to pictorial models -use strategies when adding and subtracting fractions including regrouping mixed numbers and converting to improper fractions -6<sup>th</sup> grade does not multiply or divide fractions</p>	<p>between the manipulatives, pictures, and numbers -students develop their own process to convert between forms of fractions by working with models -use pictorial representations and list equivalent fractions -include problem-solving situations -do not teach 'cross products' for checking equivalent fractions -students understand the value of 1/1000 is the same as 0.001 -solve problems such as a picture may show ½ shaded and the answer may be 0.5 in the decimal form -pictorial representations of a 10<sup>th</sup> of a circle and a 10<sup>th</sup> of a 100ths grid show equivalence</p>	<p>-in the representation of one whole (one whole circle) the shaded fractional divisions do not have to be adjacent -recognize objects greater than one concretely and pictorially -improper fractions/mixed numbers -students must build concrete models and draw the pictorial representations. -teach 'simplify' fractions...'reduce' fractions indicates the value is changed -fractions =, &lt; and &gt; one whole -compare 2 fractions w/symbols -Recognize simplest forms of fractions -relating fractions to decimals -record models and pictures -students should demonstrate 1/10 is the same value as 0.1 and 1/100, 0.01 -decimals are introduced in 4<sup>th</sup></p>	<p>symbols; equal to, less than, and greater than -students need to work with circles, rectangles, sets, and multiple examples in solving problems using models. -numerator and denominator -fractions written as two-thirds, 2/3, and 2 out of 3 -sets of objects as well as a picture of a bar in which 1/3 is shaded -students must connect the concrete (manipulatives) to the pictorial to the abstract (numbers) -Equivalent fractions are introduced in 3<sup>rd</sup> grade -Students build models and compare arrangements -emphasis on equivalent fractions is essential for success in working with fractions</p>																																																								
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Each of three students wrote an equation.

- Nikole wrote  $5\frac{2}{8} = \frac{21}{4}$ .
- Erik wrote  $5.14 = \frac{21}{4}$ .
- Keisha wrote  $4\frac{1}{5} = \frac{21}{4}$ .

Which of these students wrote an equation that is true?

- F Nikole only
- G Nikole and Erik only
- H Keisha only
- J Nikole, Erik, and Keisha

Kwan has a garden. If  $\frac{7}{10}$  of the plants in his garden are daisies, which statement could be true?

- A Out of a total of 7 plants, 1 plant is a daisy.
- B Out of a total of 50 plants, 7 plants are daisies.
- C Out of a total of 35 plants, 15 plants are daisies.
- D Out of a total of 50 plants, 35 plants are daisies.

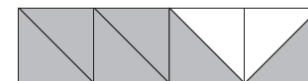
The model below is shaded to represent a fraction greater than 1.



Which fraction is represented by the model?

- F  $\frac{9}{4}$ , because 9 sections are shaded and each figure is divided into 4 equal sections
- G  $\frac{9}{3}$ , because there are 3 figures and 9 sections are shaded
- H  $\frac{9}{12}$ , because 9 sections are shaded and there are a total of 12 sections
- J  $\frac{9}{2}$ , because 9 sections are shaded and 2 figures are completely shaded

Indira shaded part of a figure, as shown below.



What fraction of the figure is shaded?

- F  $\frac{2}{6}$
- G  $\frac{2}{8}$
- H  $\frac{6}{8}$
- J  $\frac{1}{6}$

Which number is equivalent to  $\frac{13}{2}$ ?

- A 6.1, because  $13 \div 2 = 6$  with a remainder of 1
- B  $\frac{26}{2}$ , because  $13 \times 2 = 26$ , and  $2 \times 1 = 2$
- C  $6\frac{1}{2}$ , because  $13 \div 2 = 6$  with a remainder of 1
- D 6.05, because  $13 \div 2 = 6\frac{1}{2}$ , and  $\frac{1}{2} = 0.05$

Antonia colored 36 of the 60 pictures in her coloring book. Which fraction is **NOT** equivalent to the fraction of pictures Antonia colored?

- A  $\frac{6}{10}$
- B  $\frac{3}{5}$
- C  $\frac{8}{20}$
- D  $\frac{18}{30}$

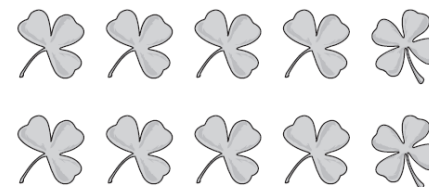
The models below are shaded to represent two different fractions.



Which statement is true?

- F  $\frac{3}{7} > \frac{7}{12}$
- G  $\frac{3}{4} < \frac{7}{12}$
- H  $\frac{3}{7} < \frac{7}{12}$
- J  $\frac{4}{7} > \frac{5}{7}$

Rochelle has clovers with different numbers of leaves, as shown below.



What part of this group of clovers has exactly three leaves?

- A 2 out of 10
- B 1 out of 8
- C 2 out of 8
- D 8 out of 10

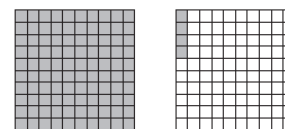
A king snake is  $\frac{31}{50}$  m long. What is an equivalent length of this king snake in meters?

- F 0.31 m
- G  $3\frac{1}{50}$  m
- H 0.062 m
- J Not here

Scott completed  $\frac{4}{6}$  of a project on Saturday. Which fraction is equivalent to  $\frac{4}{6}$ ?

- A  $\frac{16}{24}$
- B  $\frac{8}{18}$
- C  $\frac{16}{18}$
- D  $\frac{20}{24}$

The model below is shaded to represent  $1\frac{4}{100}$ .



Which decimal does the model represent?

- F 1.04
- G 1.4
- H 14.0
- J 1.004

Mr. Lee mailed 3 packages. The greatest amount he paid to mail one of these packages was \$3.60. The least amount he paid to mail one of these packages was \$1.70. What could be the total amount Mr. Lee paid to mail the 3 packages?

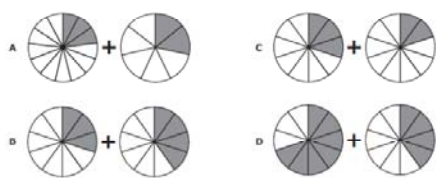
- A \$8.30
- B \$11.50
- C \$5.10
- D \$10.80

Every day a zookeeper feeds 4 adult gorillas a total of 160 lb of food. At this rate, how many pounds of food would the zookeeper need every day to feed 6 adult gorillas?

- A 40 lb
- B 320 lb
- C 240 lb
- D 80 lb

Which model is shaded to best represent the expression below?

$$\frac{3}{10} + \frac{2}{5}$$



Edna completed  $4\frac{2}{3}$  puzzles. Which improper fraction is equivalent to the number of puzzles Edna completed?

F  $\frac{9}{3}$

G  $\frac{14}{3}$

H  $\frac{10}{3}$

J  $\frac{24}{3}$

Mia is  $2\frac{1}{2}$  years older than Chloe. Allen is  $6\frac{1}{2}$  years younger than Chloe. Mia is 12 years old. What is Allen's age?

F  $14\frac{1}{2}$  years

G 3 years

H 8 years

J  $18\frac{1}{2}$  years

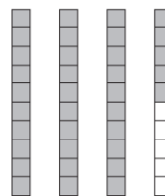
The list below shows the rate at which Riley burned calories by doing different activities last week.

- Playing basketball: burned 11 calories per minute
- Jogging: burned 9 calories per minute
- Swimming: burned a total of 600 calories in 2 hours

Riley did each of these activities for 2 hours last week. Based on the information in the list, which statement is true?

- A He burned 1,200 calories per hour while swimming, because  $600 \times 2 = 1,200$ .
- B He burned a total of 3,000 calories, because  $(11 \times 120) + (9 \times 120) + 600 = 3,000$ .
- C He burned 1,080 calories per hour while jogging, because  $9 \times 120 = 1,080$ .
- D He burned a total of 74,400 calories, because  $(11 \times 120) + (9 \times 120) + (600 \times 120) = 74,400$ .

The model below is shaded to represent a number greater than 1.



Which fraction and decimal represent this number?

A  $\frac{35}{100}$  and 0.35

B  $3\frac{5}{10}$  and 3.5

C  $3\frac{5}{100}$  and 3.5

D  $3\frac{5}{10}$  and 3.05


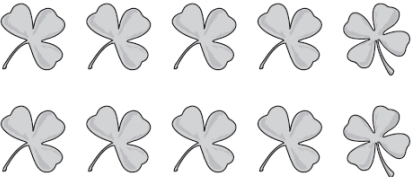


Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Fractions)

TEK: the student uses fraction names and symbols (with denominators of 12 or less) to describe fractional parts of whole objects or sets of objects	TEK: the student describes how fractions are used to name parts of whole objects or sets of objects	TEK: the student uses pairs of whole numbers to describe fractional parts of whole objects or sets of objects	TEK: the student recognizes that there are quantities less than a whole
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3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
<p>SE</p> <p><b>3.2A</b> – construct concrete models of fractions</p> <p><b>3.2B</b> – compare fractional parts of whole objects or set of objects in a problem situation using concrete models</p> <p><b>3.2C</b> – <b>(R)</b>use fraction names and symbols to describe fractional parts of whole objects or sets of objects</p> <p><b>3.2D</b> – construct concrete models of equivalent fractions for fractional parts of whole objects</p>	<p>SE</p> <p><b>2.2A</b> – <b>(S)</b>use concrete models to represent and name fractional parts of a whole object (with denominators of twelve or less)</p> <p><b>2.2B</b> – <b>(S)</b>use concrete models to represent and name fractional parts of a set of objects (with denominators of 12 or less)</p> <p><b>2.2C</b> – <b>(S)</b>use concrete models to determine if a fractional part of a whole is closer to 0, <math>\frac{1}{2}</math>, or 1</p>	<p>SE</p> <p><b>1.2A</b> – <b>(S)</b>separate a whole into two, three, or four equal parts and use appropriate language to describe the parts such as three out of four equal</p> <p><b>1.2B</b> – <b>(R)</b>use appropriate language to describe part of a set such as three out of eight crayons are red</p>	<p>SE</p> <p><b>K.3A</b>–<b>(S)</b>share a whole by separating it into two equal parts</p> <p><b>K.3B</b> – <b>(R)</b>explain why a given part is half of the whole</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics
<p>Always relate fractions back to is it closer to <math>\frac{1}{4}</math>, <math>\frac{1}{2}</math>, <math>\frac{3}{4}</math>, etc. when comparing fractions</p> <p><math>\frac{1}{2}</math> - the line is called the division bar</p>	<p>Closer to 0, <math>\frac{1}{2}</math>, or 1 on Number Line</p> <p>Part/Whole</p> <p>Fraction Man</p> <p>Continue the vocabulary of ‘fair shares’ from Kinder</p> <p><math>\frac{1}{2}</math> - the line is called the division bar</p> <p>Fractional parts of whole objects and sets</p>	<p>Continue the vocabulary of ‘fair shares’ from Kinder</p> <p><math>\frac{1}{2}</math> - the line is called the division bar</p> <p>Fractional parts of whole objects and sets</p>	<p><math>\frac{1}{2}</math> - the line is called the division bar</p> <p>Always begin with a ‘whole’</p> <p>Fractional parts of whole objects and sets</p>
<p>Rationale (clarification of TEKS/SE)</p> <p>Label number lines with 0/4, 1/4, 2/4 (1/2), 3/4, 4/4</p>	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
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<p>-Equivalent fractions are introduced in 3<sup>rd</sup> grade</p> <p>-Students build models and compare arrangements</p> <p>-emphasis on equivalent fractions is essential for success in working with fractions</p>	<p>-example – using circular fractional pieces – give 4 one fifth pieces to students and have them compare to the representation of 0 circle, one half circle and one whole circle</p> <p>-avoid representations that are too close to <math>\frac{1}{4}</math> or <math>\frac{3}{4}</math></p>	blue									
Vocabulary	Vocabulary	Vocabulary	Vocabulary								
<p>Fraction, numerator, denominator, halves, thirds, fourths, fifths, sixths, eighths, tenths, twelfths, fraction bar, division bar, equivalent, sets</p>	<p>Fraction, part, whole, sets, closer to, equal parts, out of, halves, fourths, thirds, eighths</p>	<p>Part, whole, fair shares, out of, halves, thirds, fourths, fraction</p>	<p>Part, whole, fair shares</p>								
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<p>Indira shaded part of a figure, as shown below.</p>  <p>What fraction of the figure is shaded?</p> <p><b>F</b> <math>\frac{2}{6}</math></p> <p><b>G</b> <math>\frac{2}{8}</math></p> <p><b>H</b> <math>\frac{6}{8}</math></p> <p><b>J</b> <math>\frac{1}{6}</math></p>											
<p>Rochelle has clovers with different numbers of leaves, as shown below.</p>  <p>What part of this group of clovers has exactly three leaves?</p> <p><b>A</b> 2 out of 10</p> <p><b>B</b> 1 out of 8</p> <p><b>C</b> 2 out of 8</p> <p><b>D</b> 8 out of 10</p>											

Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Decimals)

TEK:	TEK:	TEK:	TEK:	TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations -the student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation	TEK:	TEK: the student understands that different forms of numbers are appropriate for different situations
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade
SE:	SE:	SE:	SE:	SE: <b>ALGII.2B – (S)</b> use complex numbers to describe the solutions of quadratic equations graphically, tabular, and in real world application <b>ALGII.8B – (S)</b> analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula	SE:	SE: <b>8.1A – (R)</b> compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals <b>8.1B – (S)</b> select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships
Specifics	Specifics	Specifics	Specifics	Specifics (description of lesson, include any “tricks”)	Specifics	Specifics (description of lesson, include any “tricks”)
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				The roots of a quadratic equation are given by the expression below. $\frac{-25 \pm \sqrt{-100}}{25}$ Which of the following is an equivalent expression? <p>A <math>-1 \pm \frac{2i}{5}</math></p> <p>B <math>-1 \pm 2i</math></p> <p>C <math>-25 \pm \frac{2i}{5}</math></p> <p>D <math>-25 \pm 2i</math></p>		Which numbers from this list are less than $-0.94$ ? $-\frac{15}{16}, 0.24, -2.23, 97\%, -2\frac{2}{5}, -0.95$ <p>F <math>-\frac{15}{16}, -2.23,</math> and <math>-0.95</math></p> <p>G <math>-2.23, -2\frac{2}{5},</math> and <math>-0.95</math></p> <p>H <math>0.24, -\frac{15}{16},</math> and <math>-0.95</math></p> <p>J <math>-\frac{15}{16}, 0.24,</math> and <math>-2.23</math></p>																								
				What is the solution set for $x^2 + 4 = 6x$ ? <p>A <math>\{-3 \pm i\sqrt{14}\}</math></p> <p>B <math>\{-3 \pm \sqrt{5}\}</math></p> <p>C <math>\{3 \pm i\sqrt{14}\}</math></p> <p>D <math>\{3 \pm \sqrt{5}\}</math></p>		There are four students working on an assignment in a class. Mike has completed $\frac{1}{9}$ of the assignment, Gwen has completed 11% of the assignment, Jorge has completed 0.12 of the assignment, and Tai has completed $\frac{1}{8}$ of the assignment. Which of the following lists the students in order from least to greatest by the amount of the assignment they completed? <p>F Gwen, Mike, Jorge, Tai</p> <p>G Tai, Jorge, Mike, Gwen</p> <p>H Gwen, Jorge, Mike, Tai</p> <p>J Tai, Mike, Gwen, Jorge</p>																								
						The water levels of five Texas lakes were measured on the same day in 2010. The table below shows the number of feet above or below normal level for each lake. <table border="1"> <thead> <tr> <th colspan="2">Water Levels of Texas Lakes</th> </tr> <tr> <th>Lake</th> <th>Number of Feet Above or Below Normal Level</th> </tr> </thead> <tbody> <tr> <td>Comroe</td> <td>0.10</td> </tr> <tr> <td>Amistad</td> <td>-2.65</td> </tr> <tr> <td>Richland Chambers</td> <td>0.16</td> </tr> <tr> <td>Possum Kingdom</td> <td>-1.43</td> </tr> <tr> <td>Travis</td> <td>0.07</td> </tr> </tbody> </table> Which list shows the numbers in the table from greatest to least? <p>F <math>-2.65, -1.43, 0.16, 0.10, 0.07</math></p> <p>G <math>0.16, 0.10, 0.07, -1.43, -2.65</math></p> <p>H <math>0.16, 0.10, 0.07, -2.65, -1.43</math></p> <p>J <math>-2.65, -1.43, 0.07, 0.10, 0.16</math></p>	Water Levels of Texas Lakes		Lake	Number of Feet Above or Below Normal Level	Comroe	0.10	Amistad	-2.65	Richland Chambers	0.16	Possum Kingdom	-1.43	Travis	0.07										
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						To make 6 glasses of lemonade, Karla uses $\frac{1}{2}$ cup of sugar, $\frac{1}{2}$ cup of lemon juice, and $\frac{5}{2}$ cups of water. If Karla wants to make 10 glasses of lemonade, which proportion can she use to determine how many cups of water, $w$ , she will need? <p>F <math>\frac{6.5}{6} = \frac{10}{w}</math></p> <p>G <math>\frac{6}{6.5} = \frac{10}{w}</math></p> <p>H <math>\frac{10}{5.5} = \frac{6}{w}</math></p> <p>J <math>\frac{6}{5.5} = \frac{10}{w}</math></p>																								

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Algebra II	Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>ALGII.2B – (S)</b> use complex numbers to describe the solutions of quadratic equations graphically, tabular, and in real world application <b>ALGII.8B – (S)</b> analyze and interpret the solutions of quadratic equations using discriminants and solve quadratic equations using the quadratic formula	SE:	SE: <b>8.1A – (R)</b> compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals <b>8.1B – (S)</b> select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships	SE <b>7.1A – (S)</b> compare and order integers and positive rational numbers <b>7.1B – (R)</b> convert between fractions, decimals, whole numbers, and percents mentally, on paper, or with a calculator <b>7.2A – (S)</b> represent multiplication and division situations involving fractions and decimals with models, including concrete objects, pictured, words, and numbers <b>7.2B – (R)</b> use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals <b>7.2C – (S)</b> use models, such as concrete objects, pictorial models, and number lines, to add, subtract, multiply, and divide integers and connect the actions to algorithms	SE <b>6.1A – (S)</b> compare and order non-negative rational numbers <b>6.1B – (R)</b> generate equivalent forms of rational numbers including whole numbers, fractions, and decimals <b>6.1C – (S)</b> use integers to represent real-life situations <b>6.2B – (R)</b> use addition and subtraction to solve problems involving fractions and decimals <b>6.3B – (S)</b> represent ratios and percents with concrete models, fractions, and decimals
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		<p>400)</p> <ul style="list-style-type: none"> <li>-use numbers appropriate for real life application</li> <li>-arrange in order or place on number line</li> <li>-use a combination of the various forms of rational numbers including square roots</li> <li>-work should be shown in an organized format that reflects student's thinking and understanding</li> <li>-connect verbal, numeric, graphic, and symbolic representations of relationships</li> <li>-given a problem situation students explain which operation to use and support the choice with information from the problem situation</li> <li>-use problem situations and include fractions, decimals, percents, and integers</li> </ul>	<p>and vertical)</p> <ul style="list-style-type: none"> <li>-use numbers appropriate for real life application</li> <li>-comparing negative integers is introduced in 7<sup>th</sup> grade</li> <li>-percent in decimal forms &lt; or &gt; one hundred</li> <li>-include proportions and denominators of 100 to work with %s</li> <li>-connect fraction models to percents (models other than 100)</li> <li>-converting percents is a new concept for 7<sup>th</sup> grade</li> <li>-multiplying and dividing decimals and fractions are introduced in 7<sup>th</sup> grade</li> <li>-model operations using various objects including: number line, two color counters, color tiles, include positive and negative signs</li> </ul>	<p>9/5 is &gt; 1 / &lt; 2; specifically 1 4/5 or 1.8</p> <ul style="list-style-type: none"> <li>-Use numbers appropriate for real life application</li> <li>-Include changing decimals to fractions / fractions to decimals</li> <li>-use examples such as temperature, loss /gain, above/below sea-level, up/down elevations, deposit/withdrawal</li> <li>-write number sentences that connects to problem situation</li> <li>-integer: any whole number and its opposite (this does not include fractions/ decimals)</li> <li>-require students to estimate before computing</li> <li>-focus on the equivalent and proportional relationships</li> <li>-use decimals less than and greater than one</li> </ul>																																																																
Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary																																																																
		Rational numbers, integers, percents, positive, negative, proportional relationships	Integers, rational numbers, percents, algorithms, positive, negative, proportions	Rational number, equivalent form, integers, ratios, percents, repeating decimal, repeat bar, terminating decimal																																																																
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What is the solution set for  $x^2 + 4 = 6x$ ?

- A  $\{-3 \pm i\sqrt{14}\}$   
 B  $\{-3 \pm \sqrt{5}\}$   
 C  $\{3 \pm i\sqrt{14}\}$   
 D  $\{3 \pm \sqrt{5}\}$

There are four students working on an assignment in a class. Mike has completed  $\frac{1}{9}$  of the assignment, Gwen has completed 11% of the assignment, Jorge has completed 0.12 of the assignment, and Tai has completed  $\frac{1}{8}$  of the assignment. Which of the following lists the students in order from least to greatest by the amount of the assignment they completed?

- F Gwen, Mike, Jorge, Tai  
 G Tai, Jorge, Mike, Gwen  
 H Gwen, Jorge, Mike, Tai  
 J Tai, Mike, Gwen, Jorge

A sports drink contains 8% fruit juice. How is this percent written as a decimal?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Each of three students wrote an equation.

- Nikole wrote  $5\frac{2}{8} = \frac{21}{4}$ .
- Erik wrote  $5.14 = \frac{21}{4}$ .
- Keisha wrote  $4\frac{1}{5} = \frac{21}{4}$ .

Which of these students wrote an equation that is true?

- F Nikole only  
 G Nikole and Erik only  
 H Keisha only  
 J Nikole, Erik, and Keisha

The water levels of five Texas lakes were measured on the same day in 2010. The table below shows the number of feet above or below normal level for each lake.

Water Levels of Texas Lakes	
Lake	Number of Feet Above or Below Normal Level
Conroe	0.10
Amistad	-2.65
Richland Chambers	0.16
Possum Kingdom	-1.43
Trevi	0.07

Which list shows the numbers in the table from greatest to least?

- F -2.65, -1.43, 0.16, 0.10, 0.07  
 G 0.16, 0.10, 0.07, -1.43, -2.65  
 H 0.16, 0.10, 0.07, -2.65, -1.43  
 J -2.65, -1.43, 0.07, 0.10, 0.16

The box below contains equivalent values.

$3\frac{14}{40}$	335%
$\frac{335}{100}$	
3.35	$3\frac{70}{200}$

Which number is equivalent to the values in the box?

- A  $\frac{67}{20}$   
 B 3.35%  
 C  $6\frac{7}{20}$   
 D 335

Which number is equivalent to  $\frac{13}{2}$ ?

- A 6.1, because  $13 \div 2 = 6$  with a remainder of 1  
 B  $\frac{26}{2}$ , because  $13 \times 2 = 26$ , and  $2 \times 1 = 2$   
 C  $6\frac{1}{2}$ , because  $13 \div 2 = 6$  with a remainder of 1  
 D 6.05, because  $13 \div 2 = 6\frac{1}{2}$ , and  $\frac{1}{2} = 0.05$

A king snake is  $\frac{31}{50}$  m long. What is an equivalent length of this king snake in meters?

- F 0.31 m  
 G  $3\frac{1}{50}$  m  
 H 0.062 m  
 J Not here

To make 6 glasses of lemonade, Karla uses  $\frac{1}{2}$  cup of sugar,  $\frac{1}{2}$  cup of lemon juice, and  $5\frac{1}{2}$  cups of water. If Karla wants to make 10 glasses of lemonade, which proportion can she use to determine how many cups of water,  $w$ , she will need?

- F  $\frac{6.5}{6} = \frac{10}{w}$   
 G  $\frac{6}{6.5} = \frac{10}{w}$   
 H  $\frac{10}{5.5} = \frac{6}{w}$   
 J  $\frac{6}{5.5} = \frac{10}{w}$

Which two values are both equivalent to 240%?

- F 2.4 and  $2\frac{2}{25}$   
 G 2.4 and  $2\frac{2}{5}$   
 H 0.24 and  $2\frac{2}{5}$   
 J 0.24 and  $2\frac{2}{25}$

At 8:00 a.m., 26 children were at a day care. By 3:00 p.m., 12 of these children were no longer at the day care. Which integer best represents the change in the number of children at the day care from 8:00 a.m. to 3:00 p.m.?

- F +26  
 G +12  
 H -26  
 J -12

Mia is  $2\frac{1}{2}$  years older than Chloe. Allen is  $6\frac{1}{2}$  years younger than Chloe. Mia is 12 years old. What is Allen's age?

- F  $14\frac{1}{2}$  years  
 G 3 years  
 H 8 years  
 J  $18\frac{1}{2}$  years

Mr. Stein is purchasing 2.25 pounds of meat that costs \$2.80 per pound. How much change should Mr. Stein receive if he gives the cashier \$20.00?

- F \$6.30  
 G \$13.70  
 H \$14.95  
 J \$2.52

Mr. Lee mailed 3 packages. The greatest amount he paid to mail one of these packages was \$3.60. The least amount he paid to mail one of these packages was \$1.70. What could be the total amount Mr. Lee paid to mail the 3 packages?

- A \$8.30  
 B \$11.50  
 C \$5.10  
 D \$10.80

			<p>Mr. Atkinson has <math>5\frac{1}{4}</math> lb of dry fish food. He will put an equal amount of food into 3 containers. How much fish food will be in each container?</p> <p>A <math>1\frac{2}{3}</math> lb</p> <p>B <math>1\frac{3}{4}</math> lb</p> <p>C <math>2\frac{1}{4}</math> lb</p> <p>D <math>8\frac{3}{4}</math> lb</p>	<p>Maria bought 8 cups of strawberries. She used <math>1\frac{1}{2}</math> cups of the strawberries to make a salad and <math>3\frac{3}{8}</math> cups of the strawberries to make a pie. She needs 4 cups of strawberries to make milk shakes. Does Maria have enough strawberries left to make the milk shakes?</p> <p>A No, because <math>8 - (3\frac{3}{8} + 1\frac{1}{2}) = 3\frac{1}{8}</math> and <math>3\frac{1}{8} &lt; 4</math></p> <p>B Yes, because <math>8 - 3\frac{3}{8} = 4\frac{5}{8}</math>, and <math>4\frac{5}{8} &gt; 4</math></p> <p>C No, because <math>(8 - 3\frac{3}{8}) - 4 = \frac{5}{8}</math>, and <math>\frac{5}{8} &lt; 4</math></p> <p>D Yes, because <math>8 + 3\frac{3}{8} + 1\frac{1}{2} = 12\frac{7}{8}</math>, and <math>12\frac{7}{8} &gt; 4</math></p>
			<p>Scott was <math>63\frac{3}{8}</math> inches tall when he started seventh grade and <math>65\frac{1}{4}</math> inches tall when he started eighth grade. How many inches did he grow during this time?</p> <p>A <math>\frac{5}{8}</math> in.</p> <p>B <math>1\frac{3}{4}</math> in.</p> <p>C <math>2\frac{1}{2}</math> in.</p> <p>D <math>1\frac{7}{8}</math> in.</p>	<p>The students in a science class spent 85% of their class period performing an experiment. What decimal is equivalent to 85%?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>

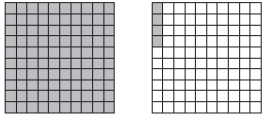
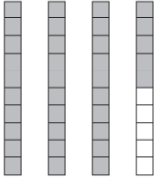


Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Decimals)

TEK: the student represents and uses rational numbers in a variety of equivalent forms	TEK: the student uses place value to represent whole numbers and decimals	TEK: the student uses place value to represent whole number and decimals	TEK: the student uses place value to communicate about increasingly large numbers in verbal and written form, including money
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
<p>SE</p> <p><b>6.1A – (S)</b> compare and order non-negative rational numbers</p> <p><b>6.1B – (R)</b> generate equivalent forms of rational numbers including whole numbers, fractions, and decimals</p> <p><b>6.1C – (S)</b> use integers to represent real-life situations</p> <p><b>6.2B – (R)</b> use addition and subtraction to solve problems involving fractions and decimals</p> <p><b>6.3B – (S)</b> represent ratios and percents with concrete models, fractions, and decimals</p>	<p>SE</p> <p><b>5.1B – (S)</b> use place value to read, write, compare, and order decimals through the thousandths place</p> <p><b>5.2D – (S)</b> use models to relate decimals to fractions that name tenths, hundredths, and thousandths</p> <p><b>5.3A – (R)</b> use addition and subtraction to solve problems involving whole numbers and decimals</p>	<p>SE</p> <p><b>4.1B – (R)</b> use place value to read, write, compare, and order decimals involving tenths and hundredths, including money, using concrete objects and pictorial models</p> <p><b>4.2D – (R)</b> relate decimals to fractions that name tenths and hundredths using concrete objects and pictorial models</p> <p><b>4.3B – (S)</b> add and subtract decimals to the hundredths place using concrete objects and pictorial models</p>	<p>SE</p> <p><b>(COINS)</b></p> <p><b>3.1C – (S)</b> determine the value of a collection of coins and bills</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
		Decimal means “and”	Decimal means “and”
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
<ul style="list-style-type: none"> <li>Include decimals <math>&lt;/ &gt;</math> one</li> <li>-Include fractions such as unit fractions, proper fractions, improper and mixed numbers</li> <li>-Relate concrete models of decimal to fraction conversions / connect to algorithms</li> <li>-Students need to understand / explain that <math>9/5</math> is <math>&gt; 1 / &lt; 2</math>; specifically <math>1\ 4/5</math> or <math>1.8</math></li> <li>-Use numbers appropriate for real life application</li> <li>-Include changing decimals to fractions / fractions to decimals</li> <li>-use examples such as temperature, loss /gain, above/below sea-level, up/down elevations, deposit/withdrawal</li> <li>-write number sentences that connects to problem situation</li> <li>-integer: any whole number and its opposite (this does not include fractions/ decimals)</li> <li>-require students to estimate before computing</li> <li>-focus on the equivalent and proportional relationships</li> <li>-use decimals less than and greater than one</li> </ul>	<ul style="list-style-type: none"> <li>-Included non-examples</li> <li>-Compare and order groups of decimal numbers using numbers in a table and number lines</li> <li>-thousandths place is introduced in 5<sup>th</sup> grade</li> <li>-use place and value</li> <li>-symbols such as <math>1/1000</math>, <math>0.001</math></li> <li>-students understand the value of <math>1/1000</math> is the same as <math>0.001</math></li> <li>-solve problems such as a picture may show <math>\frac{1}{2}</math> shaded and the answer may be <math>0.5</math></li> <li>-pictorial representations of <math>10^{\text{th}}</math> of a circle and a <math>10^{\text{th}}</math> of a 100ths grid show equivalency</li> <li>-students should write the process of solving problems</li> <li>-apply addition and subtraction concepts to decimals</li> </ul>	<ul style="list-style-type: none"> <li>-tables that include data in various orders</li> <li>-use number lines/money/concrete and pictorial models</li> <li>-include equivalent decimals <math>0.1=0.10</math></li> <li>-compare a variety of whole numbers from 999,999,999 to numbers as small as hundredths</li> <li>-decimals are introduced in 4<sup>th</sup> grade</li> <li>-relating fractions to decimals</li> <li>-record models and pictures</li> <li>-students should demonstrate <math>1/10</math> is the same value as <math>0.1</math> and <math>1/100</math>, <math>0.01</math></li> <li>-students must build concrete objects, draw pictorial models, and connect the abstract numbers</li> <li>-apply addition/subtraction concepts</li> <li>-adding and subtracting decimals are introduced in 4<sup>th</sup> grade</li> </ul>	<ul style="list-style-type: none"> <li>-pennies, nickels, dimes, quarters, half-dollars (seldom used)</li> <li>-dollar bills \$1, \$5, \$10, and \$20</li> <li>-students recognize currency such as two one dollar bills equals \$2.00 and 3 quarters with 4 pennies equals 79 cents</li> <li>-children should recognize both the front and back of coins and bills</li> </ul>

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Rational number, equivalent form, integers, ratios, percents, repeating decimal, repeat bar, terminating decimal	Decimal point, tenths, hundredths, thousandths	Decimal point, tenths, hundredths	Money, coin, penny, nickel, dime, quarter, half dollar, dollar, value, collection, decimal point																																																
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	<p>Lisa cut a rope that was 19.75 meters long into 3 pieces. The first piece of rope was 6.4 meters long, and the second piece of rope was 4.36 meters long. How long was the third piece of rope?</p> <p>A 10.76 m  B 8.99 m  C 30.51 m  D 9.35 m</p>		
<p>Which number is equivalent to <math>\frac{13}{2}</math>?</p> <p>A 6.1, because <math>13 \div 2 = 6</math> with a remainder of 1</p> <p>B <math>\frac{26}{2}</math>, because <math>13 \times 2 = 26</math>, and <math>2 \times 1 = 2</math></p> <p>C <math>6\frac{1}{2}</math>, because <math>13 \div 2 = 6</math> with a remainder of 1</p> <p>D 6.05, because <math>13 \div 2 = 6\frac{1}{2}</math>, and <math>\frac{1}{2} = 0.05</math></p>			
<p>A king snake is <math>\frac{31}{50}</math> m long. What is an equivalent length of this king snake in meters?</p> <p>F 0.31 m  G <math>3\frac{1}{50}</math> m  H 0.062 m  J Not here</p>			
<p>At 8:00 A.M., 26 children were at a day care. By 3:00 P.M., 12 of these children were no longer at the day care. Which integer best represents the change in the number of children at the day care from 8:00 A.M. to 3:00 P.M.?</p> <p>F +26  G +12  H -26  J -12</p>			
<p>Mia is <math>2\frac{1}{2}</math> years older than Chloe. Allen is <math>6\frac{1}{2}</math> years younger than Chloe. Mia is 12 years old. What is Allen's age?</p> <p>F <math>14\frac{1}{2}</math> years  G 3 years  H 8 years  J <math>18\frac{1}{2}</math> years</p>			
<p>Merla bought 8 cups of strawberries. She used <math>1\frac{1}{2}</math> cups of the strawberries to make a salad and <math>3\frac{3}{8}</math> cups of the strawberries to make a pie. She needs 4 cups of strawberries to make milk shakes. Does Merla have enough strawberries left to make the milk shakes?</p> <p>A No, because <math>8 - \left(3\frac{3}{8} + 1\frac{1}{2}\right) = 3\frac{1}{8}</math>, and <math>3\frac{1}{8} &lt; 4</math></p> <p>B Yes, because <math>8 - 3\frac{3}{8} = 4\frac{5}{8}</math>, and <math>4\frac{5}{8} &gt; 4</math></p> <p>C No, because <math>\left(8 - 3\frac{3}{8}\right) - 4 = \frac{5}{8}</math>, and <math>\frac{5}{8} &lt; 4</math></p> <p>D Yes, because <math>8 + 3\frac{3}{8} + 1\frac{1}{2} = 12\frac{7}{8}</math>, and <math>12\frac{7}{8} &gt; 4</math></p>			

Mr. Lee mailed 3 packages. The greatest amount he paid to mail one of these packages was \$3.60. The least amount he paid to mail one of these packages was \$1.70. What could be the total amount Mr. Lee paid to mail the 3 packages?

- A \$8.30
- B \$11.50
- C \$5.10
- D \$10.80

The students in a science class spent 85% of their class period performing an experiment. What decimal is equivalent to 85%?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Decimals)

TEK: the student uses place value to communicate about increasingly large numbers in verbal and written form, including money	TEK: the student understands how place value is used to represent whole numbers	TEK: the student uses whole numbers to describe and compare quantities	TEK:
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3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten								
SE <b>(COINS)</b> <b>3.1C – (S)</b> determine the value of a collection of coins and bills	SE <b>(COINS)</b> <b>2.3D – (R)</b> determine the value of a collection of coins up to one dollar <b>2.3E – (S)</b> describe how the cent symbol, dollar symbol, and the decimal point are used to name the value of a collection of coins	SE <b>(COINS)</b> <b>1.1C – (S)</b> identify individual coins by name and value and describe relationships among them	SE:								
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics								
	Use hundreds chart as intervention – students skip count using dimes by 10s, using nickels by 5s Students must memorize 1 quarter = 25¢, 2 quarters = 50¢, 3 quarters = 75¢ and 4 quarters = \$1	Teach students how to read numbers correctly – ex: choral reading Identify individual coins by name/value Describe relationships between coins Match coins – name/value Use hundreds chart as intervention – students skip count using dimes by 10s, using nickels by 5s Use the cent symbol (¢)	Coins are moving down to Kinder Identify coins by name								
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale								
-pennies, nickels, dimes, quarters, half-dollars (seldom used) -dollar bills \$1, \$5, \$10, and \$20 -students recognize currency such as two one dollar bills equals \$2.00 and 3 quarters with 4 pennies equals 79 cents -children should recognize both the front and back of coins and bills	-use real life and age appropriate examples and situations that are meaningful to students. -use concrete models with applications -use dimes, pennies, nickels and quarters – half dollar pieces are seldom used. -2 <sup>nd</sup> grade is the first time students add coins	-match pictures of coins to the name and value, such as the picture of a nickel would be matched to ‘nickel’ or 5¢ -pennies, nickels, dimes and quarters will be used -physical characteristics such as identifying coins by color and size -relationships between values such as five pennies are the same as one nickel. -the size of the coin does not necessarily correspond to value -no adding of mixed money -1 <sup>st</sup> grade is the first time coins/money is introduced									
Vocabulary	Vocabulary	Vocabulary	Vocabulary								
Money, coin, penny, nickel, dime, quarter, half dollar, dollar, value, collection, decimal point	Money, coins, penny, nickel, dime, quarter, half dollar, collection, value, cent symbol, decimal point	Money, coins, penny, nickel, dime, quarter, relationship	Penny, nickel, dime, quarter, money, coin								
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Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Addition/Subtraction)

TEK:	TEK: the student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems	TEK: the student uses functional relationships to solve problems related to personal income.	TEK:	TEK:	TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations	TEK: the student selects and uses appropriate operations to solve problems and justify solutions
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade
SE:	SE <b>PC.2B</b> – perform operations including composition on functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically	SE <b>MMA.5B</b> – solve problems, given in real life contexts, which involves personal taxes	SE:	SE:	SE: <b>ALG.4A – (R)</b> find specific function values; add, subtract, multiply or divide to simplify polynomial expressions, transform and solve equations, including factoring as necessary in problem situations which are expressed in verbal, algebraic, or pictorial (algebra tiles) representations <b>ALG.4B – (S)</b> demonstrate pictorially and algebraically the commutative, associative, and distributive properties to simplify algebraic expressions	SE: <b>8.2A – (S)</b> select appropriate operations to solve problems involving rational numbers and justify the selections <b>8.2B – (R)</b> use appropriate operations to solve problems involving rational numbers in problem situations
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						<ul style="list-style-type: none"> <li>-work should be shown in an organized format that reflects student’s thinking and understanding</li> <li>-connect verbal, numeric, graphic, and symbolic representations of relationships</li> <li>-given a problem situation students explain which operation to use and support the choice with information from the problem situation</li> <li>-use in problem situations and include fractions, decimals, percents, and integers</li> <li>-connect concrete/pictorial, verbal (written or oral), tabular (horizontal and vertical), and symbolic/numerical representations to problem situations</li> </ul>

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					<p>Which expression is equivalent to <math>-6x^2 - 11x - 4</math>?</p> <p><b>A</b> <math>(3x + 7)(3x - 3)</math>  <b>B</b> <math>(-3x + 4)(2x - 1)</math>  <b>C</b> <math>(3x - 7)(3x + 3)</math>  <b>D</b> <math>(-3x - 4)(2x + 1)</math></p>	<p>Wendy had 35 tickets for games at a carnival. She used <math>\frac{1}{5}</math> of the tickets to play the ball-toss game. She then used <math>\frac{1}{2}</math> of the remaining tickets to play the ring-toss game, in which she won 5 more tickets. How many tickets did Wendy have after playing these games?</p> <p><b>A</b> 7  <b>B</b> 19  <b>C</b> 14  <b>D</b> 28</p>																								
					<p>In which step below does a mistake first appear in simplifying the expression <math>0.5(-12c + 6) - 3(c + 4) + 10(c - 5)</math>?</p> <p>Step 1: <math>-6c + 3 - 3(c + 4) + 10(c - 5)</math>  Step 2: <math>-6c + 3 - 3c - 12 + 10(c - 5)</math>  Step 3: <math>-6c + 3 - 3c - 12 + 10c - 50</math>  Step 4: <math>7c - 41</math></p> <p><b>A</b> Step 1  <b>B</b> Step 2  <b>C</b> Step 3  <b>D</b> Step 4</p>	<p>Angie has 12 feet of string. She will cut the string into equal lengths of 5 inches each. How much string will be left after she cuts as many of these lengths as possible?</p> <p><b>A</b> 0.8 in.  <b>B</b> 2 in.  <b>C</b> 4 in.  <b>D</b> 1.25 in.</p>																								

Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Addition/Subtraction)

TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations	TEK: the student selects and uses appropriate operations to solve problems and justify solutions	TEK: the student adds, subtracts, multiplies, or divides to solve problems and justify solutions	TEK: the student adds, subtracts, multiplies, and divides to solve problems and justify solutions
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Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>ALG.4A – (R)</b> find specific function values; add, subtract, multiply or divide to simplify polynomial expressions, transform and solve equations, including factoring as necessary in problem situations which are expressed in verbal, algebraic, or pictorial (algebra tiles) representations <b>ALG.4B – (S)</b> demonstrate pictorially and algebraically the commutative, associative, and distributive properties to simplify algebraic expressions	SE: <b>8.2A – (S)</b> select appropriate operations to solve problems involving rational numbers and justify the selections <b>8.2B – (R)</b> use appropriate operations to solve problems involving rational numbers in problem situations	SE <b>7.2B – (R)</b> use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals <b>7.2F – (R)</b> select and use appropriate operations to solve problems and justify the selections	SE <b>6.2A – (S)</b> model addition and subtraction situations involving fractions with objects, pictures, words, and numbers <b>6.2B – (R)</b> use addition and subtraction to solve problems involving fractions and decimals
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
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	-work should be shown in an organized format that reflects student’s thinking and understanding -connect verbal, numeric, graphic, and symbolic representations of relationships -given a problem situation students explain which operation to use and support the choice with information from the problem situation -use in problem situations and include fractions, decimals, percents, and integers -connect concrete/pictorial, verbal (written or oral), tabular (horizontal and vertical), and symbolic/numerical representations to problem situations	-include mixed fractions and unlike denominators 12 or less -use in problem situation/word problems -work should be shown in an organized format that reflects student’s thinking and understanding including connecting written, verbal, numeric, graphic and symbolic representations of relationships -in word problem, recognize which operation comes first and choose appropriate expression/equation to correspond to the situation	-using like or unlike denominators 12 or less (w/o technology) -include numbers greater than one and less than one -model, record, draw, mathematically describe (verbally/written) and evaluate the situations including portions used/taken and portions remaining -require students to estimate before computing -add and subtract fractions and mixed numbers with like and unlike denominators 12 or less -connect algorithm to pictorial models -use strategies when adding and subtracting fractions including regrouping mixed numbers and converting to improper fractions
Vocabulary	Vocabulary	Vocabulary	Vocabulary



	algorithm	Algorithm, reciprocal	Common denominator, algorithm, least common multiple																																																
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<p>The perimeter of a rectangle is 42 centimeters. The length of the rectangle can be represented by <math>(x + 4)</math>, and its width can be represented by <math>(2x - 7)</math>. What are the dimensions of this rectangle in centimeters?</p> <p>F Length = 10 and width = 11  G Length = 8 and width = 13  H Length = 6 and width = 15  J Length = 12 and width = 9</p>	<p>Rachel rode her bicycle 18.2 miles in 1.4 hours. She determines that her mean speed was less than 17 miles per hour for this trip. Is she correct?</p> <p>A No, because 1.4 added to 18.2 is 19.6  B No, because 18.2 multiplied by 1.4 is 25.48  C Yes, because 1.4 subtracted from 18.2 is 16.8  D Yes, because 18.2 divided by 1.4 is 13</p>	<p>Mr. Stein is purchasing 2.25 pounds of meat that costs \$2.80 per pound. How much change should Mr. Stein receive if he gives the cashier \$20.00?</p> <p>F \$6.30  G \$13.70  H \$14.95  J \$2.52</p>	<p>Which model is shaded to best represent the expression below?</p> $\frac{3}{10} + \frac{2}{5}$																																																
<p>Which inequality is equivalent to <math>7x - 2y &gt; 8</math>?</p> <p>F <math>y &gt; \frac{7}{2}x + 8</math>  G <math>y &gt; -\frac{2}{7}x + \frac{8}{7}</math>  H <math>y &lt; \frac{7}{2}x - 4</math>  J <math>y &lt; -\frac{2}{7}x - \frac{4}{7}</math></p>	<p>In 2011 Ralph paid \$12.95 for a box of cards and \$0.44 each for 16 stamps. What was the total cost, in dollars and cents, of the box of cards and the stamps?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>	<p>Mr. Atkinson has <math>5\frac{1}{4}</math> lb of dry fish food. He will put an equal amount of food into 3 containers. How much fish food will be in each container?</p> <p>A <math>1\frac{2}{3}</math> lb  B <math>1\frac{3}{4}</math> lb  C <math>2\frac{1}{4}</math> lb  D <math>8\frac{3}{4}</math> lb</p>	<p>Mia is <math>2\frac{1}{2}</math> years older than Chloe. Allen is <math>6\frac{1}{2}</math> years younger than Chloe. Mia is 12 years old. What is Allen's age?</p> <p>F <math>14\frac{1}{2}</math> years  G 3 years  H 8 years  J <math>18\frac{1}{2}</math> years</p>																																																
<p>Which expression is equivalent to <math>-6x^2 - 11x - 4</math>?</p> <p>A <math>(3x + 7)(3x - 3)</math>  B <math>(-3x + 4)(2x - 1)</math>  C <math>(3x - 7)(3x + 3)</math>  D <math>(-3x - 4)(2x + 1)</math></p>	<p>Wendy had 35 tickets for games at a carnival. She used <math>\frac{1}{5}</math> of the tickets to play the ball-toss game. She then used <math>\frac{1}{2}</math> of the remaining tickets to play the ring-toss game, in which she won 5 more tickets. How many tickets did Wendy have after playing these games?</p> <p>A 7  B 19  C 14  D 28</p>	<p>Scott was <math>63\frac{3}{8}</math> inches tall when he started seventh grade and <math>65\frac{1}{4}</math> inches tall when he started eighth grade. How many inches did he grow during this time?</p> <p>A <math>2\frac{5}{8}</math> in.  B <math>1\frac{3}{4}</math> in.  C <math>2\frac{1}{2}</math> in.  D <math>1\frac{7}{8}</math> in.</p>	<p>Maria bought 8 cups of strawberries. She used <math>1\frac{1}{2}</math> cups of the strawberries to make a salad and <math>3\frac{3}{8}</math> cups of the strawberries to make a pie. She needs 4 cups of strawberries to make milk shakes. Does Maria have enough strawberries left to make the milk shakes?</p> <p>A No, because <math>8 - (3\frac{3}{8} + 1\frac{1}{2}) = 3\frac{1}{8}</math>, and <math>3\frac{1}{8} &lt; 4</math>  B Yes, because <math>8 - 3\frac{3}{8} = 4\frac{5}{8}</math>, and <math>4\frac{5}{8} &gt; 4</math>  C No, because <math>(8 - 3\frac{3}{8}) - 4 = \frac{5}{8}</math>, and <math>\frac{5}{8} &lt; 4</math>  D Yes, because <math>8 + 3\frac{3}{8} + 1\frac{1}{2} = 12\frac{7}{8}</math>, and <math>12\frac{7}{8} &gt; 4</math></p>																																																

In which step below does a mistake first appear in simplifying the expression  $0.5(-12c + 6) - 3(c + 4) + 10(c - 5)$ ?

Step 1:  $-6c + 3 - 3(c + 4) + 10(c - 5)$   
 Step 2:  $-6c + 3 - 3c - 12 + 10(c - 5)$   
 Step 3:  $-6c + 3 - 3c - 12 + 10c - 50$   
 Step 4:  $7c - 41$

- A Step 1  
 B Step 2  
 C Step 3  
 D Step 4

Arnie has 12 feet of string. She will cut the string into equal lengths of 5 inches each. How much string will be left after she cuts as many of these lengths as possible?

- A 0.8 in.  
 B 2 in.  
 C 4 in.  
 D 1.25 in.

Jackie has a puzzle book that contains a total of 65 puzzles. She has completed  $\frac{2}{5}$  of the puzzles in the book. If Jackie completes 13 more puzzles, what is the total number of puzzles that she will have completed in the book?

- A 26, because  $\frac{2}{5}(65) = 26$   
 B 52, because  $\frac{2}{5} + \frac{2}{5} = \frac{4}{5}$  and  $\frac{4}{5}(65) = 52$   
 C 39, because  $\frac{2}{5}(65) = 26$  and  $26 + 13 = 39$   
 D Not here

Mr. Grant spent \$8.40 to place an ad in the newspaper. This price included a one-time fee of \$6.00 plus \$0.08 per word. Which method can be used to determine the total number of words in the ad Mr. Grant placed?

- A  $(8.4 \times 6) \div 0.08$   
 B  $(8.4 - 6) \div 0.08$   
 C  $(8.4 + 6) \div 0.08$   
 D  $(8.4 \div 0.08) + 6$

Mr. Jenkins spent \$73 on two colors of paint. The price of each color of paint is shown below.

Prices for Paint

Color	Price per Quart
Foothills Gray	\$7
Oceanside Blue	\$13

Mr. Jenkins bought 3 quarts of Foothills Gray. How many quarts of Oceanside Blue did he buy?

- A 11, because  $73 \div (13 + 7) \times 3$  is about 11  
 B 13, because  $73 \div (13 \times 3) \times 7$  is about 13  
 C 16, because  $(73 + 3 \times 13) \div 7 = 16$   
 D 4, because  $(73 - 3 \times 7) \div 13 = 4$

Mr. Lee mailed 3 packages. The greatest amount he paid to mail one of these packages was \$3.60. The least amount he paid to mail one of these packages was \$1.70. What could be the total amount Mr. Lee paid to mail the 3 packages?

- A \$8.30  
 B \$11.50  
 C \$5.10  
 D \$10.80

Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Addition/Subtraction)

TEK: the student adds, subtracts, multiplies, and divides to solve problems and justify solutions	TEK: the student adds, subtracts, multiplies, and divides to solve meaningful problems	TEK: the student adds and subtracts to solve meaningful problems involving whole numbers and decimals	TEK: the student adds and subtracts to solve meaningful problems involving whole numbers
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
SE <b>6.2A – (S)</b> model addition and subtraction situations involving fractions with objects, pictures, words, and numbers <b>6.2B – (R)</b> use addition and subtraction to solve problems involving fractions and decimals	SE <b>5.3A – (R)</b> use addition and subtraction to solve problems involving whole numbers and decimals <b>5.3E – (S)</b> model situations using addition and/or subtraction involving fractions with like denominators using concrete objects, pictures, word, and numbers	SE <b>4.3A – (S)</b> use addition and subtraction to solve problems involving whole numbers <b>4.3B – (S)</b> add and subtract decimals to the hundredths place using concrete objects and pictorial models	SE <b>3.3A – (S)</b> model addition and subtraction using pictures, words, and numbers <b>3.3B – (R)</b> select addition or subtraction and use the operation to solve problems involving whole numbers through 999
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-using like or unlike denominators 12 or less (w/o technology) -include numbers greater than one and less than 1 -model, record, draw, mathematically describe (verbally/written) and evaluate the situations including portions used/taken and portions remaining -require students to estimate before computing -add and subtract fractions and mixed numbers with like and unlike denominators 12 or less -connect algorithm to pictorial models -use strategies when adding and subtracting fractions including regrouping mixed numbers and converting to improper fractions	-students should write the process of solving problems -students should create word problems to match the number sentences such as $(386+552) + (979+438)$ -problem situations should include multiple operations -apply addition and subtraction concepts FRACTIONS: -students work with concrete models -make connection with the concrete representations to the fraction (concrete/pictorial/abstract) -construct and draw the models -communicate with words (journals) -students add and subtract “like denominators’ in 5 <sup>th</sup> grade	-addition and subtraction need to be taught together in problem solving situations -use pictures, words, and numbers together in problem solving situations -Work with fact families -include number sentences such as $85 + \underline{\quad} = 92$ -three types of subtraction problems: take away, comparison, partition (levels of difficulty from easiest to hardest) -students must build concrete objects, draw pictorial models and connect the abstract #s -adding and subtracting decimals are introduced in 4 <sup>th</sup> grade -apply addition/subtraction concepts	-three types of subtraction problems: take away, comparison, partition (levels of difficulty from easiest to hardest) -addition and subtraction need to be taught together as both fact families and inverse operations -students should use pictures, words, and numbers together in order to build concepts -include multi-step problems for both addition and subtraction
Vocabulary	Vocabulary	Vocabulary	Vocabulary
Common denominator, algorithm, least common multiple	Like denominator, numerator, denominator	Addition, subtraction, sum, combine, together, altogether, join, difference, take away, separate, how many more, remaining, equal, compatible numbers	Addition, subtraction, both, in all, altogether, sum, total, joined, difference, take away, how many more, how many left, remaining, equal, combine

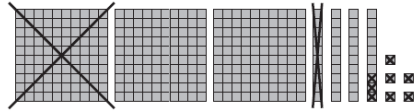
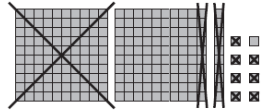
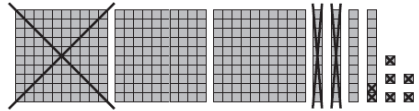
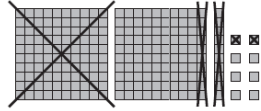
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<p>Which model is shaded to best represent the expression below?</p> $\frac{3}{10} + \frac{2}{5}$	<p>Owen lives 145.25 kilometers from Houston, Texas. Sharon lives 209.5 kilometers from Houston. What is the difference between these two distances?</p> <p>F 64.25 km G 54.35 km H 124.30 km J 144.35 km</p>	<p>Inez is 12 years younger than Raúl. Raúl is 6 years older than Kaylee. Kaylee is twice as old as Henry. Henry is 5 years old. What is the combined age of these four people?</p> <p>F 35 years G 59 years H 45 years J 26 years</p>	<p>Rob had 345 concert tickets to sell. He sold 127 of these tickets on Monday. Which model represents the number of tickets Rob had left to sell?</p>																																												
<p>Mia is <math>2\frac{1}{2}</math> years older than Chloe. Allen is <math>6\frac{1}{2}</math> years younger than Chloe. Mia is 12 years old. What is Allen's age?</p> <p>F <math>14\frac{1}{2}</math> years G 3 years H 8 years J <math>18\frac{1}{2}</math> years</p>	<p>Alex used blue, red, and green pieces of plastic to make a design.</p> <ul style="list-style-type: none"> <li>• He used 84 green pieces of plastic.</li> <li>• He used 20 more green pieces of plastic than blue pieces of plastic.</li> <li>• He used 15 more red pieces of plastic than blue pieces of plastic.</li> </ul> <p>What is the number of red pieces of plastic Alex used?</p> <p>A 79 B 89 C 49 D 119</p>																																														
<p>Maria bought 8 cups of strawberries. She used <math>1\frac{1}{2}</math> cups of the strawberries to make a salad and <math>3\frac{3}{8}</math> cups of the strawberries to make a pie. She needs 4 cups of strawberries to make milk shakes. Does Maria have enough strawberries left to make the milk shakes?</p> <p>A No, because <math>8 - (3\frac{3}{8} + 1\frac{1}{2}) = 3\frac{1}{8}</math>, and <math>3\frac{1}{8} &lt; 4</math> B Yes, because <math>8 - 3\frac{3}{8} = 4\frac{5}{8}</math>, and <math>4\frac{5}{8} &gt; 4</math> C No, because <math>(8 - 3\frac{3}{8}) - 4 = \frac{5}{8}</math>, and <math>\frac{5}{8} &lt; 4</math> D Yes, because <math>8 + 3\frac{3}{8} + 1\frac{1}{2} = 12\frac{7}{8}</math>, and <math>12\frac{7}{8} &gt; 4</math></p>	<p>Lisa cut a rope that was 19.75 meters long into 3 pieces. The first piece of rope was 6.4 meters long, and the second piece of rope was 4.36 meters long. How long was the third piece of rope?</p> <p>A 10.76 m B 8.99 m C 30.51 m D 9.35 m</p>		<p>Gilbert had a total of 85 CDs to put in stacks. He put 27 CDs in one stack and 39 CDs in a second stack. How many CDs did Gilbert have left to put in stacks? Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p> <p>F 225 G 759 H 235 J 135</p>																																												
<p>Mr. Lee mailed 3 packages. The greatest amount he paid to mail one of these packages was \$3.60. The least amount he paid to mail one of these packages was \$1.70. What could be the total amount Mr. Lee paid to mail the 3 packages?</p> <p>A \$8.30 B \$11.50 C \$5.10 D \$10.80</p>			<p>Vandra sold the following number of lightbulbs during three months at a store.</p> <ul style="list-style-type: none"> <li>• She sold 573 lightbulbs in January.</li> <li>• She sold 822 lightbulbs in February.</li> <li>• She sold 738 lightbulbs in March.</li> </ul> <p>How many lightbulbs did Vandra sell during these three months?</p> <p>F 2,023 G 2,133 H 2,223 J 2,033</p>																																												

Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Addition/Subtraction)

TEK: the student adds and subtracts to solve meaningful problems involving whole numbers	TEK: the student adds and subtracts to solve meaningful problems involving whole numbers	TEK: the student recognizes and solves problems in addition and subtraction situations	TEK: the student models addition (joining) and subtraction (separating)
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3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
SE <b>3.3A – (S)</b> model addition and subtraction using pictures, words, and numbers <b>3.3B – (R)</b> select addition or subtraction and use the operation to solve problems involving whole numbers through 999	SE <b>2.3A – (R)</b> recall and apply basic addition and subtraction facts (to 18) <b>2.3B – (S)</b> model addition and subtraction of two digit numbers with objects, pictures, words, and numbers <b>2.3C – (R)</b> select addition or subtraction to solve problems using two-digit numbers, whether or not regrouping is necessary	SE <b>1.3A – (S)</b> model and create addition and subtraction problem situations with concrete objects and write corresponding number sentences <b>1.3B – (R)</b> use concrete and pictorial models to apply basic addition and subtraction facts (up to $9 + 9 = 18$ and $18 - 9 = 9$ )	SE <b>K.4 – (R)</b> model and create addition and subtraction problems in real situations with concrete objects
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-three types of subtraction problems: take away, comparison, partition (levels of difficulty from easiest to hardest) -addition and subtraction need to be taught together as both fact families and inverse operations -students should use pictures, words, and numbers together in order to build concepts -include multi-step problems for both addition and subtraction	-students develop strategies to work with the more difficult addition/subtraction facts to improve fluency rather than rely only on rote memory -“to 18” means to the sum of 18 -students work with doubles, near doubles and near tens -recall fact families up to $9 + 9 = 18$ -2 <sup>nd</sup> grade is held accountable for ‘recalling’ facts. -This focus is on teaching strategies for recall and not just memorization of facts. -Understanding strategies will improve math ‘fluency’ speed -students may use a variety of methods such as; solving two digit addition and subtraction incorporating place value as well as the traditional method -during this grade the student is introduced to 2 digit +/- in the concrete, then connects it to the pictorial, and finally to the abstract. It is important to use base ten pieces then pictures of base ten pieces and finally bridge to the abstract numbers. It is also important to use a variety of manipulatives such as straws or buttons on a string, or hundreds chart. Drawing pictures and recording numerically what the pictures represent allows students to ‘bridge’/connect the concrete to the numerical/abstract	-three types of subtraction problems: take away, comparison, partition (levels of difficulty from easiest to hardest) -focus on transitioning from informal vocabulary (joining and separation) to formal vocabulary (adding and subtracting) -this is when the addition symbol, subtraction symbol and equal sign are introduced (=,+,-) -everything is in the concrete; timed test and flash cards are not appropriate in 1 <sup>st</sup> grade	-only with concrete objects -join two sets together; separate one set into two or more sets -students do not write number sentences or symbols -only use story situations
Vocabulary	Vocabulary	Vocabulary	Vocabulary
Addition, subtraction, both, in all, altogether, sum,	Addition, subtraction, both, in all, altogether, sum, total, joined, difference,	Addition, subtraction, sum, total,	Joining, separating, total,

total, joined, difference, take away, how many more, how many left, remaining, equal, combine	take away, how many more, how many left, remaining, regrouping, equal	altogether, take away, equal sign, symbol, difference	altogether, grouping												
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<p>Rob had 345 concert tickets to sell. He sold 127 of these tickets on Monday. Which model represents the number of tickets Rob had left to sell?</p> <p>F </p> <p>G </p> <p>H </p> <p>J </p>															
<p>Gilbert had a total of 85 CDs to put in stacks. He put 27 CDs in one stack and 39 CDs in a second stack. How many CDs did Gilbert have left to put in stacks?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>															
<p>A company received 492 phone calls from customers in June and 267 phone calls from customers in July. What is the difference between the numbers of phone calls received in these two months?</p> <p>F 225 G 759 H 235 J 135</p>															
<p>Vandra sold the following number of lightbulbs during three months at a store.</p> <ul style="list-style-type: none"> <li>• She sold 573 lightbulbs in January.</li> <li>• She sold 822 lightbulbs in February.</li> <li>• She sold 738 lightbulbs in March.</li> </ul> <p>How many lightbulbs did Vandra sell during these three months?</p> <p>F 2,023 G 2,133 H 2,223 J 2,033</p>															

Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Multiplication/Division)

TEK:	TEK: the student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems	TEK: the student uses functional relationships to solve problems related to personal income.	TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations	TEK:	TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations	TEK: the student selects and uses appropriate operations to solve problems and justify solutions
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade
SE:	SE <b>PC.2B</b> – perform operations including composition on functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically	SE <b>MMA.5B</b> – solve problems, given in real life contexts, which involves personal taxes	SE <b>GEOM.8F – (S)</b> use conversions between measurement systems to solve problems in real-world situations	SE:	SE: <b>ALG.4A – (R)</b> find specific function values; add, subtract, multiply or divide to simplify polynomial expressions, transform and solve equations, including factoring as necessary in problem situations which are expressed in verbal, algebraic, or pictorial (algebra tiles) representations <b>ALG.4B – (S)</b> demonstrate pictorially and algebraically the commutative, associative, and distributive properties to simplify algebraic expressions	SE: <b>8.2A – (S)</b> select appropriate operations to solve problems involving rational numbers and justify the selections <b>8.2B – (R)</b> use appropriate operations to solve problems involving rational numbers in problem situations <b>8.2D – (S)</b> use multiplication by a constant factor (unit rate) to represent proportional relationships
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				<p>Which inequality is equivalent to <math>7x - 2y &gt; 8</math>?</p> <p>F <math>y &gt; \frac{7}{2}x + 8</math>  G <math>y &gt; -\frac{2}{7}x + \frac{8}{7}</math>  H <math>y &lt; \frac{7}{2}x - 4</math>  J <math>y &lt; -\frac{2}{7}x - \frac{4}{7}</math></p>	<p>In 2011 Ralph paid \$12.95 for a box of cards and \$0.44 each for 16 stamps. What was the total cost, in dollars and cents, of the box of cards and the stamps?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>																																	
					<p>Wendy had 35 tickets for games at a carnival. She used <math>\frac{1}{5}</math> of the tickets to play the ball-toss game. She then used <math>\frac{1}{2}</math> of the remaining tickets to play the ring-toss game, in which she won 5 more tickets. How many tickets did Wendy have after playing these games?</p> <p>A 7  B 19  C 14  D 28</p>																																	
				<p>Which expression is equivalent to <math>-6x^2 - 11x - 4</math>?</p> <p>A <math>(3x + 7)(3x - 3)</math>  B <math>(-3x + 4)(2x - 1)</math>  C <math>(3x - 7)(3x + 3)</math>  D <math>(-3x - 4)(2x + 1)</math></p>	<p>Angle has 12 feet of string. She will cut the string into equal lengths of 5 inches each. How much string will be left after she cuts as many of these lengths as possible?</p> <p>A 0.8 in.  B 2 in.  C 4 in.  D 1.25 in.</p>																																	
				<p>In which step below does a mistake first appear in simplifying the expression <math>0.5(-12c + 6) - 3(c + 4) + 10(c - 5)</math>?</p> <p>Step 1: <math>-6c + 3 - 3(c + 4) + 10(c - 5)</math>  Step 2: <math>-6c + 3 - 3c - 12 + 10(c - 5)</math>  Step 3: <math>-6c + 3 - 3c - 12 + 10c - 50</math>  Step 4: <math>7c - 41</math></p> <p>A Step 1  B Step 2  C Step 3  D Step 4</p>	<p>A hotel charges guests \$19.75 a day to rent 5 video games. At this rate, which expression can be used to determine the charge for renting 9 video games for 1 day at this hotel?</p> <p>F <math>\frac{19.75}{5}(9)</math>  G <math>\frac{5}{19.75}(9)</math>  H <math>\frac{23.70}{5}(9)</math>  J <math>\frac{5}{23.70}(9)</math></p>																																	



Math  
Vertical Alignment by Grade

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Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>ALG.4A – (R)</b> find specific function values; add, subtract, multiply or divide to simplify polynomial expressions, transform and solve equations, including factoring as necessary in problem situations which are expressed in verbal, algebraic, or pictorial (algebra tiles) representations <b>ALG.4B – (S)</b> demonstrate pictorially and algebraically the commutative, associative, and distributive properties to simplify algebraic expressions	SE: <b>8.2A – (S)</b> select appropriate operations to solve problems involving rational numbers and justify the selections <b>8.2B – (R)</b> use appropriate operations to solve problems involving rational numbers in problem situations <b>8.2D – (S)</b> use multiplication by a constant factor (unit rate) to represent proportional relationships	SE: <b>7.2A – (S)</b> represent multiplication and division situations involving fractions and decimals with models, including concrete objects, pictures, words and numbers <b>7.2B – (R)</b> use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals <b>7.2D – (S)</b> use division to find unit rates and ratios in proportional relationships such as speed, density, price, recipes, and student-teacher ratio <b>7.2F – (R)</b> select and use appropriate operations to solve problems and justify the selections	SE: <b>6.2C – (R)</b> use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates <b>6.1D – (S)</b> write prime factorizations using exponents <b>6.1E – (S)</b> identify factors of a positive integer, common factors, and the greatest common factor of a set of positive integers <b>6.1F – (S)</b> identify multiples of a positive integer and common multiples and the least common multiple of a set of positive integers
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
	Multiply and divide with fractions and decimals	Multiply and divide with fractions and decimals	
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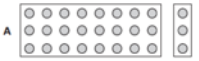
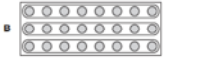

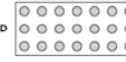

		-focus on the equivalent and proportional relationships -use numbers appropriate for real life application -always include units -density is the ratio of grams to cubic units -use scale factor -unit rate is introduced in 7 <sup>th</sup> grade -work should be shown in an organized format that reflects student's thinking and understanding including connecting written, verbal, numeric, graphic, and symbolic representations of relationships -in a word problem, recognize which operation comes first and choose appropriate expression/ equation to correspond to the situation	three digits for multiplication and 3 digit by 2 digit for division																																																												
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	Proportional relationships, constant factor, unit rate, scale factor	Proportions, relationships, unit rate, rates, ratios, scale, situation, operations, select, justify	Proportions, relationships, rates, ratios, prime factorization, exponents, factors, common factors, greatest common factors, multiples, common multiples, least common multiple, divisible																																																												
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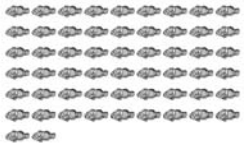

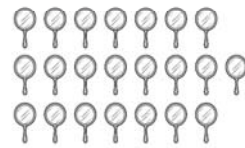
<p>Which inequality is equivalent to <math>7x - 2y &gt; 8</math>?</p> <p><b>F</b> <math>y &gt; \frac{7}{2}x + 8</math></p> <p><b>G</b> <math>y &gt; -\frac{2}{7}x + \frac{8}{7}</math></p> <p><b>H</b> <math>y &lt; \frac{7}{2}x - 4</math></p> <p><b>J</b> <math>y &lt; -\frac{2}{7}x - \frac{4}{7}</math></p>	<p>In 2011 Ralph paid \$12.95 for a box of cards and \$0.44 each for 16 stamps. What was the total cost, in dollars and cents, of the box of cards and the stamps?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>	<p>Mr. Atkinson has <math>5\frac{1}{4}</math> lb of dry fish food. He will put an equal amount of food into 3 containers. How much fish food will be in each container?</p> <p><b>A</b> <math>1\frac{2}{3}</math> lb</p> <p><b>B</b> <math>1\frac{3}{4}</math> lb</p> <p><b>C</b> <math>2\frac{1}{4}</math> lb</p> <p><b>D</b> <math>8\frac{3}{4}</math> lb</p>	<p>A worker at a clothing company uses 200 buttons to make 50 shirts. At this rate, how many buttons would the worker use to make 350 shirts?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>								
<p>Which expression is equivalent to <math>-6x^2 - 11x - 4</math>?</p> <p><b>A</b> <math>(3x + 7)(3x - 3)</math></p> <p><b>B</b> <math>(-3x + 4)(2x - 1)</math></p> <p><b>C</b> <math>(3x - 7)(3x + 3)</math></p> <p><b>D</b> <math>(-3x - 4)(2x + 1)</math></p>	<p>Wendy had 35 tickets for games at a carnival. She used <math>\frac{1}{5}</math> of the tickets to play the ball-toss game. She then used <math>\frac{1}{2}</math> of the remaining tickets to play the ring-toss game, in which she won 5 more tickets. How many tickets did Wendy have after playing these games?</p> <p><b>A</b> 7</p> <p><b>B</b> 19</p> <p><b>C</b> 14</p> <p><b>D</b> 28</p>	<p>Scott was <math>63\frac{3}{8}</math> inches tall when he started seventh grade and <math>65\frac{1}{4}</math> inches tall when he started eighth grade. How many inches did he grow during this time?</p> <p><b>A</b> <math>2\frac{5}{8}</math> in.</p> <p><b>B</b> <math>1\frac{3}{4}</math> in.</p> <p><b>C</b> <math>2\frac{1}{2}</math> in.</p> <p><b>D</b> <math>1\frac{7}{8}</math> in.</p>	<p>Every day a zookeeper feeds 4 adult gorillas a total of 160 lb of food. At this rate, how many pounds of food would the zookeeper need every day to feed 6 adult gorillas?</p> <p><b>A</b> 40 lb</p> <p><b>B</b> 320 lb</p> <p><b>C</b> 240 lb</p> <p><b>D</b> 80 lb</p>								
<p>In which step below does a mistake first appear in simplifying the expression <math>0.5(-12c + 6) - 3(c + 4) + 10(c - 5)</math>?</p> <p>Step 1: <math>-6c + 3 - 3(c + 4) + 10(c - 5)</math>  Step 2: <math>-6c + 3 - 3c - 12 + 10(c - 5)</math>  Step 3: <math>-6c + 3 - 3c - 12 + 10c - 50</math>  Step 4: <math>7c - 41</math></p> <p><b>A</b> Step 1</p> <p><b>B</b> Step 2</p> <p><b>C</b> Step 3</p> <p><b>D</b> Step 4</p>	<p>Angie has 12 feet of string. She will cut the string into equal lengths of 5 inches each. How much string will be left after she cuts as many of these lengths as possible?</p> <p><b>A</b> 0.8 in.</p> <p><b>B</b> 2 in.</p> <p><b>C</b> 4 in.</p> <p><b>D</b> 1.25 in.</p>	<p>Jackie has a puzzle book that contains a total of 65 puzzles. She has completed <math>\frac{2}{5}</math> of the puzzles in the book. If Jackie completes 13 more puzzles, what is the total number of puzzles that she will have completed in the book?</p> <p><b>A</b> 26, because <math>\frac{2}{5}(65) = 26</math></p> <p><b>B</b> 52, because <math>\frac{2}{5} + \frac{2}{5} = \frac{4}{5}</math> and <math>\frac{4}{5}(65) = 52</math></p> <p><b>C</b> 39, because <math>\frac{2}{5}(65) = 26</math> and <math>26 + 13 = 39</math></p> <p><b>D</b> Not here</p>	<p>What is the prime factorization of 196?</p> <p><b>F</b> <math>2^2 \cdot 7^2</math></p> <p><b>G</b> <math>2 \cdot 7^2</math></p> <p><b>H</b> <math>2 \cdot 7 \cdot 14</math></p> <p><b>J</b> <math>2^2 \cdot 49</math></p>								
<p>A hotel charges guests \$19.75 a day to rent 5 video games. At this rate, which expression can be used to determine the charge for renting 9 video games for 1 day at this hotel?</p> <p><b>F</b> <math>\frac{19.75}{5}(9)</math></p> <p><b>G</b> <math>\frac{5}{19.75}(9)</math></p> <p><b>H</b> <math>\frac{23.70}{5}(9)</math></p> <p><b>J</b> <math>\frac{5}{23.70}(9)</math></p>	<p>A hotel charges guests \$19.75 a day to rent 5 video games. At this rate, which expression can be used to determine the charge for renting 9 video games for 1 day at this hotel?</p> <p><b>F</b> <math>\frac{19.75}{5}(9)</math></p> <p><b>G</b> <math>\frac{5}{19.75}(9)</math></p> <p><b>H</b> <math>\frac{23.70}{5}(9)</math></p> <p><b>J</b> <math>\frac{5}{23.70}(9)</math></p>	<p>Mr. Grant spent \$8.40 to place an ad in the newspaper. This price included a one-time fee of \$6.00 plus \$0.08 per word. Which method can be used to determine the total number of words in the ad Mr. Grant placed?</p> <p><b>A</b> <math>(8.4 \times 6) \div 0.08</math></p> <p><b>B</b> <math>(8.4 - 6) \div 0.08</math></p> <p><b>C</b> <math>(8.4 + 6) \div 0.08</math></p> <p><b>D</b> <math>(8.4 \div 0.08) + 6</math></p>	<p>Mr. Jenkins spent \$73 on two colors of paint. The price of each color of paint is shown below.</p> <table border="1"> <thead> <tr> <th colspan="2">Prices for Paint</th> </tr> <tr> <th>Color</th> <th>Price per Quart</th> </tr> </thead> <tbody> <tr> <td>Foothills Gray</td> <td>\$7</td> </tr> <tr> <td>Oceanside Blue</td> <td>\$13</td> </tr> </tbody> </table> <p>Mr. Jenkins bought 3 quarts of Foothills Gray. How many quarts of Oceanside Blue did he buy?</p> <p><b>A</b> 11, because <math>73 \div (13 + 7) = 3</math> is about 11</p> <p><b>B</b> 13, because <math>73 \div (13 \times 3) = 7</math> is about 13</p> <p><b>C</b> 16, because <math>(73 + 3 \times 13) \div 7 = 16</math></p> <p><b>D</b> 4, because <math>(73 - 3 \times 7) \div 13 = 4</math></p>	Prices for Paint		Color	Price per Quart	Foothills Gray	\$7	Oceanside Blue	\$13
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Math  
Vertical Alignment by Grade

Strand: Solving Problems with Real Numbers Using Equations and Their Properties (Multiplication/Division)

TEK: the student adds, subtracts, multiplies, and divides to solve problems and justify solutions	TEK: the student adds, subtracts, multiplies, and divides to solve meaningful problems	TEK: the student multiplies and divides to solve meaningful problems involving whole numbers	TEK: the student recognizes and solves problems in multiplication and division situations	TEK: the student models multiplication and division
6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade
SE: <b>6.2C – (R)</b> use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates <b>6.1D – (S)</b> write prime factorizations using exponents <b>6.1E – (S)</b> identify factors of a positive integer, common factors, and the greatest common factor of a set of positive integers <b>6.1F – (S)</b> identify multiples of a positive integer and common multiples and the least common multiple of a set of positive integers	SE <b>5.3B – (R)</b> use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology) <b>5.3C – (R)</b> use division to solve problems involving whole numbers (no more than two-digit divisors and three-digit dividends without technology) including interpreting the remainder within a given context <b>5.3D – (S)</b> identify common factors of a set of whole numbers	SE <b>4.4A – (S)</b> model factors and products using arrays and area models <b>4.4B – (S)</b> represent multiplication and division situation in picture, word, and number form <b>4.4C – (S)</b> recall and apply multiplication facts through 12 x 12 <b>4.4D – (R)</b> use multiplication to solve problems (no more than two-digits times two-digit without technology) <b>4.4E – (R)</b> use division to solve problems (no more than one-digit divisors and three-digit dividends without technology)	SE <b>3.4A – (S)</b> learn and apply multiplication facts through 12 by 12 using concrete models and objects <b>3.4B – (R)</b> solve and record multiplication problems (up to 2 digits times 1 digit) <b>3.4C – (R)</b> use models to solve division problems and use number sentences to record the solutions	SE <b>2.4A – (S)</b> model, create, and describe multiplication situations in which equivalent sets of concrete objects are joined <b>2.4B – (S)</b> model, create, and describe division situations in which a set of concrete objects is separated into equivalent sets
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics
Introduction of exponents - foundation for future use Emphasize what it is and what it is NOT with exponents		When using the multiplication chart emphasize the vocabulary factors, products, divisor, dividend, quotient Emphasize the difference between factors and multiples	When using the multiplication chart emphasize the vocabulary factors, products, divisor, dividend, quotient Emphasize the difference between factors and multiples	
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE) Expose students to ‘prime and composite’ numbers when building arrays...13 only has 2 arrays that can be built (13x1 or 1x13) because it only has 2 factors...it’s a prime number Introduces multiples of 10s when multiplying	Rationale (clarification of TEKS/SE)	Rationale
-require students to estimate before computing -do not use cross products to teach this concept -in 6 <sup>th</sup> grade ratios are a comparison of whole numbers; example – there are 3 dogs for every 5 cats. If there are 6 dogs,	-apply multiplication concepts -include all representations -connection between multiplication/division concepts -remainders should be written as fractions (do not list remainders as a decimal)	-connect the pictorial to abstract number with area models or arrays -create number sentences and relate to the fact families -apply multiplication/division concepts -journaling should explain the process -build from the concrete to the pictorial	-area arrays with linear dimensions -use pictorial models -3 <sup>rd</sup> grade is held accountable for ‘learning and applying’ not memorizing facts -Timed tests (multiplication facts) are not appropriate in third grade -concrete models should be built and	-the most 2 <sup>nd</sup> grade students should model is 10x10. -students can model by looking at multiple sets of an object -use a variety of

<p>how many cats are there? -focus on generating equivalent relationships (proportions) -use numbers appropriate for real life application; always include units such as cost per item when working with ratios -only use whole numbers -interpret and understand remainders and write the remainder as a fraction -without the use of calculators use only two digits by three digits for multiplication and 3 digit by 2 digit for division</p>		<p>to the abstract number -learn and apply multiplication facts (fact families), and extend fact families to include related factors -Timed tests should be designed to allow students to increase their time -4<sup>th</sup> grade is held accountable for 'recalling' the multiplication facts -students build concrete models of division w/ and w/out remainders -concrete manipulatives for understanding concept of division, tiles, base 10 piece -4<sup>th</sup> grade may have remainders such as <math>125 \div 3 = 41</math> remainder 2</p>	<p>drawn before moving to the abstract numbers -students should use models (such as the area array) to demonstrate the relationship between multiplication and division -use concrete objects to model, bridge to the abstract (number) by drawing pictorial representations -This TEKS is sometimes tested with gridable answers -apply multiplication/division concepts with the concrete models and pictorial drawings -student create numbers sentences/express the answers of their concrete models</p>	<p>concrete manipulatives -ALWAYS use manipulatives at this grade level -always use 'multiplication situations' (story problems) never just <math>3 \times 6 = \underline{\quad}</math> -2<sup>nd</sup> grade students will use manipulatives to model situations requiring separation and should only model situations up to <math>18 \div 9</math> -use a variety of concrete manipulatives</p>																																																																
<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>																																																																
<p>Proportions, relationships, rates, ratios, prime factorization, exponents, factors, common factors, greatest common factors, multiples, common multiples, least common multiple, divisible</p>	<p>Multiplication, division, product, factor, dividend, divisor, quotient, interpret remainder, multiples, greatest common factor, factor pairs, common factors, least common multiple, common multiple</p>	<p>Multiplication, division, product, factor, dividend, divisor, quotient, remainder, array, equal groups, each, multiples, area, share equally</p>	<p>Multiplication, equal groups, loops and groups, repeated addition, t-chart, multiplication chart, factors, multiple, product, arrays, division, divisor, dividend, quotient</p>	<p>Model, equal groups, loops and groups, multiplication, repeated addition, t-chart</p>																																																																
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<p>The list below shows the rate at which Riley burned calories by doing different activities last week.</p> <ul style="list-style-type: none"> <li>• Playing basketball: burned 11 calories per minute</li> <li>• Jogging: burned 9 calories per minute</li> <li>• Swimming: burned a total of 600 calories in 2 hours</li> </ul> <p>Riley did each of these activities for 2 hours last week. Based on the information in the list, which statement is true?</p> <p>A He burned 1,200 calories per hour while swimming, because <math>600 \times 2 = 1,200</math>.</p> <p>B He burned a total of 3,000 calories, because <math>(11 \times 120) + (9 \times 120) + 600 = 3,000</math>.</p> <p>C He burned 1,080 calories per hour while jogging, because <math>9 \times 120 = 1,080</math>.</p> <p>D He burned a total of 74,400 calories, because <math>(11 \times 120) + (9 \times 120) + (600 \times 120) = 74,400</math>.</p>	<p>Brennon has a total of 187 postage stamps.</p> <ul style="list-style-type: none"> <li>• He has 48 stamps that are each 14 millimeters wide.</li> <li>• He has 139 stamps that are each 12 millimeters wide.</li> </ul> <p>What is the total width of these stamps?</p> <p>A 2,618 mm</p> <p>B 2,230 mm</p> <p>C 2,340 mm</p> <p>D 657 mm</p>	<p>Which model represents the expression <math>24 \div 3</math>?</p> <p>A </p> <p>B </p> <p>C </p> <p>D </p>	<p>Emery drew 3 rows of stick figures. Each row has the same number of stick figures. One of the rows is shown below.</p>  <p>How many stick figures are in 3 rows?</p> <p>A 12</p> <p>B 24</p> <p>C 9</p> <p>D Not here</p>																																																																	

<p>A worker at a clothing company uses 200 buttons to make 50 shirts. At this rate, how many buttons would the worker use to make 350 shirts?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>	<p>There are four times as many cows as horses on a farm. There are twice as many horses as pigs on the farm. Which list shows the number of each type of animal on this farm?</p> <p>F 9 cows, 36 horses, and 18 pigs  G 48 cows, 12 horses, and 24 pigs  H 32 cows, 16 horses, and 8 pigs  J 72 cows, 18 horses, and 9 pigs</p>	<p>Ms. López bought 5 packages of crackers at a store. Each package had 8 crackers. What was the total number of crackers in these 5 packages?</p> <p>A 25  B 13  C 35  D Not here</p>	<p>Andy has trumpet practice 4 times every month. Each practice lasts 2 hours. What is the total number of hours that Andy will practice in 9 months?</p> <p>A 72  B 156  C 36  D 104</p>
<p>Every day a zookeeper feeds 4 adult gorillas a total of 160 lb of food. At this rate, how many pounds of food would the zookeeper need every day to feed 6 adult gorillas?</p> <p>A 40 lb  B 320 lb  C 240 lb  D 80 lb</p>	<p>On Monday 149 people each bought 1 CD at a music store. On Tuesday 263 people each bought 1 CD. All the CDs cost \$9. What was the total amount paid for the CDs on these two days?</p> <p>A \$3,608  B \$1,341  C \$2,367  D \$3,708</p>	<p>The list below shows the number of picture frames Shelly sold on each day of an art sale.</p> <ul style="list-style-type: none"> <li>She sold 16 picture frames on Thursday.</li> <li>She sold 22 picture frames on Friday.</li> <li>She sold 25 picture frames on Saturday.</li> </ul> <p>The cost of each picture frame was \$14. What was the total cost of these picture frames in dollars?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>	<p>Willis has 5 bags of marbles that have 18 marbles each. He also has 3 bags of marbles that have 13 marbles each. What is the total number of marbles in these 8 bags?</p> <p>F 194  G 47  H 129  J 90</p>
<p><b>What is the prime factorization of 196?</b></p> <p>F <math>2^2 \cdot 7^2</math>  G <math>2 \cdot 7^2</math>  H <math>2 \cdot 7 \cdot 14</math>  J <math>2^2 \cdot 49</math></p>	<p>A gardener has 785 bricks to build a path in a garden. There will be 24 bricks in each row of the path. How many complete rows can the gardener make using 785 bricks?</p> <p>A 32  B 17  C 33  D 65</p>	<p>There are 39 containers of water for the students at a race. Each container holds 24 quarts of water. How many quarts of water are in the 39 containers?</p> <p>A 234 qt  B 936 qt  C 1,026 qt  D 836 qt</p>	<p>Carl arranged 9 rows of bricks to make a walkway. Each row had 56 bricks. How many bricks did Carl arrange in this walkway?</p> <p>A 504  B 495  C 904  D 454</p>
	<p>Terrell spent \$306 on a television and 3 video games. He spent \$243 on the television. Each video game was the same price. How much did Terrell spend on each video game?</p> <p>A \$21, because <math>306 - 243 = 63</math> and <math>63 \div 3 = 21</math>  B \$1,647, because <math>306 + 243 = 549</math> and <math>549 \div 3 = 1,647</math>  C \$183, because <math>306 + 243 = 549</math> and <math>549 \div 3 = 183</math>  D \$189, because <math>306 - 243 = 63</math> and <math>63 \times 3 = 189</math></p>	<p>The picture below shows the number of prizes that were in 5 treasure chests.</p>  <p>Mr. Washington opened the chests and put all the prizes into 7 equal groups. How many prizes did Mr. Washington put into each group?</p> <p>F 34  G 1,764  H 36  J 252</p>	<p>The picture below shows the number of fish Mrs. Gonzales wants to put into fish tanks.</p>  <p>She will put 7 fish into each tank. Which number sentence shows the number of fish tanks Mrs. Gonzales needs for her fish?</p> <p>F <math>56 \div 7 = 9</math>  G <math>56 \div 7 = 8</math>  H <math>56 \div 7 = 6</math>  J <math>56 \div 7 = 7</math></p>
<p>The numbers below all have something in common.</p> <p style="text-align: center;">64  112  96  240  344</p> <p>Which statement describes something these numbers have in common?</p> <p>F They are all divisible by 12.  G They are all divisible by 16.  H They are all divisible by 8.  J They are all divisible by 6.</p>			<p>The barrels shown below will be placed in 3 rows at a park. There will be an equal number of barrels in each row.</p>  <p>Which number sentence shows the number of barrels that will be in each row?</p> <p>A <math>30 \div 6 = 5</math>  B <math>36 \div 3 = 12</math>  C <math>30 \div 3 = 10</math>  D <math>36 \div 6 = 6</math></p>
<p>Cathy is organizing the bottles of nail polish at a store. There are a total of 296 bottles. If Cathy puts the same number of bottles on each of 4 shelves, how many bottles will be on each shelf?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>		<p>Oscar used a total of 315 blocks to make 5 towers. He used an equal number of blocks to make each tower. How many blocks did Oscar use to make each tower?</p> <p>A 65  B 63  C 61  D 79</p>	<p>Nelli will arrange 22 mirrors on 2 shelves in a store. There will be an equal number of mirrors on each of the shelves.</p>  <p>How many mirrors will be on each of the shelves?</p> <p>A 11, because <math>22 \div 2 = 11</math>  B 24, because <math>22 + 2 = 24</math>  C 44, because <math>22 \times 2 = 44</math>  D 20, because <math>22 - 2 = 20</math></p>

Math  
Vertical Alignment by Grade

Strand: Estimation

TEK: the student analyzes real-world numerical data using a variety of quantitative measures and numerical processes	TEK:	TEK:	TEK:	TEK:	TEK: the student formulates equations and inequalities based on linear functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation -the student formulates systems of linear equations from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation	TEK: the student selects and uses appropriate operations to solve problems and justify solutions
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade																																
SE: <b>AQR.2A</b> – apply, compare, and contrast ratios, rates, ratings, averages, weighted averages, or indices to make informed decisions	SE:	SE:	SE:	SE:	SE: <b>ALG.7C – (S)</b> interpret and determine the reasonableness of solutions to linear equations and inequalities <b>ALG.8C – (S)</b> interpret and determine reasonableness of solutions to linear equations and inequalities	SE: <b>8.2C – (S)</b> evaluate a solution for reasonableness <b>8.3B – (R)</b> estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates <b>8.1C – (S)</b> approximate (mentally and with calculators) the value of irrational numbers (such as pi and $\sqrt{2}$ ) as they arise from algebraic or geometric problem situations																																
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				<p>The average annual rainfall for a particular city is 33.2 inches. In the first 30 weeks of this year, the city received a total of 9.7 inches of rain. If it is expected to rain between 1.5 and 2.1 inches per week through the end of the year, what is a reasonable number of additional weeks needed for this city to reach its average annual rainfall?</p> <p>A 22 weeks                      B 13 weeks                      C 9 weeks                      D 16 weeks</p>	<p>Pia spends from \$40 to \$50 at the grocery store each week. She spends about 20% of the amount on vegetables and fruit. Which of the following is a reasonable estimate of the amount of money Pia will spend on vegetables and fruit at the grocery store during the next 3 weeks?</p> <p>F \$130                      G \$26                      H \$94                      J \$9</p>																																	
				<p>Mr. Martinez has 3 ice chests. He is placing 14 lunches in each ice chest. Each lunch contains a sandwich, a bag of chips, and a drink. About 55% of these lunches contain a ham sandwich. Which of the following is closest to the number of lunches that contain a ham sandwich?</p> <p>F 23                      G 8                      H 17                      J 9</p>	<p>According to the Texas Parks and Wildlife Department, there are about 40 white-tailed deer per square mile in each of 35 Texas counties. A rectangular area on a ranch in one of these counties measures 2.25 miles by 6.7 miles. Which of the following is closest to the number of white-tailed deer expected to live in this rectangular area?</p> <p>F 490                      G 840                      H 720                      J 600</p>																																	
				<p>The sophomore class needs a combined total of 216 medium and large T-shirts for field day. The number of medium T-shirts needed is three times the number of large T-shirts needed. Based on this information, would it be reasonable for the sophomore class to order 72 large T-shirts and 144 medium T-shirts?</p> <p>A No, because the number of medium T-shirts is not 3 times the number of large T-shirts                      B No, because the number of large T-shirts is not 3 times the number of medium T-shirts                      C Yes, because the total number of T-shirts is 216                      D Yes, because the number of large T-shirts is <math>\frac{1}{3}</math> of the total number of T-shirts</p>	<p>A package of 5 erasers costs \$0.39. At this rate, how much would 60 erasers cost, in dollars and cents?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>																																	



Math  
Vertical Alignment by Grade

## Strand: Estimation

TEK: the student formulates equations and inequalities based on linear functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation -the student formulates systems of linear equations from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation	TEK: the student selects and uses appropriate operations to solve problems and justify solutions	TEK: the student adds, subtracts, multiplies, or divides to solve problems and justify solutions	TEK: the student adds, subtracts, multiplies, and divides to solve problems and justify solutions
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Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>ALG.7C – (S)</b> interpret and determine the reasonableness of solutions to linear equations and inequalities <b>ALG.8C – (S)</b> interpret and determine reasonableness of solutions to linear equations and inequalities	SE: <b>8.2C – (S)</b> evaluate a solution for reasonableness <b>8.3B – (R)</b> estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates <b>8.1C – (S)</b> approximate (mentally and with calculators) the value of irrational numbers (such as pi and $\sqrt{2}$ ) as they arise from algebraic or geometric problem situations	SE <b>7.2G – (S)</b> determine the reasonableness of a solution to a problem <b>7.3A – (R)</b> estimate and find solutions to application problems involving percent <b>7.3B – (R)</b> estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, units costs, and related measurement units <b>7.1C – (S)</b> represent squares and square roots using geometric models <b>7.2E – (S)</b> simplify numerical expressions involving order of operations and exponents	SE <b>6.2D – (S)</b> estimate and round to approximate reasonable results and to solve problems where exact answers are not required <b>6.2E – (R)</b> use order of operations to simplify whole number expressions (without exponents) in problem solving situations
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Use estimation to check for reasonableness	Use estimation to check for reasonableness	Use estimation to check for reasonableness	Incorporate estimation in other concepts (multiplying, dividing, decimals, addition, subtraction, etc.) Use estimation to check for reasonableness Always estimate BEFORE solving
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
	communicate mathematically why solution is reasonable as well as why not -support solution to the problem with information from the situation -all rates and ratios should include units	-communicate mathematically why a solution is reasonable or not and support solution to the problem with information from the situation -include problems involving ‘best estimate of total number’ when given information in a problem situation -all rates and ratios should include units	-students should round before computing -when estimating use compatible numbers, rounded numbers or a combination of both -round up to the thousandth place in decimals and fractions -students should be able to choose and use appropriate rounding strategies according to the problem situation -to evaluate solution, check for reasonableness in relation to the problem -compatible numbers are ‘numbers that are easy

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<p>The average annual rainfall for a particular city is 33.2 inches. In the first 30 weeks of this year, the city received a total of 9.7 inches of rain. If it is expected to rain between 1.5 and 2.1 inches per week through the end of the year, what is a reasonable number of additional weeks needed for this city to reach its average annual rainfall?</p> <p>A 23 weeks B 13 weeks C 9 weeks D 16 weeks</p>	<p>Pia spends from \$40 to \$50 at the grocery store each week. She spends about 20% of the amount on vegetables and fruit. Which of the following is a reasonable estimate of the amount of money Pia will spend on vegetables and fruit at the grocery store during the next 3 weeks?</p> <p>F \$130 G \$26 H \$54 J \$9</p>	<p>The 3 members of the math team at Nelson Middle School are raising money to go to the state competition. They need between \$55 and \$80 per person for each day of the trip. Which of the following is a reasonable estimate of the total amount of money they will need for the 2-day trip?</p> <p>A \$275 B \$400 C \$700 D \$900</p>	<p>At a swimming pool, Hector swam between 9 and 21 laps each day. Each lap is 26.8 m long. Hector swam at this pool 10 days. Which of the following is a reasonable estimate of the total number of meters Hector swam?</p> <p>A 1,000 m B 9,000 m C 4,500 m D 1,800 m</p>																																																												
<p>The sophomore class needs a combined total of 216 medium and large T-shirts for field day. The number of medium T-shirts needed is three times the number of large T-shirts needed. Based on this information, would it be reasonable for the sophomore class to order 72 large T-shirts and 144 medium T-shirts?</p> <p>A No, because the number of medium T-shirts is not 3 times the number of large T-shirts B No, because the number of large T-shirts is not 3 times the number of medium T-shirts C Yes, because the total number of T-shirts is 216 D Yes, because the number of large T-shirts is <math>\frac{1}{3}</math> of the total number of T-shirts</p>	<p>Mr. Martinez has 3 ice chests. He is placing 14 lunches in each ice chest. Each lunch contains a sandwich, a bag of chips, and a drink. About 55% of these lunches contain a ham sandwich. Which of the following is closest to the number of lunches that contain a ham sandwich?</p> <p>F 23 G 8 H 17 J 9</p>	<p>Of the 250 sheep in a flock, 34% are white. What is the total number of white sheep in the flock?</p> <p>A 85 B 216 C 165 D Not here</p>	<p>All the minutes used by Mrs. Larsen and her 3 children for cell phone calls last month were reported on the same bill.</p> <ul style="list-style-type: none"> <li>The bill showed that a total of 1,850 minutes had been used last month.</li> <li>Mrs. Larsen used 462 minutes.</li> <li>Her son used twice as many minutes as she used.</li> <li>Each of her daughters used the same number of minutes.</li> </ul> <p>The expression below can be used to find the number of minutes each of Mrs. Larsen's daughters used.</p> $(1,850 - 462 - 462 \times 2) \div 2$ <p>What was the number of minutes each of Mrs. Larsen's daughters used?</p> <p>F 926 min G 1 min H 1,156 min J 232 min</p>																																																												
	<p>According to the Texas Parks and Wildlife Department, there are about 40 white-tailed deer per square mile in each of 35 Texas counties. A rectangular area on a ranch in one of these counties measures 2.25 miles by 6.7 miles. Which of the following is closest to the number of white-tailed deer expected to live in this rectangular area?</p> <p>F 480 G 840 H 720 J 600</p>	<p>A total of 40 people made cakes for a bake sale. Each person made 3 cakes. Mrs. Sánchez found that 15% of these cakes were chocolate. How many chocolate cakes were made for the bake sale?</p> <p>F 120 G 6 H 18 J Not here</p>																																																													
	<p>A package of 5 erasers costs \$0.39. At this rate, how much would 60 erasers cost, in dollars and cents?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>	<p>Carrie missed 9.6% of the problems on a test. The test had a total of 125 problems. Which of the following is the best estimate of the number of problems Carrie missed?</p> <p>F 123 G 13 H 2 J 113</p>	<p>Angie had a bag that contained 14 oranges. She put 3 of the oranges in her brother's lunch box. She put 2 times as many oranges in the refrigerator as she put in her brother's lunch box. She used the rest of the oranges to make orange juice. Based on the expression below, how many oranges did Angie use to make orange juice?</p> $14 - (3 + 2 \cdot 3)$ <p>F 8 G 5</p>																																																												

A recipe for a dessert requires 3 cups of strawberries for every  $1\frac{1}{2}$  cups of yogurt used. At this rate, how much yogurt should be used if 2 cups of strawberries are used?

A 1 c

B 9 c

C  $\frac{3}{4}$  c

D  $\frac{1}{2}$  c

At a concession stand 6 hot dogs cost \$6.72. At this rate, how much would 8 hot dogs cost, in dollars and cents?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

One-half gallon is equivalent to 4 pints. How many gallons are the equivalent of 72 pints?

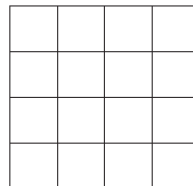
A 64 gal

B 9 gal

C 80 gal

D 576 gal

The model below has an area of 16 square units.



Which expression represents the side length of the model in units?

F  $\sqrt{64}$

G  $\sqrt{4}$

H  $\sqrt{16}$

J  $\sqrt{8}$

What is the value of the expression shown below?

$$12 + 96 \div 3 \cdot 2^3$$

A 288

B 204

C 268

D 216

Math  
Vertical Alignment by Grade

## Strand: Estimation

TEK: the student adds, subtracts, multiplies, and divides to solve problems and justify solutions	TEK: the student estimates to determine reasonable results	TEK: the student estimates to determine reasonable results	TEK: the student estimates to determine reasonable results
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
SE <b>6.2D – (S)</b> estimate and round to approximate reasonable results and to solve problems where exact answers are not required <b>6.2E – (R)</b> use order of operations to simplify whole number expressions (without exponents) in problem solving situations	SE <b>5.4 – (S)</b> use strategies including rounding and compatible numbers to estimate solutions to addition, subtraction, multiplication, and division problems	SE <b>4.5A – (S)</b> round whole numbers to the nearest ten, hundred, or thousand to approximate reasonable results in problem situations <b>4.5B – (S)</b> use strategies including rounding and compatible numbers to estimate solutions to multiplication and division problems	SE <b>3.5A – (S)</b> round whole numbers to the nearest ten or hundred to approximate reasonable results in problem situations <b>3.5B – (S)</b> use strategies including rounding and compatible numbers to estimate solutions to addition and subtraction problems
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Incorporate estimation in other concepts (multiplying, dividing, decimals, addition, subtraction, etc.) Use estimation to check for reasonableness Always estimate BEFORE solving	Incorporate estimation in other concepts (multiplying, dividing, decimals, addition, subtraction, etc.) Use estimation to check for reasonableness Always estimate BEFORE solving	Incorporate estimation in other concepts (multiplying, dividing, , addition, subtraction) Use estimation to check for reasonableness Always estimate BEFORE solving Numbers ending in zeros are ‘friendly numbers’ – they are easy numbers to work with	Numbers ending in zeros are ‘friendly numbers’ – they are easy numbers to work with Use estimation to check for reasonableness Always estimate BEFORE solving Use compatible numbers for reasonableness Kindergarten, 1 <sup>st</sup> grade, and 2 <sup>nd</sup> grade can help with estimation by asking students to determine which number the given number is ‘closest to’
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-students should round before computing -when estimating use compatible numbers, rounded numbers or a combination of both -round up to the thousandth place in decimals and fractions -students should be able to choose and use appropriate rounding strategies according to the problem situation -to evaluate solution, check for reasonableness in relation to the problem -compatible numbers are ‘numbers that are easy to compute mentally’ -compatible numbers do not always end in ‘0’	-estimate numbers before computation -use compatible numbers -work with examples of real-life estimation -wounding and estimation in word problems -justify reasonableness -single digits are not rounded -for addition and subtraction round to the highest place value of the smallest number used in computation -multiplication and division round to the highest place value of each number -front-end estimation -compatible numbers are ‘numbers that are easy to compute mentally’ -compatible numbers do not always end in ‘0’ -estimation and rounding are two different concepts	-teach within word problems -round before solving -single digit numbers are not rounded -front-end estimation -for addition and subtraction round to the highest place value of the smallest number used in computation -multiplication and division round to the highest place value of each number -problems may include information expressed as a range of numbers -Include rounding and reasonableness in solving problems -students should justify their answers -there are no definite rules for rounding an all situations -students should practice rounding using	-use word problems with real life application -round before solving -single digit numbers are not rounded -front-end estimation -for addition and subtraction round to the highest place value of the smallest number used in computation -Rounding/Estimation is introduced in 3 <sup>rd</sup> grade -there are no definite rules for rounding an all situations -students should practice rounding using different strategies and be able to determine which place value to round based on the real life situation -Include rounding and reasonableness in solving problems



		different strategies and be able to determine which place value to round based on the real life situation -estimation and rounding are two different concepts -use compatible numbers -compatible numbers are new to 3rd grade -compatible numbers are 'numbers that are easy to compute mentally' -compatible numbers do not always end in '0'	-the purpose of rounding is to estimate reasonable answers in problem situations; therefore students should encounter many different types of problems and determine what to round numbers to according to the situation and not a specific rule -use compatible numbers -compatible numbers are new to 3rd grade -compatible numbers are 'numbers that are easy to compute mentally' -compatible numbers do not always end in '0'																																				
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Estimate, reasonableness, compatible numbers, simplify, order of operations, expression, evaluate, parenthesis, brackets	Reasonableness, compatible numbers, estimate, approximately, front end estimation	About, compatible numbers, round, estimate, reasonable, approximately	Round, closest, approximately, about, reasonable, compatible numbers																																				
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Math  
Vertical Alignment by Grade

Strand: Proportional Reasoning

TEK: the student analyzes real-world numerical data using a variety of quantitative measures and numerical processes	TEK: the student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems	TEK:	TEK: the student applies logical reasoning to justify and prove mathematical statements -the student uses a variety of representations to describe geometric relationships and solve problems	TEK: the student knows the relationship between the geometric and algebraic descriptions of conic sections
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AQR	Pre-Cal	MMA	Geometry	Algebra II																
SE <b>AQR.2A</b> – apply, compare, and contrast ratios, rates, ratings, averages, weighted averages, or indices to make informed decisions	SE <b>PC.4A</b> – represent patterns using arithmetic and geometric sequences and series	SE	SE <b>GEOM.3D – (S)</b> use inductive reasoning to formulate a conjecture <b>GEOM.5A – (R)</b> use numeric and geometric patterns to develop algebraic expressions representing geometric properties <b>GEOM.5B – (S)</b> use numeric and geometric patterns to make generalizations about geometric properties, including properties of polygons, ratios in similar figures and solids, and angle relationships in polygons and circles	SE <b>ALGII.5D – (S)</b> identify the conic section from a given equation																
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			<p>A town wants to fence in a rectangular section of a park. The table shows five possible plans for the dimensions of this fenced section. The changes in the width and the length of these plans follow a pattern.</p> <table border="1"> <thead> <tr> <th>Plan</th> <th>Width (feet)</th> <th>Length (feet)</th> <th>Area (square feet)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>16</td> <td>34</td> <td>544</td> </tr> <tr> <td>2</td> <td>18</td> <td>32</td> <td>576</td> </tr> <tr> <td>3</td> <td>20</td> <td>30</td> <td>600</td> </tr> <tr> <td>4</td> <td>22</td> <td>28</td> <td>616</td> </tr> <tr> <td>5</td> <td>24</td> <td>26</td> <td>624</td> </tr> </tbody> </table> <p>If six additional plans are added to the table and follow the same pattern, which conclusion is not correct?</p> <p>A The area of one of the additional plans exceeds 624 square feet.  B The area of one of the additional plans is less than 544 square feet.  C The area in Plan 6 is the same as the area in Plan 5.  D The area in Plan 7 is less than the area in Plan 6.</p> <p>A pattern of dots is shown in the four figures below.</p>  <p>Figure 1      Figure 2      Figure 3      Figure 4</p> <p>If the pattern continues, which expression can be used to find the total number of dots in Figure <math>n</math>?</p> <p>A <math>3n - 5</math>  B <math>2n + 2</math>  C <math>2n + 3</math>  D <math>3n - 1</math></p>	Plan	Width (feet)	Length (feet)	Area (square feet)	1	16	34	544	2	18	32	576	3	20	30	600	4	22	28	616	5	24	26	624	
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			<p>The first four stages of a pattern of arcs from congruent circles are shown below.</p>  <p>Stage 1      Stage 2      Stage 3      Stage 4</p> <p>If this pattern continues, which expression can be used to find the degree measure of the arc in Stage <math>n</math>?</p> <p>A <math>20(10 - n^2)</math>  B <math>180\left(\frac{1}{3}\right)^{(n-1)}</math>  C <math>60(4 - n)</math>  D <math>270\left(\frac{2}{3}\right)^n</math></p>																									
			<p>The table below contains a pattern formed by the number of sides and the measure in degrees of each exterior angle of several regular convex polygons.</p> <table border="1"> <caption>Exterior Angle Measures of Regular Polygons</caption> <thead> <tr> <th>Number of Sides</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>10</th> <th>15</th> <th>20</th> <th>45</th> <th>90</th> </tr> </thead> <tbody> <tr> <th>Exterior Angle Measure (degrees)</th> <td>120</td> <td>90</td> <td>72</td> <td>60</td> <td>36</td> <td>24</td> <td>18</td> <td>8</td> <td>4</td> </tr> </tbody> </table> <p>If the pattern in the table continues, which statement is true?</p> <p>A As the number of sides in the polygon increases by 1, the measure of each exterior angle decreases by 25%.  B The product of the number of sides in the polygon and the measure of each exterior angle is a constant.  C The measure of each exterior angle is a multiple of 6 degrees.  D If the number of sides in the polygon is even, the measure of each exterior angle is a multiple of 3 degrees.</p>	Number of Sides	3	4	5	6	10	15	20	45	90	Exterior Angle Measure (degrees)	120	90	72	60	36	24	18	8	4					
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Math  
Vertical Alignment by Grade


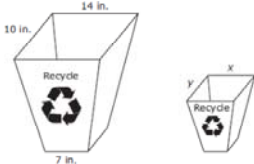
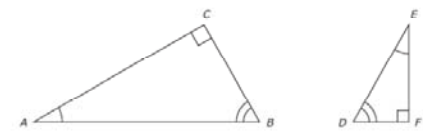
Strand: Proportional Reasoning

TEK: the student knows the relationship between the geometric and algebraic descriptions of conic sections	TEK: the student understands how algebra can be used to express generalizations and recognizes and uses the power of symbols to represent situations TEK: the student understands that linear functions can be represented in different ways and translates among their various representations	TEK: the student identifies proportional or non-proportional linear relationships in problem situations and solves problems	TEK: the student solves problems involving direct proportional relationships	TEK: the student solves problems involving direct proportional relationships
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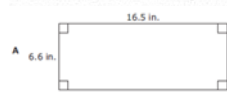
Algebra II	Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>ALGII.5D – (S)</b> identify the conic section from a given equation	SE: <b>ALG.3B – (S)</b> look for patterns and represent generalizations algebraically <b>ALG.5B – (S)</b> determine the domain and range for linear functions in given situations	SE <b>8.3A – (S)</b> compare and contrast proportional and non-proportional linear relationships <b>8.3B – (R)</b> estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates <b>8.6A – (R)</b> generate similar figures using dilations including enlargements and reductions	SE <b>7.3A – (R)</b> estimate and find solutions to application problems involving percent <b>7.3B – (R)</b> estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, units costs, and related measurement units <b>7.6D – (R)</b> use critical attributes to define similarity	SE <b>6.3A – (S)</b> use ratios to describe proportional situations <b>6.3B – (S)</b> represent ratios and percents with concrete models, fractions, and decimals <b>6.3C – (R)</b> use ratios to make predictions in proportional situations
Specifics	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
		Same operation on both sides of the equation Add and Subtract to isolate the Variable '4x' is the same as 4 times x Linear functions	Same operation on both sides of the equation Add and Subtract to isolate the Variable '4x' is the same as 4 times x Equivalency charts/bars	
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
		-focus on what makes a situation proportional (proportional relationships have equivalent ratios) -recognize in a table (horizontal and vertical), chart and or graph proportional (linear) and non-proportional relationships -recognize linear situations – linear situations have constant multiplies	-students should estimate before computing -do not use cross products to teach this concept -include concept of percent making a comparison of per hundred -compare actual to estimation and support solution with information from the problem situation/word problem	-use all three forms to write ratios (3 is to 2, 3:2, 3/2) and convert from one form to another -emphasize the order the ratio is stated -match a description to a given ratio that may or may not be in lowest terms -focus on the equivalent and proportional relationships



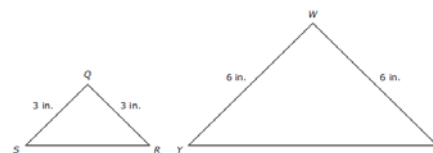
		<ul style="list-style-type: none"> <li>-estimate before computing</li> <li>-do not use cross products to teach this concept</li> <li>-focus on the equivalent and proportional relationships</li> <li>-use numbers appropriate for real life application</li> <li>-justify solution with information from the problem situation</li> <li>-proportional relationships such as scale factor, student to teacher ratio, percent of change</li> <li>-understand that similar figures must have the same corresponding angle measurement and the dimensions of the corresponding sides must be proportional</li> <li>-use scale factors such <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, 2, 0.4, 2.5</li> <li>-have students draw the figures</li> <li>-find the scale factor from a graph, drawing or a table</li> <li>-label dilations with 'prime' notation</li> <li>-make congruent parts of similar figures</li> <li>-the term dilation is introduced in 8<sup>th</sup> grade</li> <li>-the concept of dilations is introduced in 7<sup>th</sup> grade through scale factors</li> </ul>	<ul style="list-style-type: none"> <li>-application problems involving percent is introduced at 7<sup>th</sup> grade</li> <li>--do not use cross products to teach this concept</li> <li>-focus on the equivalent and proportional relationships</li> <li>-use numbers appropriate for real life application</li> <li>-unit cost and scale factor are introduced in 7<sup>th</sup> grade</li> <li>-attributes and properties are synonyms</li> <li>-define similar polygons as figures with corresponding equal angles and all dimensions are proportional (side lengths should be represented with rational numbers not just whole numbers)</li> <li>-connect to proportional reasoning</li> </ul>	<ul style="list-style-type: none"> <li>-decimals less than and greater than one</li> <li>-fractions should include unit fractions, proper fractions, improper, mixed numbers</li> <li>-make connect between the models and fractions, decimals, and percents</li> <li>-understand and explain that % means per '100'</li> <li>-do not use cross products to teach this concept</li> <li>-use real life application/problem situations</li> <li>Always use appropriate labels units in ratios/rates/proportions</li> </ul>																																																												
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<p>The first six numbers in a pattern are shown below.</p> $\frac{1}{3}, \frac{4}{3}, 3, \frac{16}{3}, \frac{25}{3}, 12, \dots$ <p>If the pattern continues, which expression can be used to find the <math>n</math>th number in the pattern?</p> <p>A <math>\frac{2n}{3}</math>          B <math>\frac{n^2}{3}</math>          C <math>\frac{n^2}{6}</math>          D <math>\frac{2n}{6}</math></p>	<p>A store sells a 5-pound bag of apples for \$4.60. Which of the following is NOT an equivalent price per pound of apples?</p> <p>A A 20-pound bag for \$18.40          B A 12-pound bag for \$11.04          C A 7-pound bag for \$6.44          D A 15-pound bag for \$9.20</p>	<p>Of the 250 sheep in a flock, 34% are white. What is the total number of white sheep in the flock?</p> <p>A 85          B 216          C 165          D Not here</p>	<p>Fred went to an arcade to play video games. He paid \$2 for every 11 tokens he bought. He spent a total of \$16 on tokens. Which equation can be used to determine <math>t</math>, the number of tokens Fred bought?</p> <p>A <math>\frac{2}{16} = \frac{t}{11}</math>          B <math>\frac{2}{11} = \frac{t}{16}</math>          C <math>\frac{18}{t} = \frac{11}{2}</math>          D <math>\frac{11}{2} = \frac{t}{16}</math></p>
<p>The number of ferryboat trips, <math>f(c)</math>, needed to transport <math>c</math> cars in 1 day can be found using the function <math>f(c) = \frac{c}{20}</math>. If there are no more than 5,000 cars transported by ferryboat daily, what is the range of the function for this situation?</p>  <p>A The set of all integers greater than or equal to 5,000          B The set of all integers from 0 to 5,000          C The set of all integers greater than or equal to 250          D The set of all integers from 0 to 250</p>	<p>A painter earns \$119.00 for 7 hours of work. Which of the following is an equivalent rate?</p> <p>A \$120.50 for <math>8\frac{1}{2}</math> hours of work          B \$110.50 for <math>6\frac{1}{2}</math> hours of work          C \$178.50 for <math>7\frac{1}{2}</math> hours of work          D \$153.50 for <math>9\frac{1}{2}</math> hours of work</p>	<p>A total of 40 people made cakes for a bake sale. Each person made 3 cakes. Mrs. Sánchez found that 15% of these cakes were chocolate. How many chocolate cakes were made for the bake sale?</p> <p>F 120          G 6          H 18          J Not here</p>	<p>The students in a science class spent 85% of their class period performing an experiment. What decimal is equivalent to 85%?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>
<p>Mr. Martínez has 3 ice chests. He is packing 14 lunches in each ice chest. Each lunch contains a sandwich, a bag of chips, and a drink. About 55% of these lunches contain a ham sandwich. Which of the following is closest to the number of lunches that contain a ham sandwich?</p> <p>F 23          G 8          H 17          J 9</p>	<p>According to the Texas Parks and Wildlife Department, there are about 40 white-tailed deer per square mile in each of 35 Texas counties. A rectangular area on a ranch in one of these counties measures 2.25 miles by 6.7 miles. Which of the following is closest to the number of white-tailed deer expected to live in this rectangular area?</p> <p>F 480          G 840          H 720          J 600</p>	<p>Carrie missed 9.6% of the problems on a test. The test had a total of 125 problems. Which of the following is the best estimate of the number of problems Carrie missed?</p> <p>F 123          G 13          H 2          J 113</p>	<p>At a school on Friday, 3 out of every 4 students were wearing jeans. There were 600 students at school on Friday. How many of the students were wearing jeans?</p> <p>A 599, because <math>600 - (4 - 3) = 599</math>          B 450, because <math>\frac{3}{4} = \frac{450}{600}</math>          C 50, because <math>600 \div (4 \times 3) = 50</math>          D 800, because <math>\frac{3}{4} = \frac{600}{800}</math></p>
<p>A package of 5 erasers costs \$0.39. At this rate, how much would 60 erasers cost, in dollars and cents?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p> <p>A square has a side length of <math>5\frac{1}{2}</math> inches. This square is dilated by a scale factor of <math>\frac{4}{5}</math> to create a new square. What is the side length of the new square?</p> <p>A <math>4\frac{4}{5}</math> in.          B <math>4\frac{1}{4}</math> in.          C <math>4\frac{3}{5}</math> in.          D Not here</p>	<p>A package of 5 erasers costs \$0.39. At this rate, how much would 60 erasers cost, in dollars and cents?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p> <p>One-half gallon is equivalent to 4 pints. How many gallons are the equivalent of 72 pints?</p> <p>A 64 gal          B 9 gal          C 80 gal          D 576 gal</p>	<p>At a concession stand 6 hot dogs cost \$6.72. At this rate, how much would 8 hot dogs cost, in dollars and cents?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>	<p>Vanessa is making a sauce for a chicken dish. The list below shows the amount of each ingredient she needs in order to make 4 servings of the sauce.</p> <ul style="list-style-type: none"> <li>• 2 tablespoons of black pepper</li> <li>• 1 cup of peanut butter</li> <li>• 3 tablespoons of vinegar</li> <li>• 2 tablespoons of soy sauce</li> <li>• 1 cup of water</li> </ul> <p>Based on this information, which statement is true?</p> <p>A For 16 servings, she would need to use 12 tablespoons of vinegar.          B For 20 servings, she would need to use 7 tablespoons of soy sauce.          C For 2 servings, she would need to use 4 tablespoons of black pepper.          D For 12 servings, she would need to use 9 cups of peanut butter.</p>
<p>Mrs. Hussen has two similar recycling bins in her office. The dimensions of the smaller bin can be found by dilating the dimensions of the larger bin by a scale factor of 0.75.</p>  <p>What are the measurements of <math>x</math> and <math>y</math> on the smaller recycling bin?</p> <p>F <math>x = 13.25</math> in. and <math>y = 9.25</math> in.          G <math>x = 10.5</math> in. and <math>y = 6.5</math> in.          H <math>x = 11.5</math> in. and <math>y = 7.5</math> in.          J <math>x = 10.5</math> in. and <math>y = 7.5</math> in.</p>	<p>The triangles shown below are similar.</p>  <p>Which line segment corresponds to <math>\overline{AC}</math>?</p> <p>A <math>\overline{BC}</math>          B <math>\overline{EF}</math>          C <math>\overline{DE}</math>          D <math>\overline{DF}</math></p>		

A rectangle has a length of 7.5 inches and a width of 3 inches. This rectangle is dilated by a scale factor of 2.2 to create a new rectangle. Which figure represents the new rectangle?



41 Triangle QRS and triangle WXY are similar.



Which statement must be true?

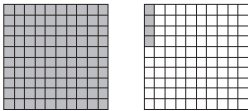
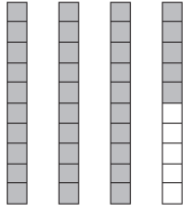
- A  $\overline{YX}$  is 6 inches long.
- B  $m\angle S + m\angle R + m\angle Y = 180$
- C  $m\angle S + m\angle R = m\angle Y + m\angle X$
- D  $\overline{SR}$  is twice as long as  $\overline{YX}$ .

Math  
Vertical Alignment by Grade

Strand: Proportional Reasoning

TEK: the student solves problems involving direct proportional relationships	TEK: the student uses fractions in problem-solving situations	TEK: the student describes and compares fractional parts of whole objects or sets of objects	TEK:
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade																								
SE <b>6.3A – (S)</b> use ratios to describe proportional situations <b>6.3B – (S)</b> represent ratios and percents with concrete models, fractions, and decimals <b>6.3C – (R)</b> use ratios to make predictions in proportional situations	SE <b>5.2D – (S)</b> use models to relate decimals to fractions that name tenths, hundredths, and thousandths	SE <b>4.2D – (R)</b> relate decimals to fractions that name tenths and hundredths using concrete objects and pictorial models	SE:																								
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<ul style="list-style-type: none"> <li>-use all three forms to write ratios (3 is to 2, 3:2, 3/2) and convert from one form to another</li> <li>-emphasize the order the ratio is stated</li> <li>-match a description to a given ratio that may or may not be in lowest terms</li> <li>-focus on the equivalent and proportional relationships</li> <li>-decimals less than and greater than one</li> <li>-fractions should include unit fractions, proper fractions, improper, mixed numbers</li> <li>-make connect between the models and fractions, decimals, and percents</li> <li>-understand and explain that % means per ‘100’</li> <li>-do not use cross products to teach this concept</li> <li>-use real life application/problem situations</li> </ul> Always use appropriate labels units in ratios/rates/proportions	<ul style="list-style-type: none"> <li>-students understand the value of 1/1000 is the same as 0.001</li> <li>-solve problems such as a picture may show ½ shaded and the answer may be 0.5 in the decimal form</li> <li>-pictorial representations of a 10<sup>th</sup> of a circle and a 10<sup>th</sup> of a 100ths grid show equivalence</li> </ul>	<ul style="list-style-type: none"> <li>-relating fractions to decimals</li> <li>-record models and pictures</li> <li>-students should demonstrate 1/10 is the same value as 0.1 and 1/100, 0.01</li> <li>-decimals are introduced in 4<sup>th</sup></li> </ul>																									
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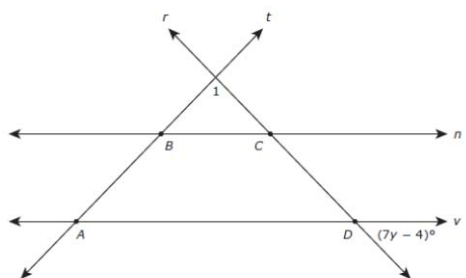
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<p>Fred went to an arcade to play video games. He paid \$2 for every 11 tokens he bought. He spent a total of \$16 on tokens. Which equation can be used to determine <math>t</math>, the number of tokens Fred bought?</p> <p>A <math>\frac{2}{16} = \frac{t}{11}</math></p> <p>B <math>\frac{2}{11} = \frac{t}{16}</math></p> <p>C <math>\frac{18}{t} = \frac{11}{2}</math></p> <p>D <math>\frac{11}{2} = \frac{t}{16}</math></p>					<p>The model below is shaded to represent <math>1\frac{4}{100}</math>.</p>  <p>Which decimal does the model represent?</p> <p>F 1.04</p> <p>G 1.4</p> <p>H 14.0</p> <p>J 1.004</p>				
<p>The students in a science class spent 85% of their class period performing an experiment. What decimal is equivalent to 85%?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>					<p>The model below is shaded to represent a number greater than 1.</p>  <p>Which fraction and decimal represent this number?</p> <p>A <math>\frac{35}{100}</math> and 0.35</p> <p>B <math>3\frac{5}{10}</math> and 3.5</p> <p>C <math>3\frac{5}{100}</math> and 3.5</p> <p>D <math>3\frac{5}{10}</math> and 3.05</p>				
<p>At a school on Friday, 3 out of every 4 students were wearing jeans. There were 600 students at school on Friday. How many of the students were wearing jeans?</p> <p>A 599, because <math>600 - (4 - 3) = 599</math></p> <p>B 450, because <math>\frac{3}{4} = \frac{450}{600}</math></p> <p>C 50, because <math>600 \div (4 \times 3) = 50</math></p> <p>D 800, because <math>\frac{3}{4} = \frac{600}{800}</math></p>									
<p>In a first-aid kit the ratio of large bandages to small bandages is 3 to 2. Based on this ratio, how many large bandages are in the kit if there are a total of 80 bandages?</p> <p>F 32</p> <p>G 48</p> <p>H 16</p> <p>J 40</p>									
<p>Vanessa is making a sauce for a chicken dish. The list below shows the amount of each ingredient she needs in order to make 4 servings of the sauce.</p> <ul style="list-style-type: none"> <li>2 tablespoons of black pepper</li> <li>1 cup of peanut butter</li> <li>3 tablespoons of vinegar</li> <li>2 tablespoons of soy sauce</li> <li>1 cup of water</li> </ul> <p>Based on this information, which statement is true?</p> <p>A For 16 servings, she would need to use 12 tablespoons of vinegar.</p> <p>B For 20 servings, she would need to use 7 tablespoons of soy sauce.</p> <p>C For 2 servings, she would need to use 4 tablespoons of black pepper.</p> <p>D For 12 servings, she would need to use 9 cups of peanut butter.</p>									

Math  
Vertical Alignment by Grade

Strand: Patterns, Relationships, and Making Predictions

<p>TEK: the student uses mathematical models to represent, analyze, and solve real-world problems involving change</p> <p>TEK: the student creates and analyzes mathematical models to make decisions related to earning, investing, spending and borrowing money to evaluate real-world situations</p>	<p>TEK: the student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems</p> <p>TEK: the student uses functions and their properties, tools and technology, to model and solve meaningful problems</p> <p>TEK: the student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems</p>	<p>TEK: the student uses functional relationships to solve problems related to personal income</p> <p>TEK: the student uses algebraic and geometric models to describe situations and solve problems</p>	<p>TEK: the student uses a variety of representations to describe geometric relationships and solve problems.</p> <p>TEK: the student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly</p>	<p>TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations</p> <p>TEK: the student connects algebraic and geometric representations of functions</p> <p>TEK: the student understands that quadratic functions can be represented in different ways and translates among their various representations</p> <p>TEK: the student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>-the student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>-the student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p>
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AQR	Pre-Cal	MMA	Geometry	Algebra II
<p>SE</p> <p><b>AQR.9A</b> – analyze and determine appropriate growth or decay models, including linear, exponential, and logistic functions</p> <p><b>AQR.10A</b> – determine, represent, and analyze mathematical models for various types of income calculations</p> <p><b>AQR.10B</b> – determine, represent, and analyze mathematical models for expenditures, including those involving credit</p>	<p>SE</p> <p><b>PC.2B</b> – perform operations including composition on functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically</p> <p><b>PC.3A</b> – investigate properties of trigonometric and polynomial functions</p> <p><b>PC.4C</b> – describe limits of sequences and apply their properties to investigate convergent and divergent series</p>	<p>SE</p> <p><b>MMA.5A</b> – use rates, linear functions, and direct variation to solve problems involving personal finance and budgeting, including compensations and deductions</p> <p><b>MMA.8C</b> – use direct and inverse variation to describe physical laws such as Hook’s, Newton’s, and Boyle’s laws.</p>	<p>SE</p> <p><b>GEOM.4A – (S)</b> select an appropriate representation (concrete, pictorial, graphical, verbal, or symbolic) in order to solve problems</p> <p><b>GEOM.7B – (R)</b> use slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and special segments of triangles and other polygons</p>	<p>SE</p> <p><b>ALGII.2A – (S)</b> use complex numbers to describe the solutions of quadratic equations</p> <p><b>ALGII.4C – (S)</b> describe and analyze the relationship between a function and its inverse</p> <p><b>ALGII.6B – (R)</b> relate representations of quadratic functions, such as algebraic, tabular, graphical, and verbal descriptions</p> <p><b>ALGII.9B – (S)</b> relate representations of square root functions, such as algebraic, tabular, graphical, and verbal descriptions</p> <p><b>ALGII.9G – (S)</b> connect inverses of square root functions with quadratic functions</p> <p><b>ALGII.10B – (S)</b> analyze various representations of rational functions with respect to problem situations</p> <p><b>ALGII.10G – (S)</b> use functions to model and make predictions in problem situations involving direct and inverse variation</p> <p><b>ALGII.11A – (R)</b> develop the definition of logarithms by exploring and describing the relationship between exponential functions and their inverse</p>
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			Lines $r$ , $t$ , $n$ , and $v$ intersect as shown to form isosceles trapezoid $ABCD$ .  Which expression represents the measure of $\angle 1$ in degrees? F $180 \div (7y - 4)$ H $(7y - 4)$ G $180 - 2(7y - 4)$ J $180 - (7y - 4)$	What is the solution set for the following equation? $3 \left  1 - \frac{1}{4}x \right  = 9$ A $\left\{ -\frac{1}{2}, \frac{1}{2} \right\}$ C $\{-8, 16\}$ B $\left\{ -\frac{1}{2}, 1 \right\}$ D $\{-8, -16\}$																																

The equation of a line containing one leg of a right triangle is  $y = -4x$ . Which of the following equations could represent the line containing the other leg of this triangle?

F  $y = -\frac{1}{4}x$

H  $y = 4x$

G  $y = \frac{1}{4}x + 2$

J  $y = -4x + 2$

Which function is equivalent to its inverse?

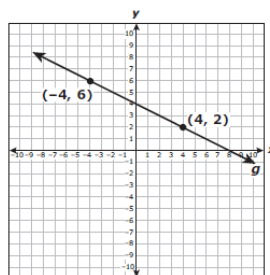
A  $f(x) = \frac{2x - 1}{2}$

B  $g(x) = \frac{3 - x}{3}$

C  $h(x) = 7 - x$

D  $j(x) = x - 4$

The graph of line  $g$  is shown below.



Which equation describes a line parallel to line  $g$  that has a  $y$ -intercept at  $(0, -1)$ ?

A  $y = 2x - 1$

C  $y = -\frac{1}{2}x - 1$

B  $y = \frac{1}{2}x - 1$

D  $y = -2x - 1$

Which function's graph has a vertex at  $(3, 5)$  and contains the point  $(5, 13)$ ?

F  $y = \frac{1}{10}(x + 3)^2 - 5$

G  $y = \frac{1}{10}(x - 3)^2 - 5$

H  $y = 2(x - 3)^2 + 5$

J  $y = 2(x + 3)^2 + 5$

The slopes of the sides of quadrilateral  $ABCD$  are shown in the table below.

Side	Slope
$\overline{AB}$	$\frac{2}{5}$
$\overline{BC}$	$-\frac{2}{5}$
$\overline{CD}$	$\frac{2}{5}$
$\overline{AD}$	$-\frac{5}{2}$

Which statement describes the relationships between the sides of the quadrilateral?

A  $\overline{AD}$  is parallel to  $\overline{BC}$ , but  $\overline{AB}$  is not parallel to  $\overline{CD}$ .

B  $\overline{AB}$  is parallel to  $\overline{CD}$ , but  $\overline{AD}$  is not parallel to  $\overline{BC}$ .

C  $\overline{AB}$  is parallel to  $\overline{CD}$ , and  $\overline{AD}$  is parallel to  $\overline{BC}$ .

D  $\overline{AD}$  is not parallel to  $\overline{BC}$ , and  $\overline{AB}$  is not parallel to  $\overline{CD}$ .

A table of values for the quadratic function  $g$  is shown below.

$x$	$g(x)$
-1	-55
2	-16
5	5
6	8
9	5
10	0
12	-16
14	-40

Which of the following statements about the graph of  $g$  are true?

- I. The graph has a line of symmetry at  $x = 7$ .
- II. The graph has a  $y$ -intercept at  $(0, -40)$ .
- III. The graph has an  $x$ -intercept at  $(4, 0)$ .
- IV. The graph has a vertex at  $(6, 8)$ .

F I and II only

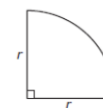
H I, II, and III only

G III and IV only

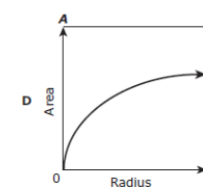
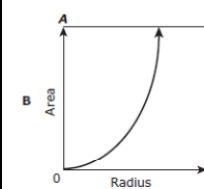
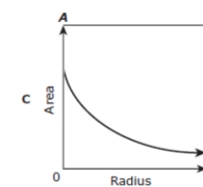
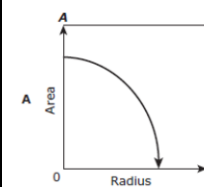
J I, II, III, and IV



A sector of a circle is shown below.



The area,  $A$ , of the sector is  $\frac{\pi}{4}$  times the square of the radius,  $r$ . Which graph represents this relationship?



Some values for the function  $f(x) = \log x$  are given in Table 1.

Table 1

$x$	$f(x)$
10	1
100	2
1,000	3
10,000	4

Table 2

$x$	$g(x)$
1	10
2	100
3	1,000
4	10,000

Which function can generate all the values in Table 2?

- A**  $g(x) = x^{10}$
- B**  $g(x) = 10^x$
- C**  $g(x) = \frac{10}{x}$
- D**  $g(x) = 10x$

What is the inverse of  $h(x) = \frac{1}{2} \log_3(x)$ ?

- A**  $h^{-1}(x) = 3^{(2x)}$
- B**  $h^{-1}(x) = 2(3)^x$
- C**  $h^{-1}(x) = 2(\log_x 3)$
- D**  $h^{-1}(x) = \log_3(2x)$

Math  
Vertical Alignment by Grade

Strand: Patterns, Relationships, and Making Predictions

<p>TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations</p> <p>TEK: the student connects algebraic and geometric representations of functions</p> <p>TEK: the student understands that quadratic functions can be represented in different ways and translates among their various representations</p> <p>TEK: the student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>-the student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>-the student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p>	<p>TEK: the student understands that a function represents a dependence of one quantity or another and can be described in a variety of ways</p> <p>TEK: the student understands that linear functions can be represented in different ways and translates among their various representations</p> <p>TEK: the student understands the meaning of the slope and intercepts of the graphs of linear functions and zero of linear functions and interprets and describes the effects of changes in parameters of linear functions in real-world and mathematical situations</p> <p>TEK: the student understands there are situations modeled by functions that are neither linear nor quadratic and models the situations</p>	<p>TEK: the student makes connections among various representations of a numerical relationship</p> <p>- the student uses graphs, tables, and algebraic representations to make predictions and solve problems</p>	<p>TEK: the student represents a relationship in numerical, geometric, verbal and symbolic form.</p>
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Algebra II	Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade
<p>SE</p> <p><b>ALGII.2A – (S)</b> use complex numbers to describe the solutions of quadratic equations</p> <p><b>ALGII.4C – (S)</b> describe and analyze the relationship between a function and its inverse</p> <p><b>ALGII.6B – (R)</b> relate representations of quadratic functions, such as algebraic, tabular, graphical, and verbal descriptions</p> <p><b>ALGII.9B – (S)</b> relate representations of square root functions, such as algebraic, tabular, graphical, and verbal descriptions</p> <p><b>ALGII.9G – (S)</b> connect inverses of square root functions with quadratic functions</p> <p><b>ALGII.10B – (S)</b> analyze various representations of rational functions with respect to problem situations</p> <p><b>ALGII.10G – (S)</b> use functions to model and</p>	<p>SE</p> <p><b>ALG.1C (S)</b> – describe functional relationships for given problem situations and write equations or inequalities to answer questions arising from the situations</p> <p><b>ALG.1D (R)</b> – represent relationships among quantities using concrete models, tables, graphs, diagrams, verbal descriptions, equations, and inequalities</p> <p><b>ALG.5C (S)</b> – use, translate, and make connections among algebraic, tabular, graphical, or verbal descriptions of linear functions</p> <p><b>ALG.6A (S)</b> – develop the concept of slope as rate of change and determine slopes from graphs, tables, and algebraic representations</p> <p><b>ALG.6G (S)</b> – relate direct variation to linear functions and solve problems involving</p>	<p>SE</p> <p><b>8.4 – (R)</b> generate a different representation of data given another representation of data (such as table, graph, equation, or verbal description)</p> <p><b>8.5B – (S)</b> find and evaluate an algebraic expression to determine any term in an arithmetic sequence (with a constant rate of change)</p>	<p>SE</p> <p><b>7.4A – (S)</b> generate formulas involving unit conversions, perimeter, area, circumference, volume, and scaling</p> <p><b>7.4B – (S)</b> graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, and scaling</p> <p><b>7.4C – (S)</b> use words and symbols to describe the relationship between the terms in an arithmetic sequence (with constant rate of change) and their positions in the sequence</p>

make predictions in problem situations involving direct and inverse variation <b>ALGII.11A – (R)</b> develop the definition of logarithms by exploring and describing the relationship between exponential functions and their inverse	proportional change <b>ALG.11A (S)</b> – use patterns to generate the laws of exponents and apply them in problem-solving situations <b>ALG.11B (S)</b> – analyze data and represent situations involving inverse variation using concrete growth and decay using concrete models, tables, graphs, or algebraic methods <b>ALG.11C (S)</b> – analyze data and represent situations involving exponential growth and decay using concrete models, tables, graphs, or algebraic methods																																														
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		-make connection between the four representations; students should be able to change data in one from to the other forms. Such as table to graph and graph to table; table to verbal and verbal to table; table to equation and equation to table; problem situation to equation and equation to problem situation -8 <sup>th</sup> grade students are not to go directly from graph to equation -predict first then make mathematical connections between all representations -include algebraic equations that require more than one step to solve -emphasis should be on using the properties of equality to solve the equation -use expression to find the nth term; make the connection between the nth term and the position of the term -use various forms including tabular and verbal -constant rate of change is linear, where n represents the term number	-through exploration make mathematical connections between a pattern that occurs repeatedly to generate formulas and equations -included unit conversions such as 12 in/1 ft -make mathematical connection between a table, graph or/and verbal description of data -if given a table, produce a graph or verbal expression -if given multiple situations, match to corresponding table, graph, and verbal representation -connect the term number with the position in the sequence -connect a table with an expression or verbal description -constant rate of change is a linear pattern (all linear patterns are not proportional) -generate an expression to describe the sequence -determine the nth term in a pattern -understand what nth term means and derive the expression for the nth term																																												
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		Evaluate, algebraic expression, arithmetic sequence, rule, nth term, constant rate, position	Formulas, unit conversions, scaling, sequence, rule, constant rate, nth term, position																																												
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<p>What is the solution set for the following equation?</p> $3\left 1 - \frac{1}{4}x\right  = 9$ <p>A <math>\left\{-\frac{1}{2}, \frac{1}{2}\right\}</math>      C <math>\{-8, 16\}</math></p> <p>B <math>\left\{-\frac{1}{2}, 1\right\}</math>      D <math>\{-8, -16\}</math></p>	<p>A family will travel 350 miles from their house in order to reach Dallas, TX. Which inequality can be used to find all possible values of <math>t</math>, the time it will take this family to reach Dallas in hours, if they travel at an average speed of at least <math>r</math> miles per hour?</p> <p>F <math>t \leq 350r</math></p> <p>G <math>t &gt; \frac{r}{350}</math></p> <p>H <math>t \leq \frac{350}{r}</math></p> <p>J <math>t &gt; 350r^2</math></p>	<p>The total number of washcloths, <math>y</math>, contained in <math>x</math> packages can be represented by the equation <math>y = 8x</math>. Which of the following graphs best represents this situation?</p>	<p>Robert drew the figure shown below.</p> <p>Which equation can be used to determine <math>A</math>, the area of the unshaded part of the figure in square inches?</p> <p>A <math>A = \frac{1}{2}(6 \times 8) + (3 \times 4)</math></p> <p>B <math>A = \frac{1}{2}(6 \times 8) + \frac{1}{2}(3 \times 4)</math></p> <p>C <math>A = \frac{1}{2}(6 \times 8) - \frac{1}{2}(3 \times 4)</math></p> <p>D <math>A = \frac{1}{2}(6 \times 8) - (3 \times 4)</math></p>																																																																																								
<p>Which function is equivalent to its inverse?</p> <p>A <math>f(x) = \frac{2x - 1}{2}</math></p> <p>B <math>g(x) = \frac{3 - x}{3}</math></p> <p>C <math>h(x) = 7 - x</math></p> <p>D <math>j(x) = x - 4</math></p>	<p>Which table shows the same relationship as <math>y = -x^2 + 3x</math>?</p> <p>F</p> <table border="1"> <tbody> <tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>y</td><td>-2</td><td>-2</td><td>0</td><td>4</td><td>10</td></tr> </tbody> </table> <p>G</p> <table border="1"> <tbody> <tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>y</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr> </tbody> </table> <p>H</p> <table border="1"> <tbody> <tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>y</td><td>-10</td><td>-4</td><td>0</td><td>2</td><td>2</td></tr> </tbody> </table> <p>J</p> <table border="1"> <tbody> <tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>y</td><td>-10</td><td>-4</td><td>0</td><td>4</td><td>10</td></tr> </tbody> </table>	x	-2	-1	0	1	2	y	-2	-2	0	4	10	x	-2	-1	0	1	2	y	-2	-1	0	1	2	x	-2	-1	0	1	2	y	-10	-4	0	2	2	x	-2	-1	0	1	2	y	-10	-4	0	4	10	<p>Ramona is walking 10,000 feet for a fund-raiser. She walks at a rate of 270 feet per minute. This situation is modeled by the equation below, where <math>d</math> represents the remaining number of feet Ramona has to walk and <math>t</math> represents the number of minutes she has already walked.</p> $d = 10,000 - 270t$ <p>Which table shows only values that satisfy this equation?</p> <p>F</p> <table border="1"> <thead> <tr><th>t</th><th>d</th></tr> </thead> <tbody> <tr><td>1</td><td>9,730</td></tr> <tr><td>3</td><td>9,190</td></tr> <tr><td>8</td><td>7,840</td></tr> <tr><td>10</td><td>7,300</td></tr> </tbody> </table> <p>G</p> <table border="1"> <thead> <tr><th>t</th><th>d</th></tr> </thead> <tbody> <tr><td>1</td><td>9,730</td></tr> <tr><td>3</td><td>9,460</td></tr> <tr><td>8</td><td>9,190</td></tr> <tr><td>10</td><td>8,920</td></tr> </tbody> </table> <p>H</p> <table border="1"> <thead> <tr><th>t</th><th>d</th></tr> </thead> <tbody> <tr><td>1</td><td>10,000</td></tr> <tr><td>3</td><td>9,460</td></tr> <tr><td>8</td><td>8,110</td></tr> <tr><td>10</td><td>7,570</td></tr> </tbody> </table> <p>J</p> <table border="1"> <thead> <tr><th>t</th><th>d</th></tr> </thead> <tbody> <tr><td>1</td><td>10,000</td></tr> <tr><td>3</td><td>9,730</td></tr> <tr><td>8</td><td>9,460</td></tr> <tr><td>10</td><td>9,190</td></tr> </tbody> </table>	t	d	1	9,730	3	9,190	8	7,840	10	7,300	t	d	1	9,730	3	9,460	8	9,190	10	8,920	t	d	1	10,000	3	9,460	8	8,110	10	7,570	t	d	1	10,000	3	9,730	8	9,460	10	9,190	<p>Miranda made a model airplane using a scale in which 0.25 inch represents 2 feet. Which graph shows this relationship?</p> <p>Airplane Scale</p> <p>A</p> <p>C</p> <p>Airplane Scale</p> <p>B</p> <p>D</p>
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Which function's graph has a vertex at (3, 5) and contains the point (5, 13)?

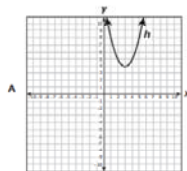
F  $y = \frac{1}{10}(x + 3)^2 - 5$

G  $y = \frac{1}{10}(x - 3)^2 - 5$

H  $y = 2(x - 3)^2 + 5$

J  $y = 2(x + 3)^2 + 5$

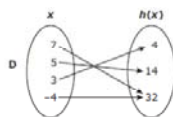
The graph of the quadratic function  $h$  passes through the points  $(-4, 32)$ ,  $(3, 4)$ ,  $(5, 14)$ , and  $(7, 32)$ . Which of the following shows the same relationship as  $h$ ?



C

$x$	$h(x)$
-4	32
3	4
5	14
7	32

B  $h(x) = x^2 + 3x + 4$



Which equation best describes a relationship between  $x$  and  $y$  in the table below?

$x$	$y$
0	5
6	7
12	9
15	10

A  $y = 3x + 5$

B  $y = \frac{1}{5}x + 3$

C  $y = \frac{1}{3}x + 5$

D  $y = x + 5$

Which arithmetic sequence is represented by the expression  $3n + 1$ , where  $n$  represents the position of a term in the sequence?

A 3, 6, 9, 12, 15, ...

B 3, 4, 5, 6, 7, ...

C 4, 5, 6, 7, 8, ...

D 4, 7, 10, 13, 16, ...

A table of values for the quadratic function  $g$  is shown below.

$x$	$g(x)$
-1	-55
2	-16
5	5
6	8
9	5
10	0
12	-16
14	-40

Which of the following statements about the graph of  $g$  are true?

- I. The graph has a line of symmetry at  $x = 7$ .
- II. The graph has a  $y$ -intercept at  $(0, -40)$ .
- III. The graph has an  $x$ -intercept at  $(4, 0)$ .
- IV. The graph has a vertex at  $(6, 8)$ .

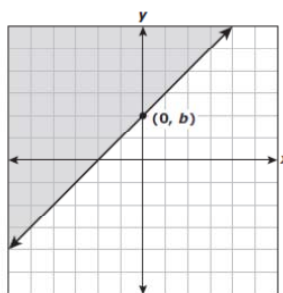
F I and II only

H I, II, and III only

G III and IV only

J I, II, III, and IV

Which inequality can be represented by the graph below?



F  $y \geq x + b$

G  $x - y \geq -b$

H  $x + y \leq b$

J  $-y \leq x + b$

A 7-inch candle burns at a rate of 2 inches an hour. Which equation represents the relationship between  $y$ , the height of the candle in inches, and  $x$ , the number of hours the candle burns?

A  $y = 2x + 7$

B  $y = 7 - 2x$

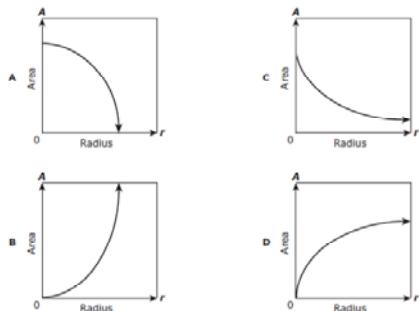
C  $y = 2 - 7x$

D  $y = 7x + 2$

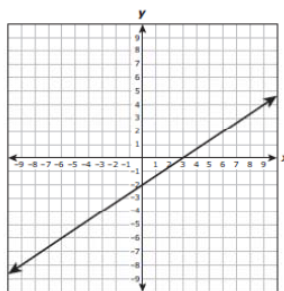
A sector of a circle is shown below.



The area,  $A$ , of the sector is  $\frac{\pi}{4}$  times the square of the radius,  $r$ . Which graph represents this relationship?



A graph is shown below.



Which of the following equations are represented by the graph?

- I.  $y = -\frac{3}{2}x - 2$   
 II.  $2x - 3y = 6$   
 III.  $y = (x - 2)(x - 3)$   
 IV.  $y - 2 = \frac{2}{3}(x - 6)$

- A II and IV  
 B I and III  
 C II and III  
 D I and IV

The expression below describes an arithmetic sequence of numbers.

$$9 - 4n$$

If  $n$  represents the position of a term in the sequence, which of the following sequences of numbers could this expression describe?

- A 4, 3, 2, 1, 0, ...  
 B 5, 10, 15, 20, 25, ...  
 C 5, 1, -3, -7, -11, ...  
 D 13, 17, 21, 25, 29, ...

Some values for the function  $f(x) = \log x$  are given in Table 1.

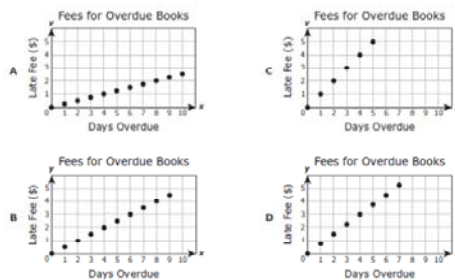
$x$	$f(x)$
10	1
100	2
1,000	3
10,000	4

$x$	$g(x)$
1	10
2	100
3	1,000
4	10,000

Which function can generate all the values in Table 2?

- A  $g(x) = x^{10}$   
 B  $g(x) = 10^x$   
 C  $g(x) = \frac{10}{x}$   
 D  $g(x) = 10x$

The late fee for overdue books at a library is \$0.25 per day per book, with a maximum late fee of \$5.00 per book. Which graph models the total late fee for 3 books that were checked out on the same day and are overdue?



What is the inverse of  $h(x) = \frac{1}{2} \log_3(x)$ ?

- A  $h^{-1}(x) = 3^{(2x)}$   
 B  $h^{-1}(x) = 2(3)^x$   
 C  $h^{-1}(x) = 2(\log_x 3)$   
 D  $h^{-1}(x) = \log_3(2x)$

Which set of ordered pairs contains only points that are on the graph of the function  $y = 12 - 3x$ ?

- A  $\{(-3, -27), (0, 0), (6, 54)\}$   
 B  $\{(-18, 10), (-6, 6), (18, -2)\}$   
 C  $\{(-5, 27), (-1, 15), (8, -12)\}$   
 D  $\{(-7, -9), (-4, 0), (2, 18)\}$

The value of  $y$  varies directly with  $x$ . Which function represents the relationship between  $x$  and  $y$  if  $y = \frac{20}{3}$  when  $x = 30$ ?

- F  $y = 200x$   
 G  $y = \frac{2}{9}x$   
 H  $y = \frac{110}{3}x$   
 J  $y = \frac{9}{2}x$

Which expression is equivalent to  $\frac{12x^6y^{-4}z^2}{3x^2y^{-6}z^3}$ ?

A  $\frac{9x^8z^5}{y^{-10}}$

B  $\frac{4x^8z^5}{y^{-10}}$

C  $\frac{9x^4y^2}{z}$

D  $\frac{4x^4y^2}{z}$

A table of values for the exponential function  $f$  is shown below.

$x$	$f(x)$
1	140,000
2	143,850
3	147,806
4	151,871
5	156,047

Which situation could describe this function?

A The value of a house increases by approximately  $2\frac{3}{4}\%$  per year.

B The value of a house increases by \$3,850 per year.

C The value of a house decreases by approximately  $2\frac{3}{4}\%$  per year.

D The value of a house decreases by \$3,850 per year.

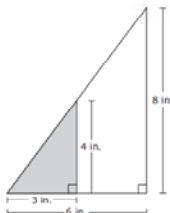
Math  
Vertical Alignment by Grade

Strand: Patterns, Relationships, and Making Predictions

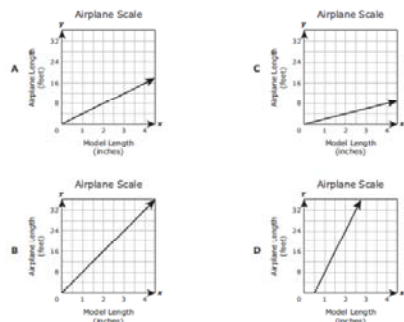
TEK: the student represents a relationship in numerical, geometric, verbal and symbolic form.	TEK: the student uses letters as variables in mathematical expressions to describe how one quantity changes when a related quantity changes	TEK: the student makes generalizations based on observed patterns and relationships	TEK: the student uses patterns in multiplication and division TEK: the student uses organizational structures to analyze and describe patterns and relationships
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7 <sup>th</sup> Grade	6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade
<p>SE <b>7.4A – (S)</b> generate formulas involving unit conversions, perimeter, area, circumference, volume, and scaling <b>7.4B – (S)</b> graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, and scaling <b>7.4C – (S)</b> use words and symbols to describe the relationship between the terms in an arithmetic sequence (with constant rate of change) and their positions in the sequence</p>	<p>SE <b>6.4A – (R)</b> use tables and symbols to represent and describe proportional and other relationships such as those involving conversions, arithmetic sequences (with a constant rate of change), perimeter and area <b>6.4B – (S)</b> use tables of data to generate formulas representing relationships involving perimeter, area, volume of a rectangular prism, etc.</p>	<p>SE <b>5.5A – (R)</b> describe the relationship between sets of data in graphic organizers such as lists, tables, charts, and diagrams <b>5.5B – (S)</b> identify prime and composite numbers using concrete objects, pictorial models, and patterns in factor pairs</p>	<p>SE <b>4.6A – (S)</b> use patterns and relationships to develop strategies to remember basic multiplication and division facts such as the patterns in related multiplication and division number sentences (fact families) such as <math>9 \times 9 = 81</math> and <math>81 \div 9 = 9</math> <b>4.6B – (S)</b> use patterns to multiply by 10 and 100 <b>4.7 – (R)</b> describe the relationship between two sets of related data such as ordered pairs in a table</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
<ul style="list-style-type: none"> <li>-through exploration make mathematical connections between a pattern that occurs repeatedly to generate formulas and equations</li> <li>-included unit conversions such as 12 in/1 ft</li> <li>-make mathematical connection between a table, graph or/and verbal description of data</li> <li>-if given a table, produce a graph or verbal expression</li> <li>-if given multiple situations, match to corresponding table, graph, and verbal representation</li> <li>-connect the term number with the position in the sequence</li> <li>-connect a table with an expression or verbal description</li> <li>-constant rate of change is a linear pattern</li> </ul>	<ul style="list-style-type: none"> <li>-set up a proportion to convert between units using equivalent ratios; do not use cross products to solve</li> <li>-written equation based on a pattern in a table with emphasis on the relationship between the columns</li> <li>-write an algebraic expression to find any term of a given arithmetic sequence</li> <li>-include units (labels) in proportional statement and in table</li> <li>-constant rate of change is a linear situation</li> <li>-not all linear relationships are proportional</li> <li>-write an equation (formula) by recognizing a pattern in a table and testing to see if the pattern holds true</li> <li>-connect verbal, numerical, graphic, and symbolic representations of relationships</li> <li>-given a problem situation with linear data use</li> </ul>	<ul style="list-style-type: none"> <li>-journal writing explaining in words the relationship</li> <li>-pictorial models illustrating the relationship</li> <li>-a variety of tables, charts, lists, picture, bar, line graphs, diagrams</li> <li>-students should work with both horizontal and vertical tables</li> <li>-students may be assessed over double bar graphs and double line graphs</li> <li>-include area arrays, pictorial drawing on grid paper</li> <li>-make connections between the different representations</li> </ul>	<ul style="list-style-type: none"> <li>-include equations/real-life applications</li> <li>-journal fact families – students include explanations on fact families</li> <li>-relate all factors to the product</li> <li>-find patterns using multiple representations (tables, bar graphs, t-charts)</li> <li>-students need to identify the relationship between paired numbers in tables</li> <li>-students should identify the relationship between paired numbers (ordered pairs are numbers that appear in tables or with parenthesis, paired numbers do not necessarily have to appear in a table)</li> <li>-tables may not begin with the number ‘1’ or be in numerical order</li> <li>-assessments may be over the process for finding the solution (journal writing is a must)</li> </ul>



(all linear patterns are not proportional) -generate an expression to describe the sequence -determine the nth term in a pattern -understand what nth term means and derive the expression for the nth term	various methods to formulate the equation -use problem situations that involve equations containing one and two variables -introduced in 6 <sup>th</sup> grade -linear relationships require a constant rate of change																																																										
Vocabulary	Vocabulary	Vocabulary	Vocabulary																																																								
Formulas, unit conversions, scaling, sequence, rule, constant rate, nth term, position	Tables, sequences, constant rate, rule, relationships, formulas, conversions	Data, table, chart, diagram, list, prime, composite, factor pairs, vertical, horizontal	Fact family, multiples, relationship, identify, extend, predict, fact family, table, input, output, rule, interval, labels, data																																																								
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Robert drew the figure shown below.  <p>Which equation can be used to determine A, the area of the unshaded part of the figure in square inches?</p> <p>A <math>A = \frac{1}{2}(6 \times 8) + (3 \times 4)</math></p> <p>B <math>A = \frac{1}{2}(6 \times 8) + \frac{1}{2}(3 \times 4)</math></p> <p>C <math>A = \frac{1}{2}(6 \times 8) - \frac{1}{2}(3 \times 4)</math></p> <p>D <math>A = \frac{1}{2}(6 \times 8) - (3 \times 4)</math></p>	The value of m can be determined by using the expression $(0.05 + j)$ . Which table represents the relationship between the values of m and j? <p>A</p> <table border="1"> <thead> <tr> <th>j</th> <th>8.5</th> <th>9</th> <th>9.5</th> <th>10</th> </tr> </thead> <tbody> <tr> <th>m</th> <td>9</td> <td>9.5</td> <td>10</td> <td>10.5</td> </tr> </tbody> </table> <p>B</p> <table border="1"> <thead> <tr> <th>j</th> <th>8.55</th> <th>9.05</th> <th>9.55</th> <th>10.05</th> </tr> </thead> <tbody> <tr> <th>m</th> <td>8.5</td> <td>9</td> <td>9.5</td> <td>10</td> </tr> </tbody> </table> <p>C</p> <table border="1"> <thead> <tr> <th>j</th> <th>8.5</th> <th>8.55</th> <th>8.6</th> <th>8.65</th> </tr> </thead> <tbody> <tr> <th>m</th> <td>9.5</td> <td>9.55</td> <td>9.6</td> <td>9.65</td> </tr> </tbody> </table> <p>D</p> <table border="1"> <thead> <tr> <th>j</th> <th>8.5</th> <th>9</th> <th>9.5</th> <th>10</th> </tr> </thead> <tbody> <tr> <th>m</th> <td>8.55</td> <td>9.05</td> <td>9.55</td> <td>10.05</td> </tr> </tbody> </table>	j	8.5	9	9.5	10	m	9	9.5	10	10.5	j	8.55	9.05	9.55	10.05	m	8.5	9	9.5	10	j	8.5	8.55	8.6	8.65	m	9.5	9.55	9.6	9.65	j	8.5	9	9.5	10	m	8.55	9.05	9.55	10.05	The table below shows the total number of juice bottles in different numbers of boxes. <table border="1"> <thead> <tr> <th colspan="2">Juice Bottles</th> </tr> <tr> <th>Total Number of Juice Bottles</th> <th>Number of Boxes</th> </tr> </thead> <tbody> <tr> <td>54</td> <td>3</td> </tr> <tr> <td>90</td> <td>5</td> </tr> <tr> <td>108</td> <td>6</td> </tr> <tr> <td>162</td> <td>9</td> </tr> </tbody> </table> <p>Which statement describes the relationship between the total number of juice bottles and the number of boxes?</p> <p>A The total number of juice bottles plus 36 equals the number of boxes.</p> <p>B The total number of juice bottles divided by 18 equals the number of boxes.</p> <p>C The total number of juice bottles times 3 equals the number of boxes.</p> <p>D The total number of juice bottles minus 51 equals the number of boxes.</p>	Juice Bottles		Total Number of Juice Bottles	Number of Boxes	54	3	90	5	108	6	162	9	Laura separated her puzzles into 2 groups. Each group had 5 puzzles. Which number sentence <b>CANNOT</b> be used to find the number of puzzles in these two groups? <p>F <math>\square \div 2 = 5</math></p> <p>G <math>\square + 2 = 5</math></p> <p>H <math>5 \times 2 = \square</math></p> <p>J <math>2 \times 5 = \square</math></p>				
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Miranda made a model airplane using a scale in which 0.25 inch represents 2 feet. Which graph shows this relationship?



A pizza chef at a restaurant uses the same amount of tomato sauce to make each pizza. The table below shows the relationship between the number of pizzas made,  $n$ , and the number of gallons of tomato sauce used,  $g$ .

Tomato Sauce for Pizzas				
Number of Pizzas, $n$	80	112	144	176
Number of Gallons of Tomato Sauce, $g$	5	7	9	11

Based on the information in the table, which expression can be used to find  $g$ , the number of gallons of tomato sauce needed to make  $n$  pizzas?

- F  $n \times 16$   
 G  $n - 75$   
 H  $\frac{n}{16}$   
 J  $n + 32$

Two lists of numbers are shown below.

List P:	16.1	17.3	19.2	21.5
	↓	↓	↓	↓
List Q:	22.0	23.2	25.1	27.4

Which statement about these lists of numbers is true?

- F Each number in List P is 6.1 less than the number below it in List Q.  
 G Each number in List P is 5.9 more than the number below it in List Q.  
 H Each number in List P is 5.9 less than the number below it in List Q.  
 J Each number in List P is 6.1 more than the number below it in List Q.

A season pass at a water park costs \$100. A total of 125 people paid for a season pass. What was the total cost of these season passes?

- A \$225  
 B \$12,500  
 C \$12,005  
 D \$1,250

Which arithmetic sequence is represented by the expression  $3n + 1$ , where  $n$  represents the position of a term in the sequence?

- A 3, 6, 9, 12, 15, ...  
 B 3, 4, 5, 6, 7, ...  
 C 4, 5, 6, 7, 8, ...  
 D 4, 7, 10, 13, 16, ...

There is a relationship between the values of  $p$  and  $k$  in the table below.

$p$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$
$k$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$	1

Which expression represents the value of  $k$  in terms of  $p$ ?

- A  $p + \frac{1}{8}$   
 B  $p + \frac{1}{16}$   
 C  $p + \frac{1}{2}$   
 D  $p + \frac{1}{4}$

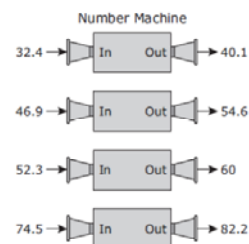
Kenji has a collection of rectangular prisms of different heights. Each rectangular prism has a length of 5 cm and a width of 2 cm. The table below shows the relationship between each rectangular prism's volume,  $V$ , and the rectangular prism's height,  $h$ .

Kenji's Collection of Prisms	
Volume, $V$ (cm <sup>3</sup> )	Height, $h$ (cm)
20	2
90	9
160	16
230	23

Which equation can be used to find  $V$ , the volume in cubic centimeters of a rectangular prism in Kenji's collection?

- A  $10h = V$   
 B  $7h = V$   
 C  $h = 7V$   
 D  $h = 10V$

Rachelle used a number machine. When she put a number into the machine, a different number came out according to a rule. Some examples are shown below.



The number that came out of the machine is —

- F 8.3 less than the number she put into the machine  
 G 7.7 less than the number she put into the machine  
 H 8.3 more than the number she put into the machine  
 J 7.7 more than the number she put into the machine

The table below shows the total number of nails in different numbers of boxes.



Boxes of Nails				
Total Number of Nails	480	960	1,440	1,920
Number of Boxes	3	6	9	12

Which statement describes the relationship between the total number of nails and the number of boxes?

- F The total number of nails is the number of boxes plus 480.  
 G The total number of nails is the number of boxes times 2.  
 H The total number of nails is the number of boxes times 160.  
 J The total number of nails is the number of boxes plus 3.

A number sentence is shown below.

$$\square \times 25 = \bigcirc$$

Which table shows numbers that correctly complete the number sentence?

F	<table border="1"><tr><td><input type="checkbox"/></td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td><input type="radio"/></td><td>75</td><td>125</td><td>175</td><td>200</td></tr></table>	<input type="checkbox"/>	3	5	7	9	<input type="radio"/>	75	125	175	200	H	<table border="1"><tr><td><input type="checkbox"/></td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td><input type="radio"/></td><td>75</td><td>100</td><td>125</td><td>150</td></tr></table>	<input type="checkbox"/>	3	5	7	9	<input type="radio"/>	75	100	125	150
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The table below shows the amount of money Hector earned and spent during each of four months.

Hector's Money		
Month	Amount Earned	Amount Spent
May	\$27	\$12
June	\$39	\$24
July	\$46	\$31
August	\$43	\$28

Which of the following describes the relationship in the table?

- F Amount spent + 12 = amount earned  
 G Amount spent  $\times$  2 = amount earned  
 H Amount spent + 15 = amount earned  
 J Amount spent - 15 = amount earned

Luke made the list of numbers below.

40	41	42	43	44	45	46	47	48	49
----	----	----	----	----	----	----	----	----	----

How many of the numbers in Luke's list are prime numbers?

- F 3  
G 7  
H 10  
J 5



The table below shows the total number of computers in different numbers of classrooms in a school.

Total Number of Computers	Number of Classrooms
105	15
84	12
42	6
21	3









Which of the following describes the relationship in the table?

- A Total number of computers  $\times$  19 = number of classrooms  
B Total number of computers  $\div$  3 = number of classrooms  
C Total number of computers  $\times$  90 = number of classrooms  
D Total number of computers  $\div$  7 = number of classrooms

The table below shows two related sets of numbers.

	
60	20
45	15
33	11
9	3

Which of the following describes the relationship in the table?

- F   $- 15 =$    
G   $\div 3 =$    
H   $- 40 =$    
J   $\div 6 =$  


Math  
Vertical Alignment by Grade

Strand: Patterns, Relationships, and Making Predictions

TEK: the student uses patterns in multiplication and division TEK: the student uses organizational structures to analyze and describe patterns and relationships	TEK: the student uses patterns to solve problems TEK: the student uses lists, tables, and charts to express patterns and relationships	TEK: the student uses patterns in numbers and operations TEK: the student uses patterns to describe relationships and make predictions	TEK: the student recognizes patterns in number and operations TEK: the student uses repeating patterns and additive patterns to make predictions	TEK: the student identifies, extends, and creates patterns TEK: the student uses patterns to make predictions
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4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
<p>SE</p> <p><b>4.6A – (S)</b> use patterns and relationships to develop strategies to remember basic multiplication and division facts such as the patterns in related multiplication and division number sentences (fact families) such as <math>9 \times 9 = 81</math> and <math>81 \div 9 = 9</math></p> <p><b>4.6B – (S)</b> use patterns to multiply by 10 and 100</p> <p><b>4.7 – (R)</b> describe the relationship between two sets of related data such as ordered pairs in a table</p>	<p>SE</p> <p><b>3.6A – (S)</b> identify and extend whole-number and geometric patterns to make predictions and solve problems</p> <p><b>3.6B – (S)</b> identify patterns in multiplication facts using concrete objects, pictorial models, or technology</p> <p><b>3.6C – (S)</b> identify patterns in related multiplication and division sentences (fact families) such as <math>2 \times 3 = 6</math>, <math>3 \times 2 = 6</math>, <math>6 \div 2 = 3</math>, <math>6 \div 3 = 2</math></p> <p><b>3.7A – (S)</b> generate a table of paired numbers based on a real-life situation such as insects and legs</p> <p><b>3.7B – (R)</b> identify and describe patterns in a table of related number pairs based on a meaningful problem and extend the table</p>	<p>SE</p> <p><b>2.5A – (S)</b> find patterns in numbers such as in a 100s chart</p> <p><b>2.5B – (S)</b> use patterns in place value to compare and order whole number through 999</p> <p><b>2.5C – (R)</b> use patterns and relationships to develop strategies to remember basic addition and subtraction facts. Determine patterns in related addition and subtraction number sentences (including fact families) such as <math>8 + 9 = 17</math>, <math>9 + 8 = 17</math>, <math>17 \div 8 = 9</math>, <math>17 \div 9 = 8</math></p> <p><b>2.6A – (S)</b> generate a list of paired numbers based on real-life situation such as insects and legs</p> <p><b>2.6B – (S)</b> identify patterns in a list of related number pairs based on a real-life situation and extend the list</p> <p><b>2.6C – (R)</b> identify, describe and extend repeating and additive patterns to make predictions and solve problems</p>	<p>SE</p> <p><b>1.4 – (S)</b> identify, describe, and extend concrete and pictorial patterns in order to make predictions and solve problems</p> <p><b>1.5A – (R)</b> use patterns to skip count by twos, fives, and tens</p> <p><b>1.5B – (S)</b> find patterns in numbers including odd and even</p> <p><b>1.5C – (R)</b> compare and order whole numbers using place value</p> <p><b>1.5D – (S)</b> use patterns to develop strategies to solve basic addition and basic subtraction problems</p> <p><b>1.5E – (R)</b> identify patterns in related addition and subtraction sentences (fact families for sums to 18) such as <math>2 + 3 = 5</math>, <math>3 + 2 = 5</math>, <math>5 - 2 = 3</math>, <math>5 - 3 = 2</math></p>	<p>SE</p> <p><b>K.5 – (R)</b> identify, extend and create patterns of sounds, physical movement, and concrete objects</p> <p><b>K.6A – (S)</b> use patterns to predict what comes next, including cause-and-effect relationships</p> <p><b>K.6B – (R)</b> count by ones to 100</p> <p><b>K.2A – (S)</b> use language such as before or after to describe relative position in a sequence of events or objects</p> <p><b>K.2B – (S)</b> name the ordinal positions in a sequence such as first, second, third, etc.</p> <p><b>K.7A – (S)</b> describe one object in relation to another using informal language such as over, under, above, and below</p> <p><b>K.7B – (S)</b> place an object in a specified position</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
		Emphasize additive/growing and skip counting patterns Use number lines and hundred charts Determine the ‘rule’ – what is the pattern, number line	Emphasize additive/growing and skip counting patterns Use number lines and hundred charts Determine the ‘rule’ – what is the pattern, number line	Emphasize number patterns Number lines and hundred charts are tools for identifying number patterns

		counting by?	counting by?	
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
<ul style="list-style-type: none"> <li>-include equations/real-life applications</li> <li>-journal fact families – students include explanations on fact families</li> <li>-relate all factors to the product</li> <li>-find patterns using multiple representations (tables, bar graphs, t-charts)</li> <li>-students need to identify the relationship between paired numbers in tables</li> <li>-students should identify the relationship between paired numbers (ordered pairs are numbers that appear in tables or with parenthesis, paired numbers do not necessarily have to appear in a table)</li> <li>-tables may not begin with the number '1' or be in numerical order</li> <li>-assessments may be over the process for finding the solution (journal writing is a must)</li> </ul>	<ul style="list-style-type: none"> <li>-journal writing must be used to explain the process, thinking, and predictions of students</li> <li>-use pictorial representations</li> <li>-use real-life application</li> <li>-use problem situation word problems</li> <li>-use growing patterns</li> <li>-tables do not have to begin with the number '1' or be in numerical order</li> <li>-multiplication patterns presented or recorded in tables</li> <li>-identify relationships between paired numbers</li> <li>-use concrete models and bridge to the abstract (number) through pictorial representations</li> <li>-students need to recognize the relationship of the items in the table or pattern</li> <li>-students need to understand the difference between factors and multiples</li> <li>--journal/include explanations of relationships in fact families</li> <li>-generating a table of paired numbers is introduced in 3<sup>rd</sup> grade</li> <li>-journal writing describing patterns</li> <li>-predictions by extending tables</li> <li>-analyze the table (what's the rule)</li> </ul>	<ul style="list-style-type: none"> <li>-students discover and communicate what happens when +/- 10, describe patterns (including what stays the same and what changes) in columns and rows</li> <li>-students compare numbers when keeping the 100s value the same and change the ones</li> <li>-what is the number that comes between</li> <li>-use concrete models such as base ten blocks, unifix cubes to demonstrate the pattern</li> <li>-students work with doubles, near doubles and near tens</li> <li>-students use counting on and back</li> <li>-this is the first time students extend patters using numbers</li> <li>-repeating and growing patterns using pictures of bugs, animals, or other real objects, geometric shapes, numbers or bead</li> <li>-repeated addition of the same number produces a growing pattern</li> </ul>	<ul style="list-style-type: none"> <li>-include growing patterns that repeat.</li> <li>-growing patterns are additive patterns</li> <li>-include repeating patterns such as ABABAB, ABACABAC</li> <li>-repetitive addition using pictorial patterns, eyes on a bear, one bear, two bears, three bears, etc.</li> <li>-predict only the next in the series</li> <li>-use visual representation such as tally marks for 5s, bundled straws for 10s</li> <li>-looking at number patterns – the students will recognize that the ones place determines odd or even properties of numbers</li> <li>-describe odd and even geometrically by using tiles to attempt to create rectangles to represent the number</li> <li>-use a 0-99 chart to find number patterns</li> <li>-compare and order whole numbers up to 99 using various tools including a 100s chart</li> <li>-students compare numbers when keeping the ten value the same and change the ones</li> <li>-keep the ones value the same and change the tens</li> <li>-when given numbers such as 34, 35, 36 in random order students are able to order the numbers</li> <li>-doubles and doubles plus</li> <li>-recognize patterns of plus ten</li> <li>-counting up or counting back</li> </ul>	<ul style="list-style-type: none"> <li>-physical movement: stomp, clap, jump, etc.</li> <li>-concrete objects: people (boy,girl), manipulatives, such as pattern blocks</li> <li>-Sound: loud/soft, high/low</li> <li>-environmental patterns in prints (wall paper, snakes, etc.)</li> <li>-such as ABAB, ABBABB, patterns as well as growing patterns such as AB, ABB, ABBB...</li> <li>-start at numbers such as 27 and count up 5 numbers (this is important to developing the add up (count up) method of addition)</li> <li>-recommend using 0-99 board to shown patterns</li> <li>-student should be able to verbally count to 100 (not write)</li> <li>-look for patterns as we count to 100</li> <li>-find patterns in rows and columns</li> </ul>
Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary
Fact family, multiples, relationship, identify, extend, predict, fact family, table, input, output, rule, interval, labels, data	Identify, extend, predict, fact family, table, input, output, rule, interval, labels, data	Pattern, compare, order, hundreds chart, greater than, less than, number pattern, number line, interval, rule, fact family, paired numbers, extend,	Pattern, number pattern, repeating pattern, growing pattern, identify, describe, even numbers, odd numbers, predict, skip counting, fact	Sound pattern, repeating pattern, growing pattern, over, under, above, below, behind, between, in front, inside, outside, near, prediction,

		predict, identify, describe, repeating pattern, additive pattern, growing pattern, increase, decrease, extending pattern	families, number lines	sequence, ordinal numbers, first, second, third, fourth, fifth																																								
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<p>Laura separated her puzzles into 2 groups. Each group had 5 puzzles. Which number sentence <b>CANNOT</b> be used to find the number of puzzles in these two groups?</p> <p>F <input type="checkbox"/> <math>\div 2 = 5</math></p> <p>G <input type="checkbox"/> <math>+ 2 = 5</math></p> <p>H <math>5 \times 2 = \square</math></p> <p>J <math>2 \times 5 = \square</math></p>	<p>The numbers below form a pattern.</p> <p style="text-align: center;">3, 16, 29, 42, 55, ...</p> <p>Which of these numbers would <b>NOT</b> be part of this pattern?</p> <p>A 68</p> <p>B 81</p> <p>C 71</p> <p>D 94</p>																																											
<p>A season pass at a water park costs \$100. A total of 125 people paid for a season pass. What was the total cost of these season passes?</p> <p>A \$225</p> <p>B \$12,500</p> <p>C \$12,005</p> <p>D \$1,250</p>	<p>Janie collected 10 sea stars at the beach. Each sea star had 5 arms, as shown below.</p>  <p>Which expression can be used to find the total number of arms on 10 sea stars?</p> <p>A <math>10 \div 5</math></p> <p>B <math>10 - 5</math></p> <p>C <math>10 + 5</math></p> <p>D <math>10 \times 5</math></p>																																											
<p>A number sentence is shown below.</p> <p style="text-align: center;"><input type="checkbox"/> <math>\times 25 = \bigcirc</math></p> <p>Which table shows numbers that correctly complete the number sentence?</p> <p>F <table border="1" style="display: inline-table; margin-right: 20px;"><tr><td><input type="checkbox"/></td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td><input type="radio"/></td><td>75</td><td>125</td><td>175</td><td>200</td></tr></table> H <table border="1" style="display: inline-table;"><tr><td><input type="checkbox"/></td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td><input type="radio"/></td><td>75</td><td>100</td><td>125</td><td>150</td></tr></table></p> <p>G <table border="1" style="display: inline-table; margin-right: 20px;"><tr><td><input type="checkbox"/></td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td><input type="radio"/></td><td>25</td><td>50</td><td>75</td><td>100</td></tr></table> J <table border="1" style="display: inline-table;"><tr><td><input type="checkbox"/></td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td><input type="radio"/></td><td>75</td><td>125</td><td>175</td><td>225</td></tr></table></p>	<input type="checkbox"/>	3	5	7	9	<input type="radio"/>	75	125	175	200	<input type="checkbox"/>	3	5	7	9	<input type="radio"/>	75	100	125	150	<input type="checkbox"/>	3	5	7	9	<input type="radio"/>	25	50	75	100	<input type="checkbox"/>	3	5	7	9	<input type="radio"/>	75	125	175	225	<p>Belinda made 5 gallons of fruit punch for a party. There are 8 pints in each gallon of punch. Which expression is in the same fact family as <math>8 \times 5 = 40</math>?</p> <p>F <math>5 \times 40</math></p> <p>G <math>8 + 5</math></p> <p>H <math>40 \div 8</math></p> <p>J <math>40 - 8</math></p>			
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The table below shows the amount of money Hector earned and spent during each of four months.

Hector's Money

Month	Amount Earned	Amount Spent
May	\$27	\$12
June	\$39	\$24
July	\$46	\$31
August	\$43	\$28

Which of the following describes the relationship in the table?

- F Amount spent  $\div$  12 = amount earned  
 G Amount spent  $\times$  2 = amount earned  
 H Amount spent  $\div$  15 = amount earned  
 J Amount spent  $-$  15 = amount earned

Each meal at a restaurant costs \$9. Which table shows the total cost for different numbers of meals?

Meals

F

Number of Meals	7	8	11	15
Total Cost	\$63	\$72	\$99	\$135

Meals

G

Number of Meals	7	8	11	15
Total Cost	\$16	\$17	\$20	\$24

Meals

H

Number of Meals	7	8	11	15
Total Cost	\$63	\$72	\$81	\$90

Meals

J

Number of Meals	7	8	11	15
Total Cost	\$9	\$18	\$27	\$36

Georgia made cupcakes for a bake sale. The table below shows the total number of cupcakes in different numbers of pans.

Cupcakes

Number of Pans	Total Number of Cupcakes
4	24
6	36
11	66
13	
20	120

There is the same number of cupcakes in each pan. What is one way to find the total number of cupcakes in 13 pans?

- F Find the sum of 66 and 36  
 G Find the difference between 120 and 13  
 H Find the product of 13 and 6  
 J Find the difference between 120 and 66

The table below shows the total number of computers in different numbers of classrooms in a school.



School Computers

Total Number of Computers	Number of Classrooms
105	15
84	12
42	6
21	3









Which of the following describes the relationship in the table?

- A Total number of computers  $-$  19 = number of classrooms  
 B Total number of computers  $\div$  3 = number of classrooms  
 C Total number of computers  $-$  90 = number of classrooms  
 D Total number of computers  $\div$  7 = number of classrooms

The table below shows two related sets of numbers.

	
60	20
45	15
33	11
9	3

Which of the following describes the relationship in the table?

- F   $-$  15 =   
 G   $\div$  3 =   
 H   $-$  40 =   
 J   $\div$  6 = 

The table below shows the total number of postcards in different numbers of packages.

Postcards

Number of Packages	Total Number of Postcards
2	24
6	72
8	
10	120
12	144

Each package has the same number of postcards. What is the total number of postcards in 8 of these packages?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

The table below shows the total number of granola bars in different numbers of boxes.

Number of Boxes	2	4	8	9
Total Number of Granola Bars	32		128	144

Each box has the same number of granola bars. What is the total number of granola bars in 4 boxes?

F  $124$ , because  $128 - 4 = 124$

G  $48$ , because  $16 \times 3 = 48$

H  $96$ , because  $128 - 32 = 96$

J  $64$ , because  $16 \times 4 = 64$

The table below shows the total number of rulers in different numbers of boxes.

Number of Boxes	1	3	5	9
Total Number of Rulers	12	36		108

There is an equal number of rulers in each box. Which number sentence shows how to find the total number of rulers in 5 boxes?

F  $5 + 36 = 41$

G  $5 \times 9 = 45$

H  $5 + 24 = 29$

J  $5 \times 12 = 60$



Math  
Vertical Alignment by Grade

Strand: Equations and Functions

<p>TEK: the student develops and applies skills used in college and careers, including reasoning, planning, and communication, to make decisions and solve problems in applied situations involving numerical reasoning, probability, statistical analysis, finance, mathematical selection, and modeling with algebra, geometry, trigonometry, and discrete mathematics</p> <p>TEK: the student analyzes real-world numerical data using a variety of quantitative measures and numerical processes</p> <p>TEK: the student analyzes the mathematics behind various methods of ranking and selection</p> <p>TEK: the student models data, makes predictions, and judges the validity of a prediction</p> <p>TEK: the student uses mathematical models to represent, analyze, and solve real-world problems involving change</p>	<p>TEKs – the student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions</p> <p>TEK: the student uses functions and their properties, tools and technology, to model and solve meaningful problems</p> <p>TEK: the student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems</p>	<p>TEK: the student uses a variety of strategies and approaches to solve both routine and non-routine problems</p> <p>TEK: the student uses algebraic and geometric models to describe situations and solve problems</p>	<p>TEK: the student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly</p>
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AQR	Pre-Cal	MMA	Geometry
<p>SE</p> <p><b>AQR.1B</b> – demonstrate reasoning skills in developing, explaining, and justifying sounds mathematical arguments, and analyze the soundness of mathematical arguments of others</p> <p><b>AQR.2B</b> – solve problems involving large quantities that are not easily measured</p> <p><b>AQR.7A</b> – apply, analyze, and compare various ranking algorithms to determine an appropriate method to solve a real-world problem</p> <p><b>AQR.7B</b> – analyze and compare various voting and selection processes to determine an appropriate method to solve a real-world problem</p> <p><b>AQR.8A</b> – determine if there is linear relationship in a set of bivariate data by finding the correlation coefficient for the data, and interpret the coefficient as a measure of the strength and direction of the linear relationship</p> <p><b>AQR.9B</b> – analyze and determine an</p>	<p>SE</p> <p><b>PC.1B</b> – determine the domain and range of functions using graphs, tables, and symbols</p> <p><b>PC.1D</b> – recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, and the symbolic representation of a function</p> <p><b>PC.3B</b> – use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data</p> <p><b>PC.3C</b> – use regression to determine the appropriateness of a linear function to model real-life data (including using technology to determine the correlation coefficient)</p> <p><b>PC.3D</b> – use properties of functions to analyze and solve problems and make predictions</p> <p><b>PC.3E</b> – solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed</p> <p><b>PC.4B</b> – use arithmetic, geometric, and other</p>	<p>SE</p> <p><b>MMA.1B</b> – use multiple approaches (algebraic, graphical, and geometric methods) to solve problems from a variety of disciplines</p> <p><b>MMA.1C</b> – select a method to solve a problem, defend the method, and justify the reasonableness of the results</p> <p><b>MMA.8B</b> – use trigonometric ratios and functions available through technology to calculate distances and model periodic motion</p>	<p>SE</p> <p><b>GOEM.7C</b> – derive and use formulas involving length, slope and midpoint</p>

appropriate cyclical model that can be modeled with trigonometric functions <b>AQR.9C</b> – analyze and determine an appropriate piecewise model <b>AQR.9D</b> – solve problems using recursion or iteration	sequences and series to solve real-life problems <b>PC.4D</b> – apply sequences and series to solve problems including sums and binomial expansion														
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			<p><math>\overline{CD}</math> has an endpoint at <math>(2, -1)</math> and a midpoint at <math>(8, 3)</math>. Which measure is closest to the length of <math>\overline{CD}</math>?</p> <p><b>A</b> 20.4 units  <b>B</b> 8.9 units  <b>C</b> 14.4 units  <b>D</b> 11.7 units</p>												
			<p>The slope of a line passing through <math>H(-2, 5)</math> is <math>-\frac{3}{4}</math>. Which ordered pair represents a point on this line?</p> <p><b>A</b> <math>(6, -1)</math>  <b>B</b> <math>(2, 8)</math>  <b>C</b> <math>(-5, 1)</math>  <b>D</b> <math>(1, 1)</math></p>												
			<p>A civil engineer is drawing a plan for the location and length of a new underground sewer pipe on a coordinate grid. The pipe on the plan will run from point <math>N(a, -2)</math> to point <math>P(1, b)</math> on the coordinate grid. Which expression represents the shortest distance between <math>N</math> and <math>P</math> in units?</p> <p><b>F</b> <math>(a + 2)^2 + (1 - b)^2</math>  <b>G</b> <math>(1 - a)^2 + (b + 2)^2</math>  <b>H</b> <math>\sqrt{(a + 2)^2 + (1 - b)^2}</math>  <b>J</b> <math>\sqrt{(1 - a)^2 + (b + 2)^2}</math></p>												

Math  
Vertical Alignment by Grade

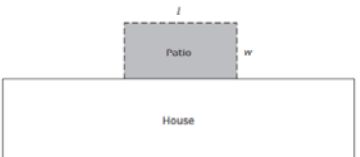
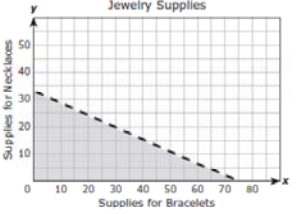
Strand: Equations and Functions

<p>TEK: the student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly</p>	<p>TEK: the student formulates systems of equations and inequalities from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situations</p> <p>TEK: the student understands that quadratic functions can be represented in different ways and translates among their various representations</p> <p>TEK: the student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>TEK: the student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>TEK: the student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>TEK: the student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p>	<p>TEK: the student understands that linear functions can be represented in different ways and translates among their various representations.</p> <p>TEK: the student formulates equations and inequalities based on linear functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>TEK: the student formulates systems of linear equations from problem situations, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>TEK: the student understands that the graphs of quadratic functions are affected by the parameters of the function and can interpret and describe the effects of changes in the parameters of quadratic functions</p> <p>TEK: the student understands there is more than one way to solve a quadratic equation and solves them using appropriate methods</p>	<p>TEK: the student uses graphs, tables, and algebraic representations to make predictions and solve problems</p>
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Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade
<p>SE <b>GOEM.7C</b> – derive and use formulas involving length, slope and midpoint</p>	<p>SE <b>ALGII.3A – (R)</b> analyze situations and formulate systems of equations in two or more unknowns or inequalities in two unknowns to solve problems</p> <p><b>ALGII.3B – (R)</b> use algebraic methods, graphs, tables, or matrices to solve systems of equations or inequalities</p> <p><b>ALGII.3C – (R)</b> interpret and determine the reasonableness of solutions to systems of equations or inequalities for given context</p> <p><b>ALGII.6A – (R)</b> determine the reasonable domain and range values of quadratic functions, as well as interpret and determine the reasonableness of solutions to quadratic equations and inequalities</p> <p><b>ALGII.8A – (R)</b> analyze situations involving quadratic functions and formulate quadratic equations or inequalities to solve problems</p> <p><b>ALGII.8D – (R)</b> solve quadratic equations and inequalities using graphs, tables, and algebraic methods</p> <p><b>ALGII.9C – (S)</b> determine the reasonable domain and</p>	<p>SE: <b>ALG.5B – (S)</b> determine the domain and range for linear functions in given situations</p> <p><b>ALG.5C – (R)</b> use, translate, and make connections among algebraic, tabular, graphical, or verbal descriptions of linear functions</p> <p><b>ALG.7A – (S)</b> analyze situation involving linear functions and formulate linear equations or inequalities to solve problems</p> <p><b>ALG.7B – (R)</b> investigate methods for solving linear equations and inequalities using (concrete) models, graphs, and the properties of equality, select a method, and solve the equations and inequalities</p> <p><b>ALG.7C – (S)</b> interpret and determine the reasonableness of solutions to linear equations and inequalities</p> <p><b>ALG.8A – (S)</b> analyze situations and</p>	<p>SE <b>8.5A – (R)</b> predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations</p>

	<p>range values of square root functions, as well as interpret and determine the reasonableness of solutions to square root equations and inequalities</p> <p><b>ALGII.9D – (S)</b> determine solutions of square root equations using graphs, tables, and algebraic methods</p> <p><b>ALGII.9E – (S)</b> determine solutions of square root inequalities using graphs and tables</p> <p><b>ALGII.9F – (R)</b> analyze situations modeled by square root functions, formulate equations or inequalities, select a method, and solve problems</p> <p><b>ALGII.10C – (S)</b> determine the reasonable domain and range values of rational functions, as well as interpret and determine the reasonableness of solutions to rational equations and inequalities</p> <p><b>ALGII.10D – (S)</b> determine the solutions of rational equations using graphs, tables, and algebraic methods</p> <p><b>ALGII.10E – (S)</b> determine solutions of rational inequalities using graphs and tables</p> <p><b>ALGII.10F – (R)</b> analyze a situation modeled by a rational function, formulate an equation or inequality composed of a linear or quadratic function, and solve the problem</p> <p><b>ALGII.11C - (S)</b> determine the reasonable domain and range values of exponential and logarithmic functions, as well as interpret and determine the reasonableness of solutions to exponential and logarithmic equations and inequalities</p> <p><b>ALGII.11D – (S)</b> determine solutions of exponential and logarithmic equations using graphs, tables, and algebraic methods</p> <p><b>ALGII.11E – (S)</b> determine solutions of exponential and logarithmic inequalities using graphs and tables</p> <p><b>ALGII.11F – (R)</b> analyze a situation modeled by an exponential function, formulate and equations or inequality and solve the problem</p>	<p>formulate systems of linear equations in two unknowns to solve problems</p> <p><b>ALG.8B – (R)</b> solve systems of linear equations using (concrete) models, graphs, tables, and algebraic methods</p> <p><b>ALG.8C – (S)</b> interpret and determine the reasonableness of solutions to systems of linear equations</p> <p><b>ALG.9A – (S)</b> determine the domain and range for quadratic functions in given situations</p> <p><b>ALG.10A – (R)</b> solve quadratic equations using concrete models, tables, graphs, and algebraic methods</p>	
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
			<ul style="list-style-type: none"> <li>-predict first then make mathematical connections between all representations (tables, graphs, and algebraic equations)</li> <li>-include algebraic equations that require more than one step to solve</li> <li>-emphasis should be on using the properties of equality to solve the equation</li> <li>-use expression to find the nth term; make the connection between the nth term and the position of the term</li> </ul>

			-use various forms including tabular and verbal -constant rate of change is linear ex. $2n + 3$ , where n represents the term number																																																																																																												
Vocabulary	Vocabulary	Vocabulary	Vocabulary																																																																																																												
			Equations, expressions, variable, nth term, constant rate of change, coefficient, function, zero pairs																																																																																																												
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<p><math>\overline{CD}</math> has an endpoint at <math>(2, -1)</math> and a midpoint at <math>(6, 3)</math>. Which measure is closest to the length of <math>\overline{CD}</math>?</p> <p>A 20.4 units B 8.9 units C 14.4 units D 11.7 units</p>	<p>The rectangular patio shown in the diagram below is enclosed on three sides by a fence.</p>  <p>The area of this patio is no more than 400 square feet. The total length of the three sides of this fence is no more than 60 feet. Which system of inequalities can be used to find values of <math>l</math>, the patio's length, and <math>w</math>, the patio's width, that will satisfy these conditions?</p> <p>A <math>l + 2w \leq 60</math> <math>lw \leq 400</math></p> <p>B <math>2l + 2w \leq 60</math> <math>lw \leq 400</math></p> <p>C <math>l + 2w \geq 60</math> <math>lw \geq 400</math></p> <p>D <math>2l + 2w \geq 60</math> <math>lw \geq 400</math></p>		
<p>The slope of a line passing through <math>N(-2, 5)</math> is <math>-\frac{3}{4}</math>. Which ordered pair represents a point on this line?</p> <p>A <math>(6, -1)</math> B <math>(2, 8)</math> C <math>(-5, 1)</math> D <math>(1, 1)</math></p>	<p>The hypotenuse of a right triangle is 17 inches long. A leg of this triangle, <math>y</math>, is 1 inch less than twice the length of the other leg, <math>x</math>. Which system of equations can be used to determine the lengths of the 2 legs of this right triangle in inches?</p> <p>F <math>x^2 + y^2 = 289</math> <math>y = 2x - 1</math></p> <p>G <math>x^2 + y^2 = 289</math> <math>2x + y = 1</math></p> <p>H <math>x + y = 17</math> <math>y = 2x - 1</math></p> <p>J <math>x + y = 17</math> <math>2x + y = 1</math></p>		
<p>A civil engineer is drawing a plan for the location and length of a new underground sewer pipe on a coordinate grid. The pipe on the plan will run from point <math>N(a, -2)</math> to point <math>P(1, b)</math> on the coordinate grid. Which expression represents the shortest distance between <math>N</math> and <math>P</math> in units?</p> <p>F <math>(a + 2)^2 + (1 - b)^2</math> G <math>(1 - a)^2 + (b + 2)^2</math> H <math>\sqrt{(a + 2)^2 + (1 - b)^2}</math> J <math>\sqrt{(1 - a)^2 + (b + 2)^2}</math></p>	<p>A craftsman wants to spend less than \$300 on supplies for making bracelets and necklaces. Supplies for 1 bracelet cost \$4, and supplies for 1 necklace cost \$9. This relationship is shown in the graph below.</p>  <p>The craftsman wants to make at least 10 more bracelets than necklaces. Which of the following is a reasonable solution?</p> <p>A 25 bracelets and 20 necklaces B 30 bracelets and 15 necklaces C 40 bracelets and 20 necklaces D 15 bracelets and 25 necklaces</p>		
	<p>Each year an architecture firm employs senior interns and junior interns. Senior interns receive \$400 per week, and junior interns receive \$300 per week. This year a minimum of 7 but no more than 13 interns will be hired. The amount spent per week on interns cannot exceed \$4,000. Which statement about this situation is not true?</p> <p>A The architecture firm can employ 13 junior interns. B The architecture firm can employ 4 senior interns and 7 junior interns. C If both types of interns are hired, the firm will spend a minimum of \$2,200 per week on interns. D If both types of interns are hired, the firm will spend a maximum of \$3,800 per week on interns.</p>		
	<p>The function below can be used to model the area of a rectangle in square inches, <math>A</math>, if the rectangle has a perimeter of 72 inches and a width of <math>w</math> inches.</p> $A = 36w - w^2$ <p>In this situation, which of the following best describes the domain of the function?</p> <p>F <math>0 &lt; w &lt; 6</math> G <math>0 &lt; w &lt; 72</math> H <math>0 &lt; w &lt; 18</math> J <math>0 &lt; w &lt; 36</math></p>		

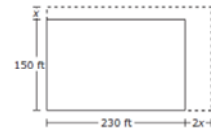
What is the range of  $f(x) = x^2 + 1$ ?

- A All real numbers
- B All real numbers greater than or equal to 0
- C All real numbers greater than or equal to 1
- D All real numbers less than or equal to 1

The product of 2 consecutive odd integers is 483. If  $x$  represents the smaller integer, which equation can be used to find both integers?

- A  $x(x + 2) = 483$
- B  $x(x + 1) = 483$
- C  $x(x + 3) = 483$
- D  $(x + 1)(x + 2) = 483$

A rectangular parking lot measures 150 feet by 230 feet. The owner of the parking lot will expand the lot's size by adding  $x$  feet and  $2x$  feet to its dimensions, as shown below.



If the total area of the parking lot cannot exceed 40,000 square feet, which inequality can be used to find all possible values of  $x$ ?

- A  $(230 + 2x)(150 + x) \leq 40,000$
- B  $(230 + x)(150 + 2x) \leq 40,000$
- C  $(230 + 2x)(150 + x) \geq 40,000$
- D  $(230 + x)(150 + 2x) \geq 40,000$

Which of the following is a solution to  $10x^2 - x = 3$ ?

- F  $-\frac{1}{5}$
- G  $\frac{3}{5}$
- H  $-\frac{3}{2}$
- J  $\frac{1}{2}$

The table below shows values of a quadratic function  $g$ .

$x$	$g(x)$
-5	-11
-4	8
-3	21
-2	28
-1	29
0	24
1	13
2	-4
3	-27

Based on the table, in which interval can a solution to  $g(x) = 0$  be found?

- A  $-5 < x < -4$   
 B  $-2 < x < -1$   
 C  $-1 < x < 1$   
 D  $2 < x < 3$

What value of  $n$  makes  $\sqrt{10 - 3n} = 7$  true?

Record your answer and fill in the bubbles on your answer document.

Which table contains only values in the solution set for  $y \leq \sqrt{25 - x} + 11$ ?

F

$x$	$y$
-24	19
-11	17
9	10
24	9

H

$x$	$y$
-24	19
-11	18
9	-18
24	-19

G

$x$	$y$
-24	18
-11	16
9	11
24	9

J

$x$	$y$
-24	9
-11	10
9	15
24	17

The sum of a number,  $n$ , and its square root can be represented by the equation  $y = n + \sqrt{n}$ . If  $y = 20$ , which of the following is true?

- A  $n = 16$   
 B  $n = 4$   
 C  $n = 16$  and  $n = 25$   
 D  $n = 4$  and  $n = 5$

The average speed of sound in air at  $t$  degrees Celsius can be found using the function below. The speed,  $s$ , is measured in meters per second.

$$s = 20.05\sqrt{t} + 273.15$$

If sound is traveling in air at an average speed of 356.5 meters per second, which temperature is closest to the value of  $t$ ?

- A  $76^\circ\text{C}$   
 B  $503^\circ\text{C}$   
 C  $43^\circ\text{C}$   
 D  $309^\circ\text{C}$

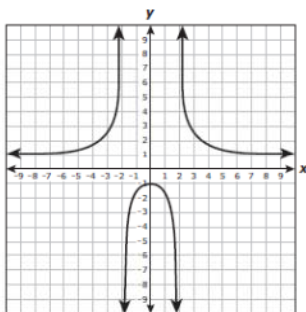
What value of  $p$  makes the equation below true?

$$\frac{19}{4p - 1} = 5$$

Record your answer and fill in the bubbles on your answer document.



The graph of the function  $f$  is shown on the grid below.



Based on the graph, for what values of  $x$  is  $f(x) > 0$ ?

- F All real numbers greater than 0
- G All real numbers greater than 1
- H All real numbers less than  $-2$  or greater than 2
- J All real numbers greater than  $-2$  and less than 2

The cost of printing cookbooks is \$2.09 per book plus a one-time setup fee of \$349. All taxes are included. Which of the following functions models  $a(x)$ , the average cost per book of printing  $x$  cookbooks?

- A  $a(x) = 2.09x + \frac{349}{x}$
- B  $a(x) = \frac{2.09x + 349}{x}$
- C  $a(x) = \frac{2.09 + 349}{2.09x}$
- D  $a(x) = \frac{2.09x + 349}{2.09x}$

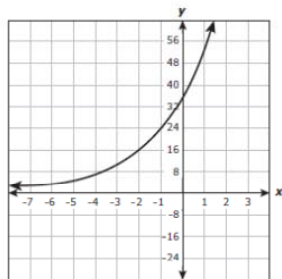
The given function models the equivalent resistance in ohms,  $R$ , when a fixed 9-ohm resistor is connected in parallel with a variable resistor of  $x$  ohms.

$$R = \frac{9x}{9 + x}$$

Which value of  $x$  is closest to the number of ohms needed in the variable resistor for there to be an equivalent resistance,  $R$ , of 6.4 ohms?

- F 15.4
- G 57.6
- H 3.7
- J 22.2

The graph of the exponential function  $f$  is shown on the grid below.



For what values of  $x$  is  $f(x) > 16$ ?

- F  $x > -2$
- G  $x > 0$
- H  $-2 < x < 2$
- J  $\infty < x < -2$

There were 417 cell phones sold at an electronics store in January. Since then, cell phone sales at this store have increased at a rate of 3.75% per month. At this rate of growth, which function can be used to determine the monthly cell phone sales  $m$  months after January?

- A  $p(m) = 417(0.0375)^m$
- B  $p(m) = 417(1.0375)^m$
- C  $p(m) = 417(0.9625)^{(m+1)}$
- D  $p(m) = 417(0.0375)^{(m+1)}$

An antibiotic is introduced into a colony of 12,000 bacteria during a laboratory experiment. The function below can be used to model the number of bacteria in the colony after  $m$  minutes.

$$n(m) = 12,000(0.851)^{\frac{m}{10}}$$

Which value is closest to the amount of time needed for the population of the colony to drop to 8,000 bacteria?

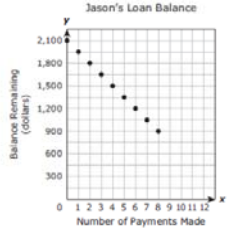

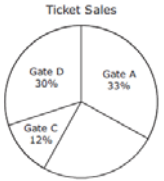
- F 11 min
- G 25 min
- H 8 min
- J 42 min

Math  
Vertical Alignment by Grade

## Strand: Equations and Functions

TEK: the student uses graphs, tables, and algebraic representations to make predictions and solve problems	TEK: the student uses equations to solve problems	TEK: the student uses letters to represent an unknown in an equation	TEK: the student describes relationships mathematically
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8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade	5 <sup>th</sup> Grade																																
SE <b>8.5A – (R)</b> predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations	SE <b>7.5A – (S)</b> use concrete and pictorial models to solve equations and use symbols to record the actions <b>7.5B – (R)</b> formulate problem situations when given a simple equation and formulate an equation when given a problem situation	SE <b>6.5 – (R)</b> formulate equations form problem situations described by linear relationships	SE <b>5.6 – (S)</b> select from and use diagrams and equations such as $y=5+3$ to represent meaningful problem situations																																
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-predict first then make mathematical connections between all representations (tables, graphs, and algebraic equations) -include algebraic equations that require more than one step to solve -emphasis should be on using the properties of equality to solve the equation -use expression to find the nth term; make the connection between the nth term and the position of the term -use various forms including tabular and verbal -constant rate of change is linear ex. $2n + 3$ , where n represents the term number	-equations should be solved only by concrete and pictorial models; record the actions with numbers and variables -demonstrate with models how to solve the equation -record the steps taken to solve the equations by using models as well as recording the algebraic notation -make connections between the concrete and pictorial models and the symbols used to record steps in solving equation -equations may include 2 variables -connect verbal, written, numeric, graphic, and symbolic representations of relationships -given a simple equation ex. $2x + 3 = 7$ , write a real life situation to represent an equation	-connect verbal, numerical, graphic, and symbolic representations of relationships -given a problem situation with linear data use various methods to formulate the equation -use problem situations that involve equations containing one and two variables -use variables and unknowns -formulated equations from problem situations is introduced in 6 <sup>th</sup> grade -linear relationships require a constant rate of change	-use journal writing to describe the meaning of the equation -students create pictorial models of equations -students create word problems matching equations -make connections between the different representations (concrete/pictorial/abstract) -use the vocabulary – variable -diagram maybe in the form of a pictorial representation such as five apples plus three apples -students may match a problem situation with an equation or diagram -relationships of patterns may be written in words																																
Vocabulary	Vocabulary	Vocabulary	Vocabulary																																
Equations, expressions, variable, nth term, constant rate of change, coefficient, function, zero pairs	Equations, expressions, formula, variable, unknown, zero pairs	Equation, expression, situation, variable, unknown, linear, constant rate	Equation, expression, variable, unknown, situation																																
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<p>The graph below shows the balance remaining on Jason's loan after he makes each payment.</p>  <p>Based on this graph, what will be the balance remaining on Jason's loan after he makes the 12th payment?</p> <p>A \$750 B \$150 C \$450 D \$300</p>								<p>The model below represents the equation <math>x + 4 = 4x + 2</math>.</p>  <p>What value of <math>x</math> makes the equation true?</p> <p>A <math>\frac{2}{3}</math> B 2 C <math>\frac{6}{5}</math> D 4</p>								<p>On a spelling test Carlos had to spell 25 words. He earned 4 points for every word he spelled correctly. Which equation can be used to find <math>p</math>, the total number of points Carlos earned for spelling <math>w</math> words correctly? <math>p = w(25 - 4)</math></p> <p>A <math>p = 4(25 - w)</math> B <math>p = 4w</math> C <math>p = 4w</math> D <math>p = 4 + w</math></p>								<p>A mechanic repaired 28 cars and 46 trucks last month. He spent 2 hours repairing each of these vehicles. Which equation can be used to find <math>h</math>, the total number of hours the mechanic spent repairing these vehicles?</p> <p>F <math>h = (28 + 46) \div 2</math> G <math>h = (28 + 46) + 2</math> H <math>h = (28 + 46) \times 2</math> J <math>h = (28 + 46) - 2</math></p>							
<p>A company conducts research to predict how a new advertisement affects sales of a product. The equation below can be used to determine <math>n</math>, the number of people who buy the product if <math>r</math> people read the advertisement.</p> $n = 0.08r + 7,400$ <p>If 7,496 people bought the product last week, how many people read the advertisement?</p> <p>F 186,200 G 600 H 1,200 J 93,700</p>								<p>Angelo's pet rabbit weighs 1 pound less than twice the weight of Carmen's pet rabbit. Angelo's rabbit weighs 9 pounds. Which equation can be used to find <math>w</math>, the weight of Carmen's pet rabbit?</p> <p>F <math>9 = 2w + 1</math> G <math>9 = 2w - 1</math> H <math>w - 9 = 1</math> J <math>w + 9 = 1</math></p>								<p>On Saturday, Ricardo drank a total of 40 fluid ounces of water. If he drank <math>m</math> fluid ounces of water that morning, which equation can be used to find <math>n</math>, the number of fluid ounces of water he drank the rest of the day?</p> <p>F <math>40 - m = n</math> G <math>40 + m = n</math> H <math>40 \div m = n</math> J <math>40 \times m = n</math></p>															
<p>Tickets were sold at four different gates of a high school football stadium. The graph below shows the percent of the total tickets sold at each gate during a recent game.</p>  <p>If 90 tickets were sold at Gate C, what was the total number of tickets sold?</p> <p>A 750 B 1,080 C 360 D 1,168</p>								<p>Ashton needs a total of \$1.50 in quarters for a coin-operated car wash. He already has \$0.75. Which equation can be used to find <math>q</math>, the number of additional quarters Ashton needs in order to have enough money for the car wash?</p> <p>A <math>1.5 = 0.75q + 0.25</math> B <math>0.75 = 1.5q + 0.25</math> C <math>0.75 = 0.25q + 1.5</math> D <math>1.5 = 0.25q + 0.75</math></p>								<p>At a movie theater adult tickets cost \$10, and child tickets cost \$6. Which equation can be used to find <math>s</math>, the total number of dollars a family of <math>k</math> adults and 5 children would pay for movie tickets?</p> <p>F <math>s = 10k + 6(5)</math> G <math>s = 6k + 10(5)</math> H <math>s = (10 + 6) \cdot (k + 5)</math> J <math>s = 10k - 6(5)</math></p>															
<p>A store manager discounted the prices of several items during a sale. The original price and the sale price of each item are shown in the table below.</p> <table border="1"> <thead> <tr> <th>Original Price</th> <th>Sale Price</th> </tr> </thead> <tbody> <tr> <td>\$30</td> <td>\$24</td> </tr> <tr> <td>\$40</td> <td>\$32</td> </tr> <tr> <td>\$50</td> <td>\$40</td> </tr> <tr> <td>\$60</td> <td>\$48</td> </tr> <tr> <td>\$70</td> <td>\$56</td> </tr> </tbody> </table> <p>Based on the data in the table, what would be the sale price of an item that had an original price of \$85?</p> <p>A \$79 B \$64 C \$68 D \$71</p>								Original Price	Sale Price	\$30	\$24	\$40	\$32	\$50	\$40	\$60	\$48	\$70	\$56	<p>Which situation is best represented by the equation <math>3x = 288</math>?</p> <p>A Ms. Jones makes 3 equal stacks of cafeteria trays. There are 288 trays in all. What is <math>x</math>, the number of trays in each stack? B Ms. Jones makes 3 stacks, each with 288 cafeteria trays. What is <math>x</math>, the number of trays in all? C Ms. Jones stacks 3 cafeteria trays. There are 288 more trays to stack. What is <math>x</math>, the number of trays in all? D Ms. Jones has to stack 288 cafeteria trays in all. She has 3 trays left to stack. What is <math>x</math>, the number of trays Ms. Jones has already stacked?</p>											
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Math  
Vertical Alignment by Grade

Strand: Attributes of Functions

TEK:	TEK: the student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems	TEK:	TEK:	TEK: the student uses properties and attributes of functions and applies functions to problem situations TEK: the student understands that quadratic functions can be represented in different ways and translates among their various representations TEK: the student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation	TEK: the student understands that a function represents a dependence of one quantity on another and can be described in a variety of ways TEK: the student uses the properties and attributes of functions TEK: the student understands the importance of the skills required to manipulate symbols in order to solve problems and uses the necessary algebraic skills required to simplify algebraic expressions and solve equations and inequalities in problem situations TEK: the student understands the meaning of the slope and intercepts of the graphs of linear functions and zeros of linear functions and interprets and describes the effects of changes in parameters of linear functions in real-world and mathematical situations TEK: the student understands there is more than one way to solve a quadratic equation and solves them using appropriate methods
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I												
SE:	SE: <b>PC.2C</b> – investigate identities graphically and verify them symbolically, including logarithmic properties, trigonometric identities, and exponential properties	SE:	SE:	SE: <b>ALGII.1A – (R)</b> identify the mathematical domain and ranges of functions and determine reasonable domain and range values for continuous and discrete situations <b>ALGII.6C – (S)</b> determine a quadratic function from its roots (real and complex) or a graph <b>ALGII.8C – (S)</b> compare and translate between algebraic and graphical solutions of quadratic equations	SE: <b>ALG.1A – (S)</b> describe independent and dependent quantities in functional relationships <b>ALG.2B – (R)</b> identify mathematical domains and ranges and determine reasonable domain and range values for given situations, both continuous and discrete <b>ALG.4C – (S)</b> connect equation notation with function notation, such as $y = x + 1$ and $f(x) = x + 1$ <b>ALG.6B – (R)</b> interpret the meaning of slope and intercepts in situations using data, symbolic representations, or graphs <b>ALG.6E – (S)</b> interpret and predict the effects of changing slope and y-intercept in applied situations <b>ALG.10B – (S)</b> make connections among the solutions (roots) of quadratic equations, the zeros of their related functions, and the horizontal intercepts (x-intercepts) of the graph of the function												
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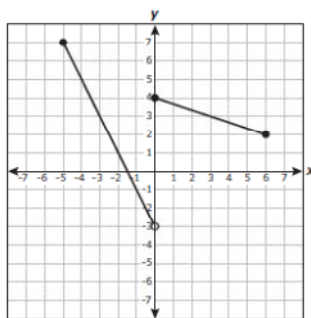
If 5 is an element in the domain of  $f(x) = \frac{7x - 22}{4}$ , what is the corresponding element in the range?

Record your answer and fill in the bubbles on your answer document.

A print shop charges a fixed amount per photocopy and gives a 10% discount off the total cost of the photocopies. The total cost is a function of the number of photocopies made. What is the independent quantity in this situation?

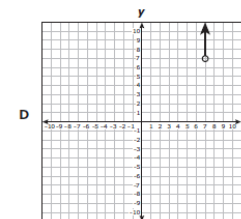
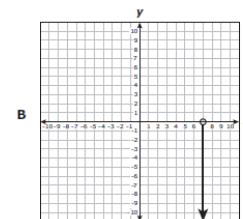
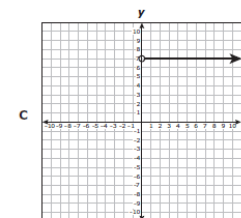
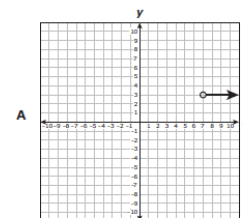
A The total cost of the photocopies  
 B The price per photocopy  
 C The amount of the discount  
 D The total number of photocopies made

What is the greatest value in the domain of the function graphed below?



- A 2
- B 6
- C 4
- D 7

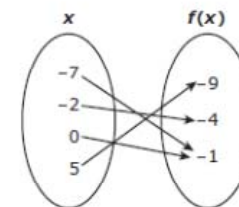
Which graph shows a function with a domain of all real numbers greater than 7?



For what value of  $b$  will  $f(x) = x^2 + bx + 400$  have  $-20$  as its only zero?

Record your answer and fill in the bubbles on your answer document.

What is the range of the function shown below?



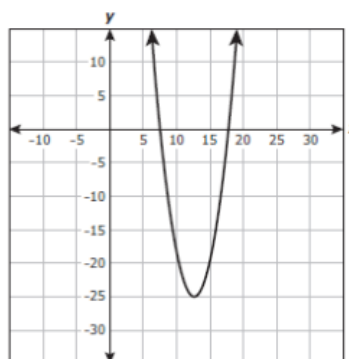
F  $\{-7, -2, 0, 5\}$

G  $\{-9, -4, -1\}$

H  $\{-9, -7, -4, -2, -1, 0, 5\}$

J  $\{-1\}$

The graph of the quadratic function  $f$  is shown on the grid below.



What does the solution set for  $f(x) = 0$  appear to be?

F  $\{12.5\}$

G  $\{12.5, -25\}$

H  $\{7.5, 17.5\}$

For the function  $w$ ,  $w(9) = -7$ , and  $w(-7) = 9$ . If  $y = w(x)$ , what is the value of  $y$  when  $x = -7$ ?

Record your answer and fill in the bubbles on your answer document.

The graph below shows the relationship between the number of dollars a worker earns and the number of hours worked.



What does the slope of the graph represent?

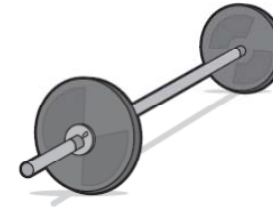
A The number of hours of work it takes to earn \$320

B The amount of money earned per hour

C The amount earned for 40 hours of work

D The number of hours worked per dollar earned

A weightlifter is adding plates of equal weight to a bar. The table below shows the total weight, including the bar, that he will lift depending on the total number of plates on the bar.

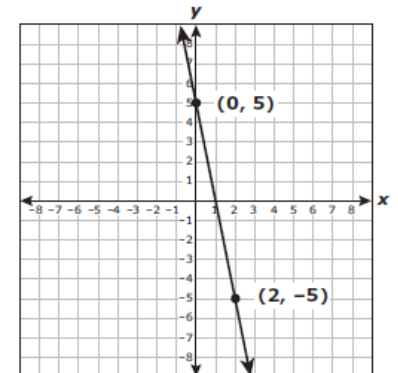


Number of Plates	Total Weight (lb)
2	115
4	185
6	255
8	325

Based on this information, which statement is true?

- A The bar weighs 35 lb without any plates.
- B The bar weighs 70 lb without any plates.
- C The bar weighs 45 lb without any plates.
- D The bar weighs 25 lb without any plates.

What is the zero of the linear function graphed below?



Record your answer and fill in the bubbles on your answer document.

What are the  $x$ -intercepts of the graph of the quadratic function  $f(x) = 5x^2 + 4x - 1$ ?

- F  $\frac{1}{5}$  and  $-1$
- G  $-\frac{1}{5}$  and  $1$
- H  $0$  and  $-1$
- J  $-\frac{2}{5}$  and  $1\frac{2}{5}$





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			<p>The following conditional statement is true.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;">                     If a quadrilateral is a square, then it has four congruent sides.                 </div> <p>Which statement must also be true?</p> <p><b>A</b> If a quadrilateral has four congruent sides, then it is a square.</p> <p><b>B</b> If a quadrilateral does not have four congruent sides, then it is not a square.</p> <p><b>C</b> If a quadrilateral is not a square, then it does not have four congruent sides.</p> <p><b>D</b> If a quadrilateral does not have four congruent sides, then it is a square.</p> <hr/> <p>For triangles <math>ABC</math> and <math>DEF</math>, <math>\angle A \cong \angle D</math> and <math>\angle B \cong \angle E</math>. Based on this information, which statement is a reasonable conclusion?</p> <p><b>F</b> <math>\angle C \cong \angle D</math> because they are corresponding angles of congruent triangles.</p> <p><b>G</b> <math>\overline{CA} \cong \overline{FD}</math> because they are corresponding parts of congruent triangles.</p> <p><b>H</b> <math>\angle C \cong \angle F</math> because they are corresponding angles of similar triangles.</p> <p><b>J</b> <math>\overline{AB} \cong \overline{DE}</math> because they are corresponding parts of similar triangles.</p> <hr/> <p>A conditional statement is given below.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;">                     If two interior angles of a triangle are acute, then the third interior angle must be obtuse.                 </div> <p>Which of the following best describes this statement?</p> <p><b>A</b> This statement is true because all obtuse triangles have two acute interior angles.</p> <p><b>B</b> This statement is false because the third interior angle must also be acute.</p> <p><b>C</b> This statement is true because a triangle can have at most one interior obtuse angle.</p> <p><b>D</b> This statement is false because the third interior angle can be acute, right, or obtuse.</p>																																																			

18 A statement is given below.

The number of square units in the area of a square is greater than or equal to the number of units in the perimeter of the square.

Which side length of a square provides a counterexample to the given statement?

- F 6 units
- G 4 units
- H 10 units
- J 2 units

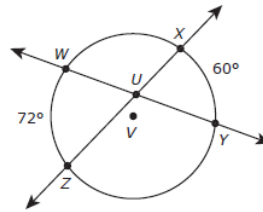
The two conditional statements below are true.

If  $\angle 3$  and  $\angle 4$  form a linear pair, then they are supplementary.  
If  $\angle 3$  and  $\angle 4$  are supplementary, then  $m\angle 3 + m\angle 4 = 180^\circ$ .

Based on these conditional statements, which statement must also be true?

- F If  $\angle 3$  and  $\angle 4$  form a linear pair, then  $m\angle 3 + m\angle 4 = 180^\circ$ .
- G If  $\angle 3$  and  $\angle 4$  form a linear pair, then  $m\angle 3 = 90^\circ$ , and  $m\angle 4 = 90^\circ$ .
- H If  $m\angle 3 + m\angle 4 = 180^\circ$ , then  $\angle 3$  and  $\angle 4$  form a linear pair.
- J If  $\angle 3$  and  $\angle 4$  are supplementary, then  $\angle 3$  and  $\angle 4$  form a linear pair.

$\overleftrightarrow{ZX}$  and  $\overleftrightarrow{WY}$  are secants of circle  $V$ , as shown below.



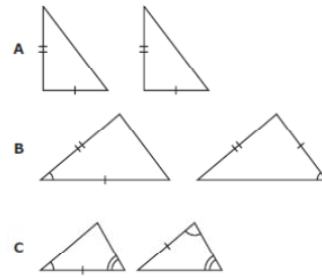
Based on this information, which of the following can be proved true?

- A  $m\angle ZUY = m\angle ZVY$
- B  $m\angle XUY = \frac{1}{2}(m\widehat{WZ} + m\widehat{XY})$
- C  $m\widehat{WX} = 180^\circ - m\widehat{WZ}$
- D  $m\angle WUX = \frac{1}{2}(m\widehat{ZY} - m\widehat{WX})$

Which statement about a triangular prism is true?

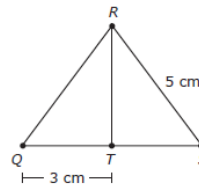
- F A triangular prism has 4 faces, 6 edges, and 4 vertices.
- G A triangular prism has 3 faces, 6 edges, and 3 vertices.
- H A triangular prism has 5 faces, 9 edges, and 6 vertices.
- J A triangular prism has 6 faces, 11 edges, and 8 vertices.

Which pair of triangles has enough given information to prove that the triangles are congruent?



D None of these

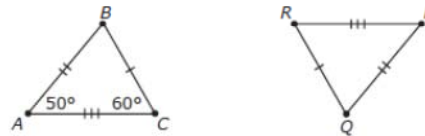
In  $\triangle QRS$ ,  $\overline{RT}$  is an altitude.



Which additional condition would not be sufficient to prove that  $QR = SR$ ?

- A  $T$  is the midpoint of  $\overline{QS}$ .
- B  $\overline{RT}$  bisects  $\angle QRS$ .
- C  $TS = 2$  cm
- D  $RT = 4$  cm

$\triangle ABC$  and  $\triangle PQR$  are shown in the diagram below.



Based on the information provided in the diagram, what is  $m\angle P$  in degrees?

Record your answer and fill in the bubbles on your answer document.

The top of a bench has a length of 5 ft and a width of 2 ft. A second bench is similar to the first bench. The top of the second bench is 3 ft wide. What is the length of the top of the second bench?

- F 6 ft
- G 7 ft
- H 4.5 ft
- J 7.5 ft




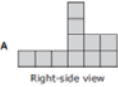


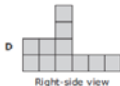


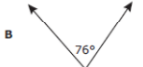
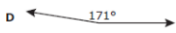
Math  
Vertical Alignment by Grade

Strand: Geometric Structure

<p>TEK: the student understands the structure of, and relationships within, an axiomatic system</p> <p>TEK: the student applies logical reasoning to justify and prove mathematical statements</p> <p>TEK: the student analyzes properties and describes relationships in geometric figures</p> <p>TEK: the student applies the concept of congruence to justify properties of figures and solve problems</p> <p>TEK: the student applies the concepts of similarity to justify properties of figures and solve problems</p>	<p>TEK: the student uses geometry to model and describe the physical world</p>	<p>TEK: the student compares and classifies two- and three-dimensional figures using geometric vocabulary and properties</p> <p>TEK: the student uses geometry to model and describe the physical world</p>	<p>TEK: the student uses geometric vocabulary to describe angles, polygons, and circles</p>
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Geometry	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
<p>SE:</p> <p><b>GEOM.1A</b> – develop an awareness of the structure of a mathematical system, connecting definitions, postulates, logical reasoning, and theorems</p> <p><b>GEOM.1B</b> – (S) recognize the historical development of geometric systems and know mathematics is developed for a variety of purposes</p> <p><b>GEOM.1C</b> – (S) compare and contrast the structures and implications of Euclidean and non-Euclidean geometries</p> <p><b>GEOM.3A</b> – (S) determine the validity of a conditional statement, its converse, inverse, and contrapositive</p> <p><b>GEOM.3B</b> – (S) construct and justify statements about geometric figures and their properties</p> <p><b>GEOM.3C</b> – (R) use logical reasoning to prove statements are true and find counter examples to disprove statements that are false</p> <p><b>GEOM.3E</b> – (S) use deductive reasoning to prove a statement</p> <p><b>GEOM.9A</b> – formulate and test conjectures about the properties of parallel and perpendicular lines based on explorations and concrete models</p> <p><b>GEOM.9B</b> – (S) formulate and test conjectures about the properties and attributes of polygons and their component parts based on explorations and concrete models</p>	<p>SE</p> <p><b>8.7A</b> – (S) draw three-dimensional figures from different perspectives</p> <p><b>8.7B</b> – (S) use geometric concepts and properties to solve problems in fields such as art and architecture</p>	<p>SE</p> <p><b>7.6A</b> – (S) use angle measurements to classify pairs of angles as complementary or supplementary</p> <p><b>7.6B</b> – (S) use properties to classify triangles and quadrilaterals</p> <p><b>7.6C</b> – (S) use properties to classify three-dimensional figures, including pyramids, cones, prisms, and cylinders</p>	<p>SE</p> <p><b>6.6A</b> – (S) use angle measurements to classify angles as acute, obtuse, or right</p> <p><b>6.6B</b> – (S) identify relationships involving angles in triangles and quadrilaterals</p> <p><b>6.6C</b> – (S) describe the relationship between radius, diameter, and circumference of a circle</p>

<p><b>GEOM.9C – (S)</b> formulate and test conjectures about the properties of circles and the line that intersect them based on explorations and concrete models</p> <p><b>GEOM.9D – (S)</b> analyze the characteristics of polyhedra and other three-dimensional figures and their component parts based on explorations and concrete models</p> <p><b>GEOM.10B – (R)</b> justify and apply triangle congruence relationships</p> <p><b>GEOM.11B – (S)</b> use ratios to solve problems involving similar figures</p> <p><b>GEOM.11C – (R)</b> develop, apply, and justify triangle similarity relationships, such as right triangle ratios, trigonometric ratios, and Pythagorean triples using a variety of methods</p>			
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
	<ul style="list-style-type: none"> <li>-practice building and sketching 3-D figures from all views</li> <li>-identify a solid figure when given the front, top and side views</li> <li>-use activities involving real life application where they are encouraged to explore and use appropriate geometric concepts, properties and formulas to solve problems</li> <li>-include conversion in square units – number of square feet in square yard</li> </ul>	<ul style="list-style-type: none"> <li>-use properties and connect to models</li> <li>-include properties of equilateral, isosceles, scalene, right, obtuse, and acute triangles</li> <li>-classify by sides (equilateral, isosceles, scalene) and angles (acute, right, obtuse)</li> <li>-include quadrilaterals – classify by congruent sides and angles, parallel and perpendicular sides</li> <li>-quadrilaterals include square, rectangle, rhombus, parallelogram, trapezoid</li> <li>-properties of 3D figures include shape of bases, parallel bases, and shape of sides</li> <li>-practice building with cubes and sketching 3D figures when given the top, side and front views</li> <li>-students should be able to identify a solid figure when given the front, top and side views</li> <li>-Views and Nets are new concepts to 7<sup>th</sup> grade</li> <li>-only make nets – use prisms, pyramids, and cylinders</li> <li>-do not calculate surface area</li> <li>-use activities involving real life application to explore and use geometric concepts and properties to solve problems-students explain complementary and supplementary angles, verbally and with diagrams</li> <li>-measure angles with appropriate tools, such as protractor</li> <li>-complementary and supplementary angles are</li> </ul>	<ul style="list-style-type: none"> <li>-through explorations students should be able to differentiate and describe differences between radius, diameter, and circumference of circles</li> <li>-make mathematical connections</li> <li>-use approximation of <math>\pi</math> or solve in terms of <math>\pi</math></li> <li>-students should recognize that <math>\pi</math> is approximately 3 and be able to use that approximation to solve problems</li> <li>-when given the circumference students should be able to determine the radius/diameter</li> <li>-measure angles with protractor, pattern blocks, corner of paper, etc. to classify angles</li> <li>-classifying acute, obtuse, and right angles without angle measurements is introduced in 4<sup>th</sup> grade</li> <li>-mark congruent sides and angles appropriately</li> <li>-use appropriate marking for right angle and congruent sides</li> <li>-know sums of angles in triangles and quadrilaterals and identify missing angle</li> <li>-for isosceles triangles, define base angles and their relationships</li> <li>-equilateral triangles, know all angles are equal</li> </ul>

<p>Vocabulary</p>	<p>Vocabulary</p>	<p>introduced in 7<sup>th</sup> grade</p>	<p>Vocabulary</p>																																																																																								
	<p>Perspectives, properties</p>	<p>Angles, acute, obtuse, right, straight, complementary, supplementary, scalene, isosceles, equilateral, parallel, perpendicular, corresponding, congruent, attributes, classify, base</p>	<p>Angle, acute, obtuse, right, radius, circumference, diameter, chord, ray, corresponding, pi, protractor, classify, congruent, isosceles, right triangle, base, equilateral, scalene, irregular figures</p>																																																																																								
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<p>The following conditional statement is true.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>If a quadrilateral is a square, then it has four congruent sides.</p> </div> <p>Which statement must also be true?</p> <p><b>A</b> If a quadrilateral has four congruent sides, then it is a square.</p> <p><b>B</b> If a quadrilateral does not have four congruent sides, then it is not a square.</p> <p><b>C</b> If a quadrilateral is not a square, then it does not have four congruent sides.</p> <p><b>D</b> If a quadrilateral does not have four congruent sides, then it is a square.</p>	<p>A three-dimensional figure made of identical cubes is shown below.</p>  <p style="text-align: center;">Front</p> <p>Which of these could be the right-side view of this figure?</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>A Right-side view</p> </div> <div style="text-align: center;">  <p>C Right-side view</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p>B Right-side view</p> </div> <div style="text-align: center;">  <p>D Right-side view</p> </div> </div>	<p>The measure of <math>\angle W</math> is <math>37^\circ</math>. What is the measure, in degrees, of the angle that is complementary to <math>\angle W</math>?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>	<p>Danica drew an angle that has the characteristics listed below.</p> <ul style="list-style-type: none"> <li>↳ Its measure is less than <math>108.5^\circ</math>.</li> <li>• It is an acute angle.</li> </ul> <p>Which of the following could be the angle Danica drew?</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>A</p> </div> <div style="text-align: center;">  <p>C</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;">  <p>B</p> </div> <div style="text-align: center;">  <p>D</p> </div> </div>																																																																																								



For triangles  $ABC$  and  $DEF$ ,  $\angle A \cong \angle D$  and  $\angle B \cong \angle E$ . Based on this information, which statement is a reasonable conclusion?

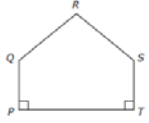
F  $\angle C \cong \angle D$  because they are corresponding angles of congruent triangles.

G  $\overline{CA} \cong \overline{FD}$  because they are corresponding parts of congruent triangles.

H  $\angle C \cong \angle F$  because they are corresponding angles of similar triangles.

J  $\overline{AB} \cong \overline{DE}$  because they are corresponding parts of similar triangles.

Pentagon  $PQRST$  below models one side of a building.



The sum of the interior angles of the pentagon is  $540^\circ$ , the measure of angle  $R$  is  $100^\circ$ , and  $\angle Q \cong \angle S$ . What is the measure of  $\angle Q$ ?

F  $92^\circ$

G  $130^\circ$

H  $108^\circ$

J Not here

The following list shows the names of three figures that have a common characteristic.

Rectangular prism, hexagonal pyramid, cube

Which statement describes the characteristic that the figures have in common?

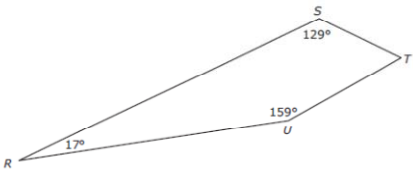
A Each figure has exactly 12 edges.

B Each figure has at least one rectangular face.

C Each figure has an even number of vertices.

D Each figure has 4 more edges than vertices.

Which statement about figure  $RSTU$  is true?



A The difference between the measures of  $\angle T$  and  $\angle R$  is  $4^\circ$ .

B The difference between the measures of  $\angle S$  and  $\angle T$  is  $95^\circ$ .

C The sum of the measures of  $\angle R$ ,  $\angle S$ , and  $\angle T$  is  $201^\circ$ .

D The sum of the measures of  $\angle R$ ,  $\angle T$ , and  $\angle U$  is  $193^\circ$ .

A conditional statement is given below.

If two interior angles of a triangle are acute, then the third interior angle must be obtuse.

Which of the following best describes this statement?

A This statement is true because all obtuse triangles have two acute interior angles.

B This statement is false because the third interior angle must also be acute.

C This statement is true because a triangle can have at most one interior obtuse angle.

D This statement is false because the third interior angle can be acute, right, or obtuse.

18 A statement is given below.

The number of square units in the area of a square is greater than or equal to the number of units in the perimeter of the square.

Which side length of a square provides a counterexample to the given statement?

F 6 units

G 4 units

H 10 units

J 2 units

The two conditional statements below are true.

If  $\angle 3$  and  $\angle 4$  form a linear pair, then they are supplementary.  
If  $\angle 3$  and  $\angle 4$  are supplementary, then  $m\angle 3 + m\angle 4 = 180^\circ$ .

Based on these conditional statements, which statement must also be true?

F If  $\angle 3$  and  $\angle 4$  form a linear pair, then  $m\angle 3 + m\angle 4 = 180^\circ$ .

G If  $\angle 3$  and  $\angle 4$  form a linear pair, then  $m\angle 3 = 90^\circ$ , and  $m\angle 4 = 90^\circ$ .

H If  $m\angle 3 + m\angle 4 = 180^\circ$ , then  $\angle 3$  and  $\angle 4$  form a linear pair.

J If  $\angle 3$  and  $\angle 4$  are supplementary, then  $\angle 3$  and  $\angle 4$  form a linear pair.

The radius of a circular clock face is 13 centimeters. Which expression can be used to find the circumference of the clock face in centimeters?

F  $\pi \times 13$

G  $\pi \times 2$

H  $2 \times \pi \times 13$

J  $2 \times \pi \div 13$

Information about three circles is listed below.

- Circle  $P$  has a diameter of 26 cm.
- Circle  $Q$  has a diameter of 52 cm.
- Circle  $R$  has a radius of 52 cm.

Based on this information, which statement is true?

F The diameter of circle  $P$  is the same length as the diameter of circle  $Q$ .

G The radius of circle  $P$  is the same length as the radius of circle  $Q$ .

H The diameter of circle  $P$  is the same length as the radius of circle  $Q$ .

J The radius of circle  $P$  is the same length as the diameter of circle  $R$ .

In the figure below, the vertices of triangle  $RST$  are on a circle.



- Line segment  $TS$  contains the center of the circle.
- The perimeter of triangle  $RST$  is 24 inches.

What is the circle's radius?

F 8 inches, because  $d = 24 - 8$  and  $d \div 2 = r$

G 32 inches, because  $d = 24 - 8$  and  $d \times 2 = r$

H 20 inches, because  $d = 24 - (8 + 6)$  and  $d \times 2 = r$

J 5 inches, because  $d = 24 - (8 + 6)$  and  $d \div 2 = r$

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Based on this information, which statement is true?

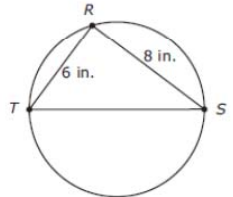
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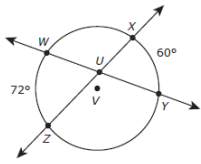
F 8 inches, because  $d = 24 - 8$  and  $d \div 2 = r$

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H 20 inches, because  $d = 24 - (8 + 6)$  and  $d \times 2 = r$

J 5 inches, because  $d = 24 - (8 + 6)$  and  $d \div 2 = r$

$\overleftrightarrow{ZX}$  and  $\overleftrightarrow{WY}$  are secants of circle  $V$ , as shown below.



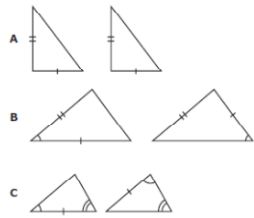
Based on this information, which of the following can be proved true?

- A  $m\angle ZUY = m\angle ZVY$
- B  $m\angle XUY = \frac{1}{2}(m\widehat{WZ} + m\widehat{XY})$
- C  $m\widehat{WX} = 180^\circ - m\widehat{WZ}$
- D  $m\angle WUX = \frac{1}{2}(m\widehat{ZY} - m\widehat{WX})$

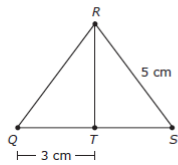
Which statement about a triangular prism is true?

- F A triangular prism has 4 faces, 6 edges, and 4 vertices.
- G A triangular prism has 3 faces, 6 edges, and 3 vertices.
- H A triangular prism has 5 faces, 9 edges, and 6 vertices.
- J A triangular prism has 6 faces, 11 edges, and 8 vertices.

Which pair of triangles has enough given information to prove that the triangles are congruent?



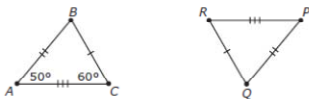
- D None of these
- In  $\triangle QRS$ ,  $\overline{RT}$  is an altitude.



Which additional condition would not be sufficient to prove that  $QR = SR$ ?

- A  $T$  is the midpoint of  $\overline{QS}$ .
- B  $\overline{RT}$  bisects  $\angle QRS$ .
- C  $TS = 2$  cm
- D  $RT = 4$  cm

$\triangle ABC$  and  $\triangle PQR$  are shown in the diagram below.



Based on the information provided in the diagram, what is  $m\angle P$  in degrees?

Record your answer and fill in the bubbles on your answer document.

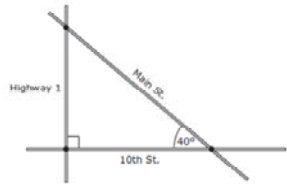
The circular opening of a tunnel has a circumference of 36 meters. Which equation can be used to find  $d$ , the diameter of the tunnel opening in meters?

- A  $\pi \cdot 36 = d$
- B  $\frac{36}{2\pi} = d$
- C  $2 \cdot \pi \cdot 36 = d$
- D  $\frac{36}{\pi} = d$

The top of a bench has a length of 5 ft and a width of 2 ft. A second bench is similar to the first bench. The top of the second bench is 3 ft wide. What is the length of the top of the second bench?

- F 6 ft
- G 7 ft
- H 4.5 ft
- J 7.5 ft

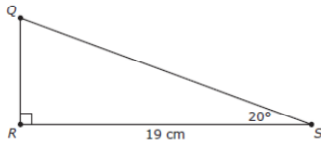
On the map below, Main Street, 10th Street, and Highway 1 intersect to form a right triangle.



The distance between 10th Street and Main Street along Highway 1 is 5.6 mi. Which measure is closest to the length of Main Street from Highway 1 to 10th Street?

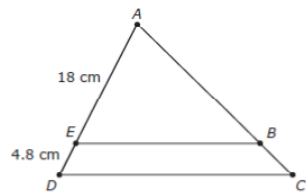
- A 8.7 mi
- B 3.6 mi
- C 4.7 mi
- D 7.3 mi

Which expression can be used to find the length of  $\overline{QR}$  in centimeters?



- A  $19(\cos 20^\circ)$
- B  $19(\tan 20^\circ)$
- C  $19(\sin 70^\circ)$
- D  $19(\tan 70^\circ)$

In  $\triangle DAC$  shown below,  $\overline{EB} \parallel \overline{DC}$ .



If  $AC = 28.5$  cm, what is the length of  $\overline{AB}$ ?

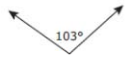
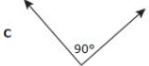
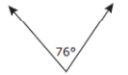

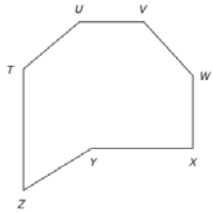
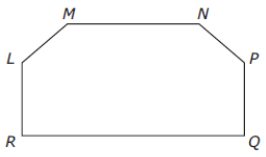
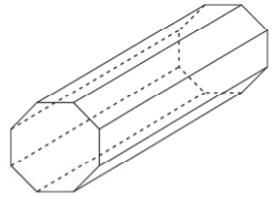
- F 22.5 cm
- G 14.4 cm
- H 36.1 cm
- J 23.7 cm

Math  
Vertical Alignment by Grade

Strand: Geometric Structure

TEK: the student uses geometric vocabulary to describe angles, polygons, and circles	TEK: the student generates geometric definitions using critical attributes.	TEK: the student identifies and describes attributes of geometric figures using formal geometric language	TEK: the student uses formal geometric vocabulary
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
SE <b>6.6A – (S)</b> use angle measurements to classify angles as acute, obtuse, or right <b>6.6B – (S)</b> identify relationships involving angles in triangles and quadrilaterals <b>6.6C – (S)</b> describe the relationship between radius, diameter, and circumference of a circle	SE <b>5.7 – (S)</b> identify essential attributes including parallel, perpendicular, and congruent parts of two- and three-dimensional geometric figures	SE <b>4.8A – (S)</b> identify and describe right, acute, and obtuse angles <b>4.8B – (S)</b> identify and describe parallel and intersecting (including perpendicular) lines using concrete models and pictorial models <b>4.8C – (R)</b> use essential attributes to define two- and three-dimensional geometric figures	SE <b>3.8 – (R)</b> identify, classify, and describe two- and three-dimensional geometric figures by their attributes. The student compares two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
		A base is a face The base names the figure Expose students to figures laying on all sides...not always on its base Students have the misconception that a figure always sits on its base Expose students to Irregular figures	A base is a face The base names the figure Expose students to figures laying on all sides...not always on its base Students have the misconception that a figure always sits on its base Expose students to Irregular figures
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-through explorations students should be able to differentiate and describe differences between radius, diameter, and circumference of circles -make mathematical connections -use approximation of $\pi$ or solve in terms of $\pi$ -students should recognize that $\pi$ is approximately 3 and be able to use that approximation to solve problems -when given the circumference students should be able to determine the radius/diameter -measure angles with protractor, pattern blocks, corner of paper, etc. to classify angles -classifying acute, obtuse, and right angles without angle measurements is introduced in 4 <sup>th</sup> grade -mark congruent sides and angles appropriately -use appropriate marking for right angle and congruent sides -know sums of angles in triangles and quadrilaterals and identify missing angle	-two-dimensional figures (circle, polygon, triangle, square, rectangle, quadrilateral, rhombus, trapezoid, parallelogram, pentagon, hexagon, octagon) -three-dimensional figures (sphere, cone, cylinder, cube, rectangular prism, triangular prism, square pyramid, triangular pyramid) --teachers may state attributes of an object and students pick an object from a group of items	-two-dimensional figures (circle, polygon, triangle, square, rectangle, quadrilateral, rhombus, trapezoid, parallelogram, pentagon, hexagon, octagon) -three-dimensional figures (sphere, cone, cylinder, cube, rectangular prism, triangular prism, square pyramid, triangular pyramid) -teacher may state attributes of an object and students pick an object meeting the description from a group of items -angles are introduced in 4 <sup>th</sup> grade -only degree taught in 4 <sup>th</sup> grade is 90° -journal writing-form definitions with attributes -include concrete examples -use pictorial representations -real world application	-two-dimensional figures (circle, polygon, triangle, square, rectangle, quadrilateral, rhombus, trapezoid, parallelogram, pentagon, hexagon, octagon) -three-dimensional figures (sphere, cone, cylinder, cube, rectangular prism, triangular prism, square pyramid, triangular pyramid) -two-dimensional vocabulary – vertices and sides -three-dimensional vocabulary – vertices, edges, faces -comparing geometric figures is introduced in the third grade, in second grade students describe attributes of geometric figures

<p>-for isosceles triangles, define base angles and their relationships -equilateral triangles, know all angles are equal</p>																																																			
<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>																																																
<p>Angle, acute, obtuse, right, radius, circumference, diameter, chord, ray, corresponding, pi, protractor, classify, congruent, isosceles, right triangle, base, equilateral, scalene, irregular figures</p>	<p>Attributes, parallel, perpendicular, congruent, 2D figures, 3D figures, polygon, adjacent, irregular figures</p>	<p>2D figures, 3D figures, polygon, attributes, hexagon, octagon, pentagon, triangle, square, rectangle, trapezoid, rhombus, heptagon, nonagon, decagon, dodecagon, cube, sphere, cylinder, cone, triangular prism, triangular pyramid, rectangular prism, rectangular pyramid, vertex (vertices), edge, side, base, face, identify, describe, compare, classify, parallelogram, angles, acute, obtuse, right, measure, 90°, parallel, perpendicular, intersecting, line segment, irregular figures</p>	<p>2D figures, 3D figures, polygon, attributes, hexagon, octagon, pentagon, triangle, square, rectangle, trapezoid, rhombus, heptagon, nonagon, decagon, dodecagon, cube, sphere, cylinder, cone, triangular prism, triangular pyramid, rectangular prism, rectangular pyramid, vertex (vertices), edge, side, base, face, identify, describe, compare, classify, parallelogram, irregular figures</p>																																																
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SE	# of Questions	Percent	Dual Coded																																																
8A	4	76%	14D,16A																																																
<p>Danica drew an angle that has the characteristics listed below.</p> <ul style="list-style-type: none"> <li>Its measure is less than 108.5°.</li> <li>It is an acute angle.</li> </ul> <p>Which of the following could be the angle Danica drew?</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>A</b></p>  </div> <div style="text-align: center;"> <p><b>C</b></p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;"> <p><b>B</b></p>  </div> <div style="text-align: center;"> <p><b>D</b></p>  </div> </div>	<p>Lakin drew the figure below.</p>  <p>Which line segments intersect each other but do not appear to be perpendicular?</p> <p><b>A</b> <math>\overline{UV}</math> and <math>\overline{VW}</math>  <b>B</b> <math>\overline{WX}</math> and <math>\overline{TZ}</math>  <b>C</b> <math>\overline{WX}</math> and <math>\overline{XY}</math>  <b>D</b> <math>\overline{UV}</math> and <math>\overline{XY}</math></p>	<p>The figure below has 6 labeled angles.</p>  <p>Which list shows only the angles that appear to be right angles?</p> <p><b>F</b> Angle <math>L</math>, angle <math>M</math>, angle <math>N</math>, and angle <math>P</math>  <b>G</b> Angle <math>L</math>, angle <math>P</math>, angle <math>Q</math>, and angle <math>R</math>  <b>H</b> Angle <math>Q</math> and angle <math>R</math>  <b>J</b> Angle <math>M</math> and angle <math>N</math></p>	<p>A three-dimensional figure is shown below.</p>  <p>How many vertices does this figure have?</p> <p><b>A</b> 10  <b>B</b> 16  <b>C</b> 24  <b>D</b> 8</p>																																																

Which statement about figure  $RSTU$  is true?

A The difference between the measures of  $\angle T$  and  $\angle R$  is  $4^\circ$ .  
 B The difference between the measures of  $\angle S$  and  $\angle T$  is  $95^\circ$ .  
 C The sum of the measures of  $\angle R$ ,  $\angle S$ , and  $\angle T$  is  $201^\circ$ .  
 D The sum of the measures of  $\angle R$ ,  $\angle T$ , and  $\angle U$  is  $193^\circ$ .

Two figures are shown below.

Which statement about these two figures appears to be true?

F There are a total of 5 acute angles.  
 G There are a total of 5 obtuse angles.  
 H There are a total of 2 acute angles.  
 J There are a total of 2 obtuse angles.

The radius of a circular clock face is 13 centimeters. Which expression can be used to find the circumference of the clock face in centimeters?

F  $\pi \times 13$   
 G  $\pi \times 2$   
 H  $2 \times \pi \times 13$   
 J  $2 \times \pi \div 13$

Information about three circles is listed below.

- Circle  $P$  has a diameter of 26 cm.
- Circle  $Q$  has a diameter of 52 cm.
- Circle  $R$  has a radius of 52 cm.

Based on this information, which statement is true?

F The diameter of circle  $P$  is the same length as the diameter of circle  $R$ .  
 G The radius of circle  $P$  is the same length as the radius of circle  $Q$ .  
 H The diameter of circle  $P$  is the same length as the radius of circle  $Q$ .  
 J The radius of circle  $P$  is the same length as the diameter of circle  $R$ .

A group of lines is shown below.

Which two lines appear to be perpendicular?

F Lines  $m$  and  $p$   
 G Lines  $p$  and  $q$   
 H Lines  $m$  and  $n$   
 J Lines  $n$  and  $q$

The figures below share a characteristic.

Which statement best describes these figures?

A They are all trapezoids.  
 B They are all rectangles.  
 C They are all squares.  
 D They are all quadrilaterals.

Ava drew the figures below on her paper.

Which statement about these figures is true?

A They are all hexagons.  
 B They are all pentagons.  
 C They are all quadrilaterals.  
 D They are all polygons.

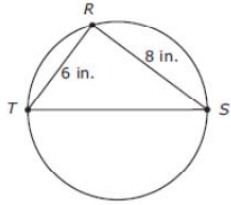
Naomi drew these figures and called them *serzas*.

These are not *serzas*.

Which figure is a *serza*?

F F  
 G G  
 H H  
 J J

In the figure below, the vertices of triangle  $RST$  are on a circle.



- Line segment  $TS$  contains the center of the circle.
- The perimeter of triangle  $RST$  is 24 inches.

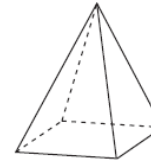
What is the circle's radius?

- F 8 inches, because  $d = 24 - 8$  and  $d \div 2 = r$
- G 32 inches, because  $d = 24 - 8$  and  $d \times 2 = r$
- H 20 inches, because  $d = 24 - (8 + 6)$  and  $d \times 2 = r$
- J 5 inches, because  $d = 24 - (8 + 6)$  and  $d \div 2 = r$

The circular opening of a tunnel has a circumference of 36 meters. Which equation can be used to find  $d$ , the diameter of the tunnel opening in meters?

- A  $\pi \cdot 36 = d$
- B  $\frac{36}{2\pi} = d$
- C  $2 \cdot \pi \cdot 36 = d$
- D  $\frac{36}{\pi} = d$

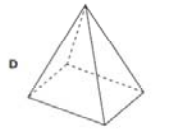
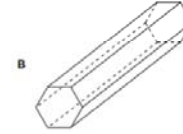
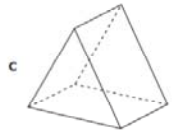
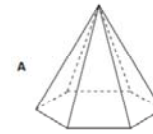
A three-dimensional figure is shown below.



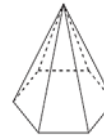
How many more edges than faces does this figure have?

- A 3
- B 8
- C 5
- D 4

Which figure has exactly 12 edges?



A three-dimensional figure is shown below.



What is the total number of edges and vertices in this figure?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Math  
Vertical Alignment by Grade

Strand: Geometric Structure

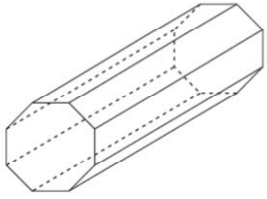
TEK: the student uses formal geometric vocabulary	TEK: the student uses attributes to identify two- and three-dimensional geometric figures. The student compares and contrasts two- and three-dimensional geometric figures, or both.	TEK: the student uses attributes to identify two- and three-dimensional geometric figures. The student compares and contrasts two- and three-dimensional geometric figures, or both.	TEK: the student uses attributes to determine how objects are alike and different TEK: the student recognizes attributes of two- and three-dimensional geometric figures
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3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
SE <b>3.8 – (R)</b> identify, classify, and describe two- and three-dimensional geometric figures by their attributes. The student compares two-dimensional figures, three-dimensional figures, or both by their attributes using formal geometry vocabulary	SE <b>2.7A – (R)</b> describe attributes (the number of vertices, faces, edges, sides) of two- and three-dimensional geometric figures, such as circles, polygons, spheres, cones, cylinders, prisms, and pyramids, etc. <b>2.7B – (R)</b> use attributes to describe how 2 two-dimensional or 2 three-dimensional geometric figures are alike or different <b>2.7C – (S)</b> cut two-dimensional geometric figures apart and identify the new geometric figures formed	SE <b>1.6A – (R)</b> describe and identify two dimensional geometric figures including circles, triangles, rectangles, and squares (a special type of rectangle) <b>1.6B – (R)</b> describe and identify three-dimensional figures including spheres, rectangular prisms (including cubes), cylinders and cones <b>1.6C – (S)</b> describe and identify two- and three-dimensional geometric figures in order to sort them according to a given attribute using informal and formal language <b>1.6D – (S)</b> use concrete models to combine two-dimensional geometric figures to make new geometric figures	SE <b>K.8A – (S)</b> describe and identify an object by its attributes using informal language <b>K.8B – (R)</b> compare two objects based on their attributes <b>K.8C – (R)</b> sort a variety of objects including two- and three-dimensional geometric figures according to their attributes and describe how the objects are sorted <b>K.9A – (S)</b> describe and compare the attributes of real-life objects such as balls, boxes, cans, and cones or models of three-dimensional geometric figures <b>K.9B – (S)</b> recognize shapes in real-life three-dimensional geometric figures or models of three-dimensional geometric figures <b>K.9C – (S)</b> describe, identify, and compare circles, triangles, rectangles, and squares (a special type of rectangle)
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
A base is a face The base names the figure Expose students to figures laying on all sides...not always on its base Students have the misconception that a figure always sits on its base Expose students to Irregular figures	Consistent vocabulary is a must for geometry Corners, points, etc. should be formally named ‘vertex or vertices’ Vertices are on 2D and 3D figures A base is a face The base names the figure Expose students to figures laying on all sides...not always on its base Students have the misconception that a figure always sits on its base Expose students to Irregular figures Use formal vocabulary on Anchor Charts Use the connection “the base names the baby”	Consistent vocabulary is a must for geometry Corners, points, etc. should be formally named ‘vertex or vertices’ Vertices are on 2D and 3D figures A base is a face The base names the figure Expose students to figures laying on all sides...not always on its base Students have the misconception that a figure always sits on its base Expose students to Irregular figures Use formal vocabulary on Anchor Charts Take students on a ‘Shape Walk’ around the school – take pictures of shapes and put them into a station for shape sorting Use paper folding for students to make 3D	Consistent vocabulary is a must for geometry Corners, points, etc. should be formally named ‘vertex or vertices’ Vertices are on 2D and 3D figures A base is a face The base names the figure Expose students to figures laying on all sides...not always on its base Students have the misconception that a figure always sits on its base Expose students to Irregular figures Use informal and formal vocabulary on Anchor Charts Take students on a ‘Shape Walk’ around the school – take pictures of shapes and put them into a station for shape sorting



		shapes	Use paper folding for students to make 3D shapes Use rope to have students create a shape...each student is a vertex								
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)								
<p>-two-dimensional figures (circle, polygon, triangle, square, rectangle, quadrilateral, rhombus, trapezoid, parallelogram, pentagon, hexagon, octagon)</p> <p>-three-dimensional figures (sphere, cone, cylinder, cube, rectangular prism, triangular prism, square pyramid, triangular pyramid)</p> <p>-two-dimensional vocabulary – vertices and sides</p> <p>-three-dimensional vocabulary – vertices, edges, faces</p> <p>-comparing geometric figures is introduced in the third grade, in second grade students describe attributes of geometric figures</p>	<p>-identify the number of vertices on two and three dimensional figures</p> <p>-use formal language including: vertices, faces, edges, bases and sides</p> <p>-two-dimensional (circle, oval, polygon, triangle, square, rectangle, rhombus, quadrilateral, pentagon, trapezoid, parallelogram, hexagon, octagon)</p> <p>-three-dimensional (cylinder, sphere, cone, triangular prism, cube, rectangular prism, triangular pyramid, rectangular pyramid, square pyramid)</p> <p>-include definition that a square is a rectangle</p> <p>-discuss similarities and differences using formal vocabulary</p> <p>-cut rectangles on the diagonal and create 2 triangles, cut polygons into triangles, cut trapezoid to create rectangle and two triangles, etc.</p>	<p>-identify the three dimensional figure by name and use formal language including faces, vertices, edges to describe</p> <p>-formal language is introduced in 1<sup>st</sup> grade</p> <p>-focus on the transition from informal vocabulary to formal vocabulary</p> <p>-two-dimensional (circle, oval, trapezoid, polygon, triangle, square, rectangle, rhombus, pentagon, hexagon, octagon, attributes: sides and vertices)</p> <p>-three-dimensional (spheres, cylinder, cone, triangular prism, cube, rectangular prism, triangular pyramid, rectangular pyramid, attributes: faces, vertices, edges, and bases)</p> <p>-two triangles combine to make rectangle, two trapezoids combine to make a hexagon.</p>	<p>-include words: round, sides, corners, flat circle, triangle, square, rectangle</p> <p>-compare based on presence/absence of attribute (red/not red)</p> <p>-include how the objects are the same and how are they different</p> <p>--include words: round, circular, rectangular, square, corner, sides, flat, pointed (use informal every day words)</p> <p>-include items: food boxed, can food, toy boxes, balls, blocks, books</p> <p>-include words; pointed, round, sides, corners</p> <p>-make sure students see the triangle and rectangle in several different positions</p>								
Vocabulary	Vocabulary	Vocabulary	Vocabulary								
2D figures, 3D figures, polygon, attributes, hexagon, octagon, pentagon, triangle, square, rectangle, trapezoid, rhombus, heptagon, nonagon, decagon, dodecagon, cube, sphere, cylinder, cone, triangular prism, triangular pyramid, rectangular prism, rectangular pyramid, vertex (vertices), edge, side, base, face, identify, describe, compare, classify, parallelogram, irregular figures	2D figures, 3D figures, polygon, attributes, hexagon, octagon, pentagon, triangle, square, rectangle, trapezoid, rhombus, heptagon, nonagon, decagon, dodecagon, cube, sphere, cylinder, cone, triangular prism, triangular pyramid, rectangular prism, rectangular pyramid, vertex (vertices), edge, side, base, face, describe, identify	Face, vertex (vertices), edge, base, describe, identify, cube, cylinder, sphere, triangular prism, rectangular prism, triangular pyramid, rectangular pyramid, circle, oval, trapezoid, polygon, triangle, square, rectangle, rhombus, pentagon, hexagon, octagon, side, attributes, 2D figures, 3D figures, attributes	Object, attribute, sort, size, sphere, cylinder, cube, cone, 2D shapes (figures), 3D shapes (figures), circle, oval, rectangle, triangle, square, sides, vertex (vertices)								
<p>STAAR 2012</p> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>8A</td> <td>4</td> <td>63%</td> <td>14C,14D,16A</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	8A	4	63%	14C,14D,16A	STAAR 2012	STAAR 2012	STAAR 2012
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<p>STAAR 2013</p> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>8A</td> <td>4</td> <td>76%</td> <td>14D,16A</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	8A	4	76%	14D,16A	STAAR 2013	STAAR 2013	STAAR 2013
SE	# of Questions	Percent	Dual Coded								
8A	4	76%	14D,16A								

A three-dimensional figure is shown below.



How many vertices does this figure have?

- A 10
- B 16
- C 24
- D 8

Ava drew the figures below on her paper.



Which statement about these figures is true?

- A They are all hexagons.
- B They are all pentagons.
- C They are all quadrilaterals.
- D They are all polygons.

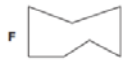
Naomi drew these figures and called them *serzas*.



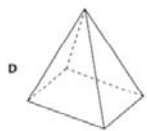
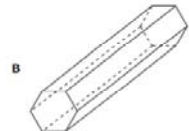
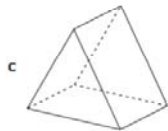
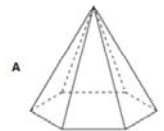
These are not *serzas*.



Which figure is a *serza*?



Which figure has exactly 12 edges?

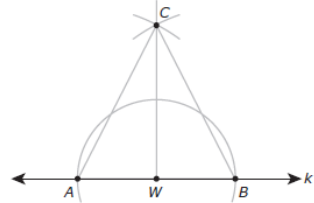


Math  
Vertical Alignment by Grade

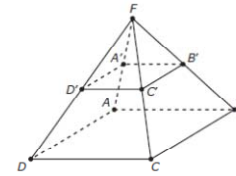
Strand: Graphing, Transformations, and Geometric Models

<p>TEK: the student uses a variety of tools and methods to represent and solve problems involving static and dynamic situations</p>	<p>TEK: the student defines functions, describes characteristics of functions, and translate among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions          TEK: the student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems          TEK: the student uses conic sections, their properties, and parametric representations, as well as tools and technology, to model physical situations          TEK: the student uses vectors to model physical situations</p>	<p>TEK: the student uses algebraic and geometric models to describe situations and solve problems          TEK: the student uses algebraic and geometric models to represent patterns and structures</p>	<p>TEK: the student analyzes geometric relationships in order to make and verify conjectures          TEK: the student uses a variety of representations to describe geometric relationships and solve problems          TEK: the student analyzes the relationship between three-dimensional geometric figures and related two-dimensional representations and uses these representation to solve problems          TEK: the student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly          TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations          TEK: the student applies the concept of congruence to justify properties of figures and solve problems          TEK: the student applies the concepts of similarity to justify properties of figures and solve problems</p>
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AQR	Pre-Cal	MMA	Geometry
<p>SE  <b>AQR.12A</b> – create and use two- and three-dimensional representations of authentic situations using paper techniques or dynamic geometric environments for computer-aided design and other applications  <b>AQR.12B</b> – use vectors to represent and solve applied problems  <b>AQR.12C</b> – use matrices to represent geometric transformations and solve applied problems</p>	<p>SE  <b>PC.1A</b> – describe parent functions symbolically and graphically, including <math>f(x) = xn</math>, <math>f(x) = 1nx</math>, <math>f(x) = \log_a x</math>, <math>f(x) = 1/x</math>, <math>f(x) =  x </math>, <math>f(x) = ax</math>, <math>f(x) = \sin x</math>, <math>f(x) = \arcsin x</math>, etc.  <b>PC.1C</b> – describe symmetry of graphs of even and odd functions  <b>PC.1E</b> – investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically  <b>PC.2A</b> – apply basic transformations and compositions with absolute value functions, including <math>f(x)</math>, and <math>f( x )</math> to parent functions  <b>PC.5A</b> – use conic sections to model motion, such as the graph of velocity vs. position of a pendulum and motions of planets  <b>PC.5B</b> – use properties of conic sections to describe physical phenomena such as the reflective properties of light and sound  <b>PC.5C</b> – convert between parametric and rectangular forms of functions and equations to graph them  <b>PC.5D</b> – use parametric functions to simulate problems involving motion  <b>PC.6A</b> – use the concept of vectors to model situations defined by magnitude and direction  <b>PC.6B</b> – analyze and solve vector problems generated by real-life situations</p>	<p>SE  <b>MMA.8A</b> – use geometric models available through technology to model growth and decay in areas such as population, biology, and ecology  <b>MMA.9A</b> – use geometric transformations, symmetry, and perspective drawings to describe mathematical patterns and structure in art and architecture  <b>MMA.9B</b> – use geometric transformations, proportions, and periodic motion to describe mathematical patterns and structure in music</p>	<p>SE  <b>GEOM.2A – (S)</b> use constructions to explore attributes of geometric figures and to make conjectures about geometric relationships  <b>GEOM.2B – (R)</b> make conjectures about angles, lines, polygons, circles, and three-dimensional figures and determine the validity of the conjectures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic  <b>GEOM.5C – (S)</b> use properties of transformations and their compositions to make connections between mathematics and the real world, such as tessellations  <b>GEOM.5D – (R)</b> identify and apply patterns from right triangles to solve meaningful problems, including special right triangles (45-45-90 and 30-60-90) and triangles whose sides are Pythagorean triples  <b>GEOM.6A – (S)</b> describe and draw the intersection of a given plane with various three-dimensional geometric figures  <b>GEOM.6B – (S)</b> use nets to represent and construct three-dimensional geometric figures  <b>GEOM.6C – (S)</b> use orthographic and isometric views of three-dimensional geometric figures to represent and construct three-dimensional geometric figures and solve problems  <b>GEOM.7A – (S)</b> use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures  <b>GEOM.8A – (R)</b> find areas of regular polygons, circles, and composite figures  <b>GEOM.10A – (S)</b> use congruence transformations to make conjectures and justify properties of geometric figures including figures represented on a coordinate plane  <b>GEOM.11A – (S)</b> use and extend similarity properties and transformations to explore and justify conjectures about geometric figures</p>

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STAAR 2013	STAAR 2013	STAAR 2013	<p>STAAR 2013</p> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>2A</td> <td>1</td> <td>33%</td> <td></td> </tr> <tr> <td>2B</td> <td>3</td> <td>58%</td> <td></td> </tr> <tr> <td>5C</td> <td>1</td> <td>67%</td> <td></td> </tr> <tr> <td>5D</td> <td>3</td> <td>51%</td> <td></td> </tr> <tr> <td>6A</td> <td>1</td> <td>60%</td> <td></td> </tr> <tr> <td>6B</td> <td>1</td> <td>47%</td> <td></td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>6C</td> <td>1</td> <td>87%</td> <td></td> </tr> <tr> <td>7A</td> <td>1</td> <td>20%</td> <td></td> </tr> <tr> <td>8A</td> <td>3</td> <td>51%</td> <td></td> </tr> <tr> <td>10A</td> <td>1</td> <td>67%</td> <td></td> </tr> <tr> <td>11A</td> <td>1</td> <td>33%</td> <td></td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	2A	1	33%		2B	3	58%		5C	1	67%		5D	3	51%		6A	1	60%		6B	1	47%		SE	# of Questions	Percent	Dual Coded	6C	1	87%		7A	1	20%		8A	3	51%		10A	1	67%		11A	1	33%	
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			<p>The diagram below shows the arcs and segments used to construct <math>\triangle ABC</math>, given line <math>k</math>.</p>  <p>Based on this construction, which statement is not true?</p> <p>A <math>\angle AWC</math> is complementary to <math>\angle CWB</math>.</p> <p>B <math>\triangle CWB</math> is a right triangle.</p> <p>C <math>\triangle ACB</math> is isosceles.</p> <p>D <math>m\angle CAB = m\angle CBA</math></p>																																																				

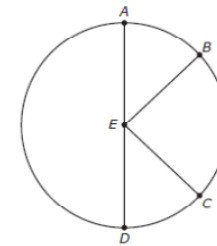
The rectangular pyramid shown below was intersected by a plane parallel to base  $ABCD$  to form quadrilateral  $A'B'C'D'$ .



Based on this information, which statement cannot be proved true?

- A  $ABCD \sim A'B'C'D'$
- B  $\frac{AF}{A'F} = \frac{BF}{B'F}$
- C  $\angle AA'D' \cong \angle BB'A'$
- D  $\angle BCD \cong \angle B'C'D'$

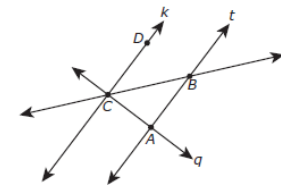
In circle  $E$  below,  $\angle AEB \cong \angle CED$ .



Based on this information, which statement must be true?

- F  $\overline{AB} \cong \overline{CD}$
- G  $\overline{EB} \perp \overline{EC}$
- H  $m\angle AED = 4(m\angle DEC)$
- J  $m\angle AEB + m\angle DEC = m\angle BEC$

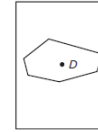
In the figure below,  $k \parallel t$  and  $k \perp q$ .



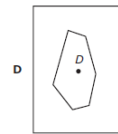
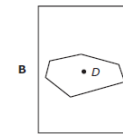
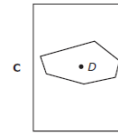
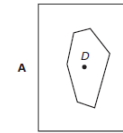
Based on this information, which statement can be proved true?

- F  $\angle ACB \cong \angle ABC$
- G  $\triangle CAB$  is an acute triangle.
- H  $\angle DCB \cong \angle BCA$
- J  $\triangle CAB$  is a right triangle.

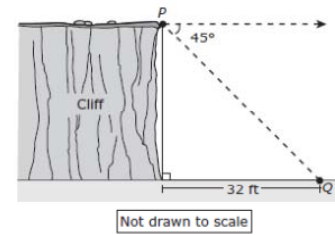
The diagram below represents one layout of a hexagonal swimming pool that contains a drain at point  $D$  in the center of a rectangular yard.



Other layouts are also being considered. Which layout is the result of a  $90^\circ$  counterclockwise rotation of the original layout using  $D$  as the center of rotation?



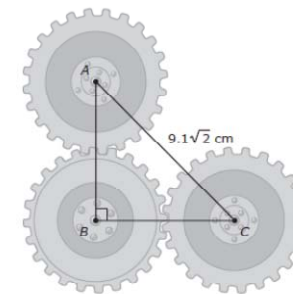
In the diagram below, the angle of depression from  $P$  to  $Q$  is  $45^\circ$ .



Which of the following is closest to the distance between  $P$  and  $Q$ ?

- F 45.3 ft
- G 22.6 ft
- H 55.4 ft
- J 18.5 ft

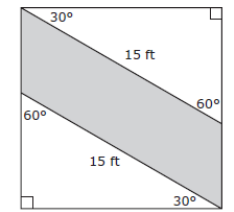
Three gears in a machine are positioned relative to each other to form an isosceles right triangle, as shown below.



What is the distance in centimeters between the centers of the gears located at  $B$  and  $C$ ?

Record your answer and fill in the bubbles on your answer document.

Within a square section of land, a landscaper will build a path, as represented by the shaded section in the diagram below.



Which measure is closest to the value of  $y$ ?

- A 5.5 ft
- B 3.1 ft
- C 4.3 ft
- D 7.5 ft

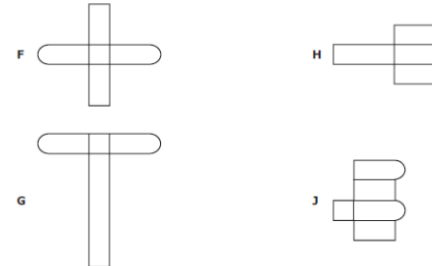
A plane intersects a cylinder. Which of the following cannot be formed by this intersection?

- F Triangle
- G Line
- H Rectangle
- J Circle

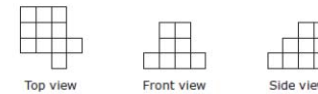
A company is designing a flotation device made of foam. The shape of the design is modeled below.



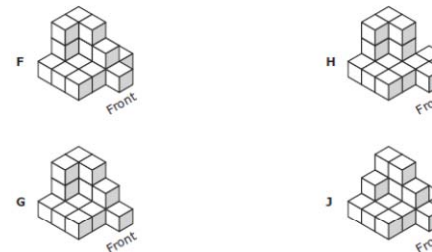
Which net can be folded to form the shape of the flotation device?



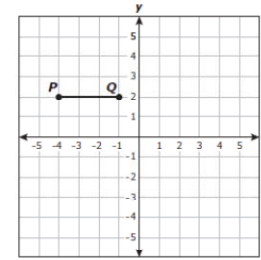
The front, side, and top views of a three-dimensional figure made of identical cubes are shown below.



Which diagram best represents this three-dimensional figure?



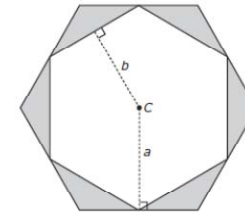
$\overline{PQ}$  is shown on the coordinate grid below. The coordinates of  $P$  and  $Q$  are integers.



Point  $(x, y)$  lies on the perpendicular bisector of  $\overline{PQ}$ . What is the value of  $x$ ?

Record your answer and fill in the bubbles on your answer document.

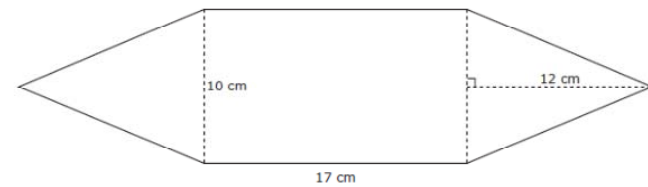
Two regular hexagons with center  $C$  and apothems  $a$  and  $b$  are shown in the figure below. Each vertex of the smaller hexagon is a midpoint on a side of the larger hexagon.



If  $a = 12\sqrt{3}$  cm and  $b = 18$  cm, what is the total area of the shaded regions?

- A  $648\sqrt{3}$  cm<sup>2</sup>
- B  $36\sqrt{3}$  cm<sup>2</sup>
- C  $216\sqrt{3}$  cm<sup>2</sup>
- D  $1,512\sqrt{3}$  cm<sup>2</sup>

33 A banner is composed of two congruent triangles and a rectangle, as shown below.

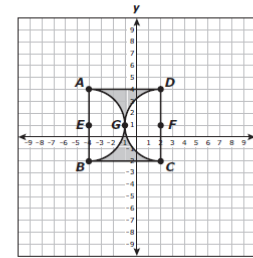


What is the total area of the banner in square centimeters?

Record your answer and fill in the bubbles on your answer document.



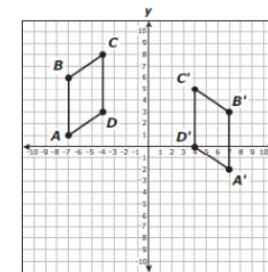
Points  $A$ ,  $B$ ,  $C$ , and  $D$  are the vertices of a square. Points  $E$  and  $F$  are the centers of two congruent semicircles that are tangent to each other at point  $G$ .



Which value is closest to the area of the shaded regions?

- F 7.7 units<sup>2</sup>
- G 4.3 units<sup>2</sup>
- H 17.2 units<sup>2</sup>
- J 64.3 units<sup>2</sup>

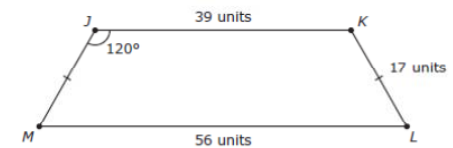
Parallelogram  $ABCD$  was transformed to form parallelogram  $A'B'C'D'$ .



Which rule describes the transformation that was used to form parallelogram  $A'B'C'D'$ ?

- F  $(x, -y)$
- G  $(-x, y)$
- H  $(x + 6, -y)$
- J  $(-x, y - 3)$

Isosceles trapezoid  $JKLM$  is shown below.



If the dimensions of trapezoid  $JKLM$  are multiplied by a scale factor of  $f$  to create trapezoid  $J'K'L'M'$ , which statement is true?

- F Trapezoid  $J'K'L'M'$  contains two base angles measuring  $30^\circ$  each.
- G The longer base of trapezoid  $J'K'L'M'$  is  $56f$  units.
- H The bases of trapezoid  $J'K'L'M'$  have lengths of 22 units and 39 units.
- J Trapezoid  $J'K'L'M'$  contains two base angles measuring  $(120f)^\circ$  each.

Math  
Vertical Alignment by Grade

Strand: Graphing, Transformations, and Geometric Models

<p>TEK: the student analyzes geometric relationships in order to make and verify conjectures</p> <p>TEK: the student uses a variety of representations to describe geometric relationships and solve problems</p> <p>TEK: the student analyzes the relationship between three-dimensional geometric figures and related two-dimensional representations and uses these representation to solve problems</p> <p>TEK: the student understands that coordinate systems provide convenient and efficient ways of representing geometric figures and uses them accordingly</p> <p>TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations</p> <p>TEK: the student applies the concept of congruence to justify properties of figures and solve problems</p> <p>TEK: the student applies the concepts of similarity to justify properties of figures and solve problems</p>	<p>TEK: the student connects algebraic and geometric representations of functions</p> <p>TEK: the student knows the relationship between the geometric and algebraic descriptions of conic sections</p> <p>TEK: the student understands that quadratic functions can be represented in different ways and translates among their various representations</p> <p>TEK: the student interprets and describes the effects of changes in the parameters of quadratic functions in applied and mathematical situations</p> <p>TEK: the student formulates equations and inequalities based on square root functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>TEK: the student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation</p> <p>TEK: the student formulates equations and inequalities based on exponential and logarithmic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of situation</p>	<p>TEK: the student uses the properties and attributes of functions</p> <p>TEK: the student understands the meaning of the slope and intercepts of the graphs of linear functions and zeros of linear functions and interprets and describes the effects of changes in parameters of linear functions in real-world and mathematical situations</p> <p>TEK: the student understands that the graphs of quadratic functions are affected by the parameters of the function and can interpret and describe the effects of changes in the parameters of quadratic functions</p>	<p>TEK: the student uses transformational geometry to develop spatial sense</p> <p>TEK: the student uses geometry to model and describe the physical world</p>
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Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade
<p>SE</p> <p><b>GEOM.2A – (S)</b> use constructions to explore attributes of geometric figures and to make conjectures about geometric relationships</p> <p><b>GEOM.2B – (R)</b> make conjectures about angles, lines, polygons, circles, and three-dimensional figures and determine the validity of the conjectures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic</p> <p><b>GEOM.5C – (S)</b> use properties of transformations and their compositions to make connections between mathematics and the real world, such as tessellations</p> <p><b>GEOM.5D – (R)</b> identify and apply patterns from right triangles to solve meaningful problems, including special right triangles (45-45-90 and 30-60-90) and triangles whose sides are Pythagorean triples</p> <p><b>GEOM.6A – (S)</b> describe and draw the intersection</p>	<p>SE</p> <p><b>ALGII.4A – (S)</b> identify and sketch graphs of parent functions, including linear, quadratic, exponential, and logarithmic functions, absolute value of <math>x</math>, square root of <math>x</math>, and reciprocal of <math>x</math></p> <p><b>ALGII.4B – (R)</b> extend parent functions with parameters such as <math>a</math> in <math>f(x) = a/x</math> and describe the effects of the parameter changes on the graph of parent functions</p> <p><b>ALGII.5A – (S)</b> describe a conic section as the intersection of a plane and a cone</p> <p><b>ALGII.5B – (S)</b> sketch graphs of conic sections to relate simple parameter changes in the equation to corresponding changes in the graph</p> <p><b>ALGII.5C – (S)</b> identify symmetries from graphs of conic sections</p> <p><b>ALGII.5E – (S)</b> use the method of completing the square</p> <p><b>ALGII.7A – (R)</b> use characteristics of the quadratic</p>	<p>SE</p> <p><b>ALG.2A – (S)</b> identify and sketch the general forms of linear (<math>y=x</math>) and quadratic (<math>y=x^2</math>) parent functions</p> <p><b>ALG.2C – (S)</b> interpret situations in terms of given graphs or creates situations that fit given graphs</p> <p><b>ALG.6C – (R)</b> investigate, describe, and predict the effects of changes in <math>m</math> and <math>b</math> on the graph of <math>y = mx + b</math></p> <p><b>ALG.6D – (S)</b> graph and write equations on lines given characteristics such as two points, a point and a slope, or a slope and <math>y</math>-intercept</p> <p><b>ALG.6F – (R)</b> interpret and predict the effects of changing slope and <math>y</math>-intercept in applied situations</p> <p><b>ALG.9B – (S)</b> investigate, describe, and predict the effects of changes in <math>a</math> on the graph of</p>	<p>SE:</p> <p><b>8.6A – (R)</b> generate similar figures using dilations including enlargements and reductions</p> <p><b>8.6B – (S)</b> graph dilations, reflections, and translations on a coordinate plane</p> <p><b>8.7A – (S)</b> draw three-dimensional figures from different perspectives</p> <p><b>8.7B – (S)</b> use geometric concepts and properties to solve problems in fields such as art and architecture</p> <p><b>8.7C – (S)</b> use pictures or models to demonstrate the Pythagorean Theorem</p> <p><b>8.7D – (S)</b> locate and name points on a coordinate plane using ordered pairs of rational numbers</p>

<p>of a given plane with various three-dimensional geometric figures</p> <p><b>GEOM.6B – (S)</b> use nets to represent and construct three-dimensional geometric figures</p> <p><b>GEOM.6C – (S)</b> use orthographic and isometric views of three-dimensional geometric figures to represent and construct three-dimensional geometric figures and solve problems</p> <p><b>GEOM.7A – (S)</b> use one- and two-dimensional coordinate systems to represent points, lines, rays, line segments, and figures</p> <p><b>GEOM.8A – (R)</b> find areas of regular polygons, circles, and composite figures</p> <p><b>GEOM.10A – (S)</b> use congruence transformations to make conjectures and justify properties of geometric figures including figures represented on a coordinate plane</p> <p><b>GEOM.11A – (S)</b> use and extend similarity properties and transformations to explore and justify conjectures about geometric figures</p>	<p>parent function to sketch the related graphs and connect between the <math>y=ax^2 + bx + c</math> and the <math>y=a(x-h)^2 + k</math> symbolic representations of quadratic functions</p> <p><b>ALGII.7B – (S)</b> use the parent function to investigate, describe, and predict the effects of changes in a, h, and k on the graphs of <math>y=a(x-h)^2 + k</math> form of a function in applied and purely mathematical situations</p> <p><b>ALGII.9A – (S)</b> use the parent function to investigate, describe, and predict the effects of parameter changes on the graphs of square root functions and describe limitations on the domains and ranges</p> <p><b>ALGII.10A – (S)</b> use quotients of polynomials to describe the graphs of rational functions, predict the effects of parameter changes, describe limitations on the domains and ranges, and examine asymptotic behavior</p> <p><b>ALGII.11B – (S)</b> use the parent functions to investigate, describe, and predict the effects of parameter changes on the graphs of exponential and logarithmic functions, describe limitations on the domains and ranges, and examine asymptotic behavior</p>	<p><math>y=ax^2 + c</math></p> <p><b>ALG.9C – (S)</b> investigate, describe, and predict the effects of changes in c on the graph of <math>y=ax^2 + c</math></p> <p><b>ALG.9D – (R)</b> analyze graphs of quadratic functions and draw conclusions</p>	
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
			Dilations on the coordinate plane
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
			<ul style="list-style-type: none"> <li>-understand that similar figures must have the same corresponding angle measurement and the dimensions of the corresponding sides must be proportional</li> <li>-use scale factors such as <math>\frac{1}{2}</math>, <math>\frac{1}{4}</math>, 2, 0.5,</li> <li>-have students draw the figures</li> <li>-find the scale factor from a graph, drawing or a table</li> <li>-label dilations with ‘prime’ notation</li> <li>-mark congruent parts of similar figures</li> <li>-the term dilation is introduced in 8<sup>th</sup></li> <li>-translations include vertical and horizontal slides, reflections across both axes, dilations include enlargements and reductions</li> <li>-include composition of transformations</li> <li>-connect dilations to scale factor and similar figures</li> <li>-discuss the ‘point of dilation’</li> <li>-practice building and sketching 3-D figures</li> </ul>

			<ul style="list-style-type: none"> <li>from all views</li> <li>-identify a solid figure when given the front, top and side views</li> <li>-use activities involving real life application where they are encouraged to explore and use appropriate geometric concepts, properties and formulas to solve problems</li> <li>-include conversion in square units – number of square feet in square yard</li> <li>-understand the Pythagorean theorem is used with right triangles</li> <li>-use various models to illustrate the sum of squares of the sides are the same as the square of/on the hypotenuse</li> <li>-recognize hypotenuse is always the longest side</li> <li>-use rational numbers in all 4 quadrants</li> <li>-rational numbers include positive and negative whole numbers, fractions, and decimal</li> <li>-negative rational numbers are introduced in 8<sup>th</sup> grade</li> <li>-positive rational numbers and integers are introduced in 7<sup>th</sup> grade</li> </ul>																																																																																																												
Vocabulary	Vocabulary	Vocabulary	Vocabulary																																																																																																												
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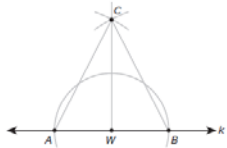
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8A	3	51%	
10A	1	67%	
11A	1	33%	

4B	2	54%	
5A	1	43%	
5B	1	60%	
5E	1	68%	
7A	3	69%	
9A	1	51%	
10A	1	51%	
11B	1	50%	

6C	3	53%	
6D	1	48%	
6F	3	57%	
9B	1	59%	
9D	2	64%	

6B	1	64%	
7A	1	72%	15A
7B	1	61%	14B
7C	1	44%	15A
7D	1	41%	15A

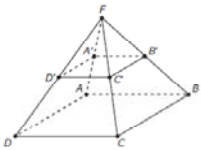
The diagram below shows the arcs and segments used to construct  $\triangle ABC$ , given line  $k$ .



Based on this construction, which statement is not true?

- A  $\angle AWC$  is complementary to  $\angle CWB$ .
- B  $\triangle CWB$  is a right triangle.
- C  $\triangle ACB$  is isosceles.
- D  $m\angle CAB = m\angle CBA$

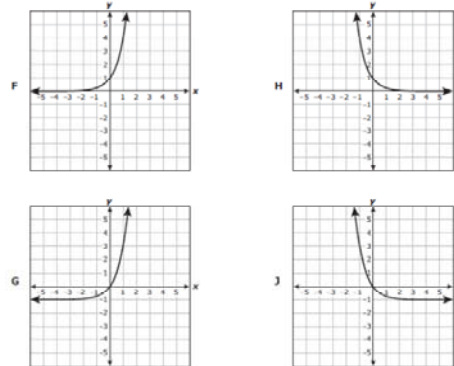
The rectangular pyramid shown below was intersected by a plane parallel to base  $ABCD$  to form quadrilateral  $A'B'C'D'$ .



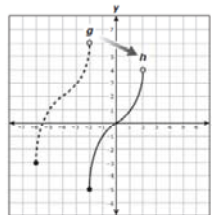
Based on this information, which statement cannot be proved true?

- A  $ABCD \sim A'B'C'D'$
- B  $\frac{AF}{A'F} = \frac{BF}{B'F}$
- C  $\angle AA'D' \cong \angle BB'A'$
- D  $\angle BCD \cong \angle B'C'D'$

Which graph best represents the parent function of  $y = 4^{(x+3)}$ ?



The graph of the function  $h$  was obtained from the graph of the function  $g$  using a composite transformation, as shown below.



Which equation can be used to describe  $h(x)$  in terms of  $g(x)$ ?

- F  $h(x) = g(x + 4) + 2$
- G  $h(x) = g(x + 4) - 2$
- H  $h(x) = g(x - 4) - 2$
- J  $h(x) = g(x - 4) + 2$

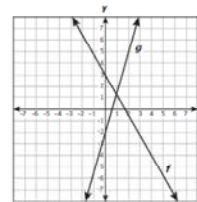
The set of ordered pairs below represents some points on the graph of function  $f$ .

$\{(3, 11), (-1, 3), (5, 15), (-4, -3), (-7, -9)\}$

What is the parent function of  $f$ ?

- F  $y = x$
- G  $y = 2^x$
- H  $y = x^2$
- J  $y = \sqrt{x}$

The slope and  $y$ -intercept of the graph of  $f$  were changed to make the graph of  $g$ , as shown below.



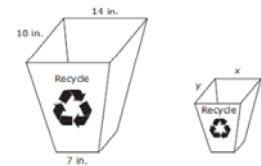
Which statement describes the changes that were made to the graph of  $f$  to make the graph of  $g$ ?

- A The slope was multiplied by 2, and the  $y$ -intercept was decreased by 5 to make the graph of  $g$ .
- B The slope was multiplied by  $-\frac{1}{2}$ , and the  $y$ -intercept was increased by 5 to make the graph of  $g$ .
- C The slope was multiplied by  $-2$ , and the  $y$ -intercept was decreased by 5 to make the graph of  $g$ .
- D The slope was multiplied by  $\frac{1}{2}$ , and the  $y$ -intercept was increased by 5 to make the graph of  $g$ .

A square has a side length of  $5\frac{1}{2}$  inches. This square is dilated by a scale factor of  $\frac{4}{5}$  to create a new square. What is the side length of the new square?

- A  $4\frac{4}{5}$  in.
- B  $4\frac{1}{2}$  in.
- C  $4\frac{2}{5}$  in.
- D Not here

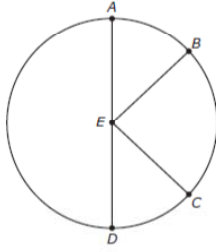
Mrs. Hussien has two similar recycling bins in her office. The dimensions of the smaller bin can be found by dilating the dimensions of the larger bin by a scale factor of 0.75.



What are the measurements of  $x$  and  $y$  on the smaller recycling bin?

- F  $x = 13.25$  in. and  $y = 9.25$  in.
- G  $x = 10.5$  in. and  $y = 6.5$  in.
- H  $x = 11.5$  in. and  $y = 7.5$  in.
- J  $x = 10.5$  in. and  $y = 7.5$  in.

In circle  $E$  below,  $\angle AEB \cong \angle CED$ .



Based on this information, which statement must be true?

- F  $\overline{AB} \cong \overline{CD}$
- G  $\overline{EB} \perp \overline{EC}$
- H  $m\angle AED = 4(m\angle DEC)$
- J  $m\angle AEB + m\angle DEC = m\angle BEC$

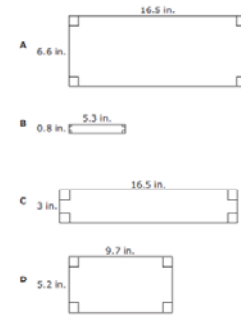
For the functions  $h$  and  $g$ , which statement is true if  $h(x) = g(x + 14) - 12$ ?

- A The graph of  $h$  is the result of the graph of  $g$  being translated right 14 units and down 12 units.
- B The graph of  $h$  is the result of the graph of  $g$  being translated left 14 units and down 12 units.
- C The graph of  $h$  is the result of the graph of  $g$  being translated right 14 units and up 12 units.
- D The graph of  $h$  is the result of the graph of  $g$  being translated left 14 units and up 12 units.

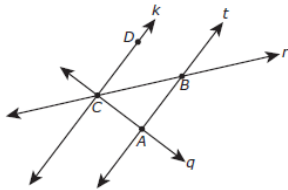
The graph of line  $p$  represents  $y = \frac{1}{5}x - 1$ . If the slope of line  $p$  is multiplied by  $-10$  to create line  $r$ , which statement about the graphs of the two lines is true?

- A Line  $r$  intersects line  $p$ .
- B Line  $r$  is parallel to line  $p$ .
- C Line  $r$  is 10 units above line  $p$ .
- D Line  $r$  is 10 units below line  $p$ .

A rectangle has a length of 7.5 inches and a width of 3 inches. This rectangle is dilated by a scale factor of 2.2 to create a new rectangle. Which figure represents the new rectangle?



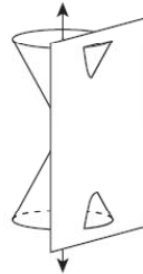
In the figure below,  $k \parallel t$  and  $k \perp q$ .



Based on this information, which statement can be proved true?

- F  $\angle ACB \cong \angle ABC$
- G  $\triangle CAB$  is an acute triangle.
- H  $\angle DCB \cong \angle BCA$
- J  $\triangle CAB$  is a right triangle.

A plane intersects a double cone as shown below.



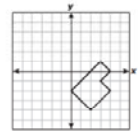
What conic section is created by this intersection?

- F Circle
- G Ellipse
- H Hyperbola
- J Parabola

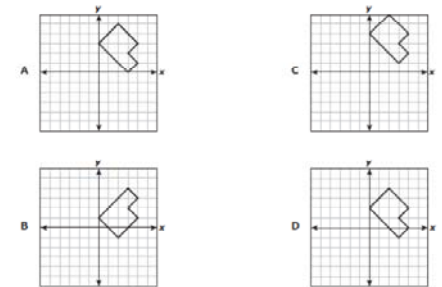
If the graph of  $y = 9x + 4$  is translated 4 units up, which equation describes the new graph?

- F  $y = 9x + 8$
- G  $y = 13x + 4$
- H  $y = 13x + 8$
- J  $y = 4x + 4$

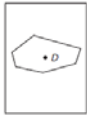
The graph of a figure is shown below.



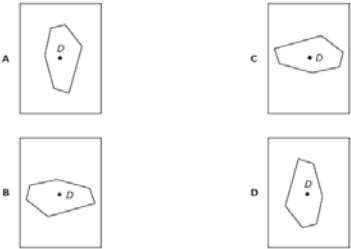
Which graph represents the reflection of this figure across the  $x$ -axis?



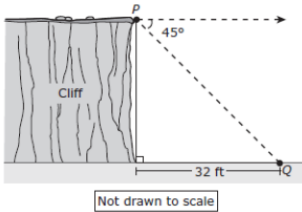
The diagram below represents one layout of a hexagonal swimming pool that contains a drain at point  $D$  in the center of a rectangular yard.



Other layouts are also being considered. Which layout is the result of a  $90^\circ$  counterclockwise rotation of the original layout using  $D$  as the center of rotation?



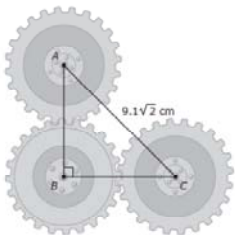
In the diagram below, the angle of depression from  $P$  to  $Q$  is  $45^\circ$ .



Which of the following is closest to the distance between  $P$  and  $Q$ ?

- F 45.3 ft
- G 22.6 ft
- H 55.4 ft
- J 18.5 ft

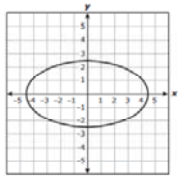
Three gears in a machine are positioned relative to each other to form an isosceles right triangle, as shown below.



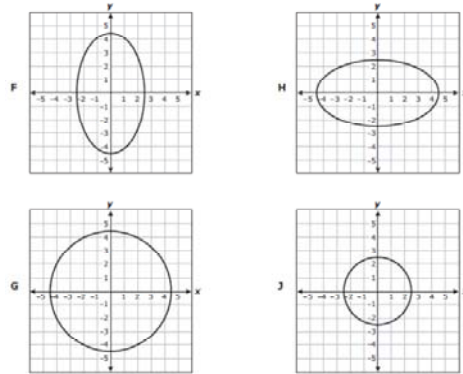
What is the distance in centimeters between the centers of the gears located at  $B$  and  $C$ ?

Record your answer and fill in the bubbles on your answer document.

An equation in the form  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  is graphed below.



If the values of  $a$  and  $b$  remain the same, which graph best represents  $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$ ?



Which equation has the same graph as  $2x^2 - 4x - y + 11 = 0$ ?

- F  $y = (2x - 1)^2 + 9$
- G  $y = (2x - 1)^2 + 13$
- H  $y = 2(x - 1)^2 + 9$
- J  $y = 2(x - 1)^2 + 13$

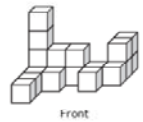
For what value of  $c$  will the graphs of  $y = 2x^2 - 36x + c$  and  $y = 2(x - 9)^2 - 18$  be the same?

- F 63
- G -180
- H 99
- J 144

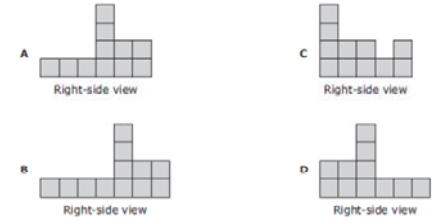
What is the equation in standard form of the line that passes through the point  $(1, 24)$  and has a slope of  $-0.67$ ?

- F  $3x + 5y = 125$
- G  $3x + 5y = 77$
- H  $3x + 5y = 123$
- J  $3x + 5y = 115$

A three-dimensional figure made of identical cubes is shown below.



Which of these could be the right-side view of this figure?



Students at a school will sell hats to raise money. There are some hats left over from last year, and 20 boxes of hats will be ordered this year. When the order arrives, the total number of hats the students will have can be determined using the function  $f(x) = 48x + 37$ , where  $x$  represents the number of boxes ordered. If the number of hats per box changes so that the situation is modeled by the function  $h(x) = 24x + 37$ , then how many fewer hats will the students have available to sell if they still order 20 boxes?

Record your answer and fill in the bubbles on your answer document.

Pentagon  $PQRST$  below models one side of a building.



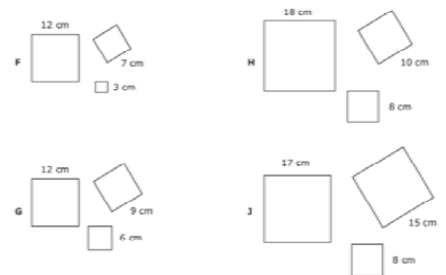
The sum of the interior angles of the pentagon is  $540^\circ$ , the measure of angle  $R$  is  $100^\circ$ , and  $\angle Q \cong \angle S$ . What is the measure of  $\angle Q$ ?

- F  $92^\circ$
- G  $130^\circ$
- H  $108^\circ$
- J Not here

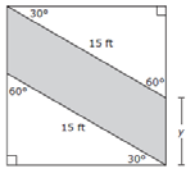
An airplane's altitude in feet during its descent for landing can be found using the function  $f(x) = -300x + 30,000$ , where  $x$  represents the horizontal distance in miles from where the plane begins its descent. After new government regulations become law, the airplane's descent will be modeled by the function  $g(x) = -300x + 30,500$ . Which statement describes this change?

- F The airplane starts its descent from an altitude 500 feet higher.
- G The airplane starts its descent from an altitude 500 feet lower.
- H The airplane descends 500 feet per horizontal mile faster.
- J The airplane descends 500 feet per horizontal mile slower.

Which group of three squares will form a right triangle when joined at their vertices?



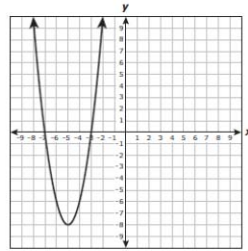
Within a square section of land, a landscaper will build a path, as represented by the shaded section in the diagram below.



Which measure is closest to the value of  $y$ ?

- A 5.5 ft
- B 3.1 ft
- C 4.3 ft
- D 7.5 ft

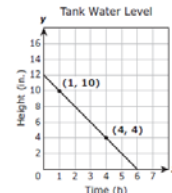
A quadratic function is graphed on the grid below.



If this function is written in the form  $y = a(x - h)^2 + k$ , what is the value of  $a$ ?

- F -3
- G -8
- H 5
- J 2

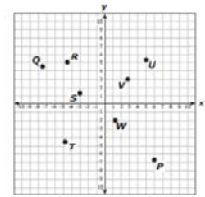
The graph below shows the water level in a tank being drained at a constant rate.



If the rate at which the tank is drained is changed to 3 inches per hour and the initial water level stays the same, how would the time it takes to empty the tank be affected?

- F It would take 4 fewer hours.
- G It would take 1.5 more hours.
- H It would take 2 fewer hours.
- J It would take 2 more hours.

Which points on the coordinate grid below satisfy the conditions  $x > -3\frac{1}{2}$  and  $y < 1\frac{4}{5}$ ?

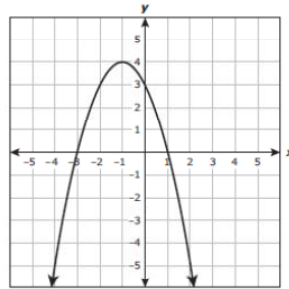


- F Points P and U
- G Points Q, R, and T
- H Points Q, S, T, and W
- J Points P, S, and W

A plane intersects a cylinder. Which of the following cannot be formed by this intersection?

- F Triangle
- G Line
- H Rectangle
- J Circle

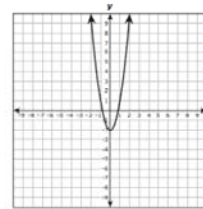
A function is graphed below.



Which function is best represented by this graph?

- F  $y = -(x + 1)^2 + 4$
- G  $y = -(x - 1)^2 + 4$
- H  $y = -x^2 + 4x + 3$
- J  $y = -x^2 - 4x + 3$

The graph of  $y = 3x^2 - 2$  is shown below.



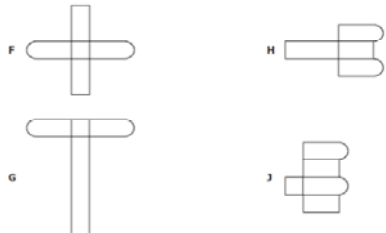
If the coefficient of  $x^2$  is changed from 3 to another positive number to create a new function, how will the graph of the new function compare with the graph of the original function?

- A The  $x$ -intercepts of the new graph will be the same as the  $x$ -intercepts of the original graph.
- B The vertex of the new graph will be different from the vertex of the original graph.
- C The new graph will be wider or narrower than the original graph.
- D The new graph will open in the opposite direction as the original graph.

A company is designing a flotation device made of foam. The shape of the design is modeled below.



Which net can be folded to form the shape of the flotation device?



Which two transformations can be used to obtain the graph of  $g(x) = -\sqrt{x - c}$  from the graph of  $f(x) = \sqrt{x}$  if  $c > 0$ ?

- A A translation to the right  $c$  units followed by a reflection across the  $x$ -axis
- B A translation to the left  $c$  units followed by a reflection across the  $x$ -axis
- C A translation to the right  $c$  units followed by a reflection across the  $y$ -axis
- D A translation to the left  $c$  units followed by a reflection across the  $y$ -axis

What is the vertex of the graph of the quadratic function  $f(x) = x^2 + 6x + 10$ ?

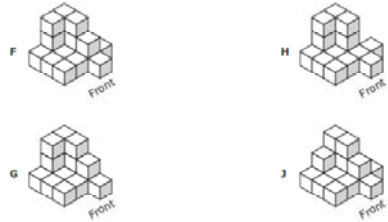
- F (3, -1)
- G (-3, -1)
- H (-3, 1)
- J (3, 1)



The front, side, and top views of a three-dimensional figure made of identical cubes are shown below.



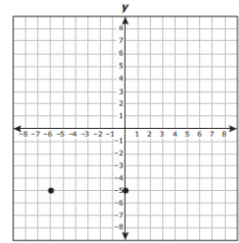
Which diagram best represents this three-dimensional figure?



Which of the following gives the equations for all the vertical asymptotes of the graph of  $f(x) = \frac{x+4}{(x+8)(x-5)}$ ?

- F  $x = -4$
- G  $x = -5$  and  $x = 8$
- H  $x = -2$  and  $x = 5$
- J  $x = -8$  and  $x = 5$

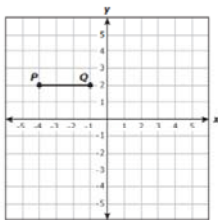
Two points on the graph of a quadratic function are shown on the grid below.



What is the equation for the axis of symmetry of the graph of this function?

- A  $x = -3$
- B  $y = -3$
- C  $x = -5$
- D  $y = -5$

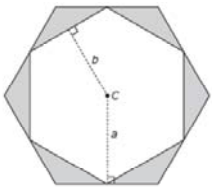
$\overline{PQ}$  is shown on the coordinate grid below. The coordinates of P and Q are integers.



Point  $(x, y)$  lies on the perpendicular bisector of  $\overline{PQ}$ . What is the value of  $x$ ?

Record your answer and fill in the bubbles on your answer document.

Two regular hexagons with center C and apothems a and b are shown in the figure below. Each vertex of the smaller hexagon is a midpoint on a side of the larger hexagon.



If  $a = 12\sqrt{3}$  cm and  $b = 18$  cm, what is the total area of the shaded regions?

- A  $648\sqrt{3}$  cm<sup>2</sup>
- B  $36\sqrt{3}$  cm<sup>2</sup>
- C  $216\sqrt{3}$  cm<sup>2</sup>
- D  $1,512\sqrt{3}$  cm<sup>2</sup>

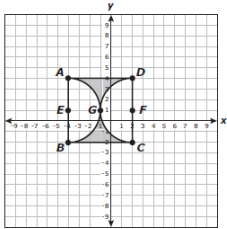
33 A banner is composed of two congruent triangles and a rectangle, as shown below.



What is the total area of the banner in square centimeters?

Record your answer and fill in the bubbles on your answer document.

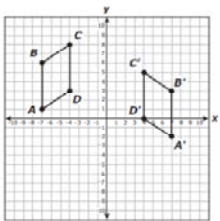
Points  $A$ ,  $B$ ,  $C$ , and  $D$  are the vertices of a square. Points  $E$  and  $F$  are the centers of two congruent semicircles that are tangent to each other at point  $G$ .



Which value is closest to the area of the shaded regions?

- F 7.7 units<sup>2</sup>
- G 4.3 units<sup>2</sup>
- H 17.2 units<sup>2</sup>
- J 64.3 units<sup>2</sup>

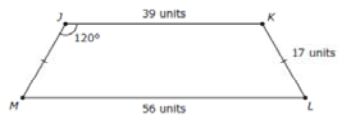
Parallelogram  $ABCD$  was transformed to form parallelogram  $A'B'C'D'$ .



Which rule describes the transformation that was used to form parallelogram  $A'B'C'D'$ ?

- F  $(x, -y)$
- G  $(-x, y)$
- H  $(x + 6, -y)$
- J  $(-x, y - 3)$

Isosceles trapezoid  $JKLM$  is shown below.



If the dimensions of trapezoid  $JKLM$  are multiplied by a scale factor of  $t$  to create trapezoid  $J'K'L'M'$ , which statement is true?

- F Trapezoid  $J'K'L'M'$  contains two base angles measuring  $30^\circ$  each.
- G The longer base of trapezoid  $J'K'L'M'$  is  $56t$  units.
- H The bases of trapezoid  $J'K'L'M'$  have lengths of 22 units and 39 units.
- J Trapezoid  $J'K'L'M'$  contains two base angles measuring  $(120t)^\circ$  each.

Math  
Vertical Alignment by Grade

Strand: Graphing, Transformations, and Geometric Models

TEK: the student uses transformational geometry to develop spatial sense TEK: the student uses geometry to model and describe the physical world	TEK: the student uses coordinate geometry to describe location on a plane TEK: the student uses geometry to model and describe the physical world	TEK: the student uses coordinate geometry to identify location in two dimensions	TEK: the student models transformations TEK: the student recognizes the connection between ordered pairs of numbers and locations of points on a plane
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8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade	5 <sup>th</sup> Grade
SE: <b>8.6A – (R)</b> generate similar figures using dilations including enlargements and reductions <b>8.6B – (S)</b> graph dilations, reflections, and translations on a coordinate plane <b>8.7A – (S)</b> draw three-dimensional figures from different perspectives <b>8.7B – (S)</b> use geometric concepts and properties to solve problems in fields such as art and architecture <b>8.7C – (S)</b> use pictures or models to demonstrate the Pythagorean Theorem <b>8.7D – (S)</b> locate and name points on a coordinate plane using ordered pairs of rational numbers	SE <b>7.7A – (S)</b> locate and name points on a coordinate plane using ordered pairs of integers <b>7.7B – (R)</b> graph reflections across the horizontal or vertical axis and graph translations on a coordinate plane <b>7.8A – (S)</b> sketch three-dimensional figures when given the top, side, and front views <b>7.8C – (S)</b> use geometric concepts and properties to solve problems in fields such as art and architecture	SE <b>6.7 – (S)</b> locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers	SE <b>5.8A – (R)</b> sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid <b>5.8B – (S)</b> identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid <b>5.9 – (S)</b> locate and name points on a coordinate grid using ordered pairs of whole numbers
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
	Transformations: translation=slide, rotation=turn, reflection=flip	Call the axis by name (vertical is the y-axis and the horizontal is the x-axis)	Call the axis by name (vertical is the y-axis and the horizontal is the x-axis) when constructing graphs Transformations: translation=slide, rotation=turn, reflection=flip 4 <sup>th</sup> grade students plot halves, fourths, tenths and hundredths on the number line...build on this prior knowledge
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-understand that similar figures must have the same corresponding angle measurement and the dimensions of the corresponding sides must be proportional -use scale factors such as $\frac{1}{2}$ , $\frac{1}{4}$ , 2, 0.5, -have students draw the figures -find the scale factor from a graph, drawing or a table	-use integers in all four quadrants -label and identify origin, quadrants, x-axis and y-axis -integers are positive and negative numbers not including fractions and decimals -7 <sup>th</sup> grade is the first time students have graphed in all quadrants (graph using negative numbers) -use all 4 quadrants for reflections, vertical and	-use first quadrant only -ordered pairs may include fractions and decimals	-journal writing-students form definitions using attributes -pictorial representations on geoboard grid paper -quadrant I is positive numbers -must work with and understand the concept of congruent -pictorial representations on geoboard grid

<ul style="list-style-type: none"> <li>-label dilations with 'prime' notation</li> <li>-mark congruent parts of similar figures</li> <li>-the term dilation is introduced in 8<sup>th</sup></li> <li>-translations include vertical and horizontal slides, reflections across both axes, dilations include enlargements and reductions</li> <li>-include composition of transformations</li> <li>-connect dilations to scale factor and similar figures</li> <li>-discuss the 'point of dilation'</li> <li>-practice building and sketching 3-D figures from all views</li> <li>-identify a solid figure when given the front, top and side views</li> <li>-use activities involving real life application where they are encouraged to explore and use appropriate geometric concepts, properties and formulas to solve problems</li> <li>-include conversion in square units – number of square feet in square yard</li> <li>-understand the Pythagorean theorem is used with right triangles</li> <li>-use various models to illustrate the sum of squares of the sides are the same as the square of/on the hypotenuse</li> <li>-recognize hypotenuse is always the longest side</li> <li>-use rational numbers in all 4 quadrants</li> <li>-rational numbers include positive and negative whole numbers, fractions, and decimal</li> <li>-negative rational numbers are introduced in 8<sup>th</sup> grade</li> <li>-positive rational numbers and integers are introduced in 7<sup>th</sup> grade</li> </ul>	<p>horizontal translation</p> <ul style="list-style-type: none"> <li>-this is the first time students have used a coordinate plane for transformations or reflected across an axis</li> <li>-graphing reflections in all 4 quadrants is introduced in 7<sup>th</sup> grade</li> <li>-practice building with cubes and sketching 3D figures when given the top, side and front views</li> <li>-students should be able to identify a solid figure when given the front, top and side views</li> <li>-views is a new 7thgrade concept</li> <li>-only make nets – use prisms, pyramids, and cylinders</li> <li>-do not calculate surface area in 7<sup>th</sup></li> <li>-use activities involving real life application to explore and use geometric concepts and properties to solve problems</li> <li>-can labels, wrapping a box, painting columns on a building, bicycle tire, steam roller</li> </ul>		<p>paper (often tested on grids)</p> <ul style="list-style-type: none"> <li>-students should only work in quadrant I which uses only positive numbers</li> <li>-focus on concept and position of points on a coordinate grid related to written coordinate</li> <li>-combine the concept of x-axis, y-axis and ordered pairs</li> <li>-points on a grid is a new concept introduced in 5<sup>th</sup> grade</li> </ul>																																																												
<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>																																																												
<p>Similar figures, dilations, reductions, enlargements, reflections, translations, coordinate plane, perspectives, ordered pairs, Pythagorean Theorem, hypotenuse</p>	<p>Coordinate plane, integers, positive, negative, ordered pairs, x-axis, y-axis, quadrants, origin, vertical, horizontal, reflections, translations, views,</p>	<p>Coordinate plane, quadrant I, locate, ordered pairs, y-axis, x-axis, origin, positive</p>	<p>Transformations, translation, rotations, reflections, coordinate plane, quadrant I, congruent, locate, ordered pairs, y-axis, x-axis, origin</p>																																																												
<p>STAAR 2012</p> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>6A</td> <td>3</td> <td>51%</td> <td>14D,14B</td> </tr> <tr> <td>6B</td> <td>1</td> <td>69%</td> <td>14D</td> </tr> <tr> <td>7A</td> <td>1</td> <td>49%</td> <td>15A</td> </tr> <tr> <td>7B</td> <td>1</td> <td>52%</td> <td>14B</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	6A	3	51%	14D,14B	6B	1	69%	14D	7A	1	49%	15A	7B	1	52%	14B	<p>STAAR 2012</p> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>7B</td> <td>3</td> <td>71%</td> <td></td> </tr> <tr> <td>8A</td> <td>1</td> <td>69%</td> <td>14A</td> </tr> <tr> <td>8C</td> <td>1</td> <td>40%</td> <td>13B</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	7B	3	71%		8A	1	69%	14A	8C	1	40%	13B	<p>STAAR 2012</p> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>7A</td> <td>2</td> <td>57%</td> <td>11D</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	7A	2	57%	11D	<p>STAAR 2012</p> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>8A</td> <td>3</td> <td>74%</td> <td></td> </tr> <tr> <td>8B</td> <td>1</td> <td>66%</td> <td></td> </tr> <tr> <td>9A</td> <td>1</td> <td>74%</td> <td>14D</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	8A	3	74%		8B	1	66%		9A	1	74%	14D
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7C	1	35%	15A
7D	1	38%	14D

STAAR 2013

SE	# of Questions	Percent	Dual Coded
6A	3	63%	14A
6B	1	64%	
7A	1	72%	15A
7B	1	61%	14B
7C	1	44%	15A
7D	1	41%	15A

STAAR 2013

SE	# of Questions	Percent	Dual Coded
7A	1	77%	11D
7B	3	74%	13D
8A	1	78%	14A

STAAR 2013

SE	# of Questions	Percent	Dual Coded
7A	2	50%	11D

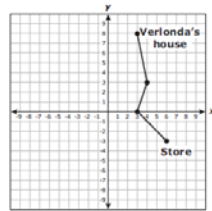
STAAR 2013

SE	# of Questions	Percent	Dual Coded
8A	2	83%	
8B	1	73%	
9A	2	70%	14D

A square has a side length of  $5\frac{1}{2}$  inches. This square is dilated by a scale factor of  $\frac{4}{5}$  to create a new square. What is the side length of the new square?

- A  $4\frac{4}{5}$  in.
- B  $4\frac{1}{4}$  in.
- C  $4\frac{2}{5}$  in.
- D Not here

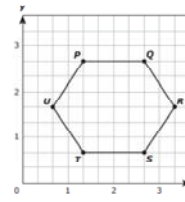
The route that Verlonida takes from her house to a store is represented on the grid below.



Which ordered pair represents a point on Verlonida's route?

- A (0, -3)
- B (-3, 6)
- C (3, 4)
- D (3, 8)

A polygon is shown on the coordinate grid.



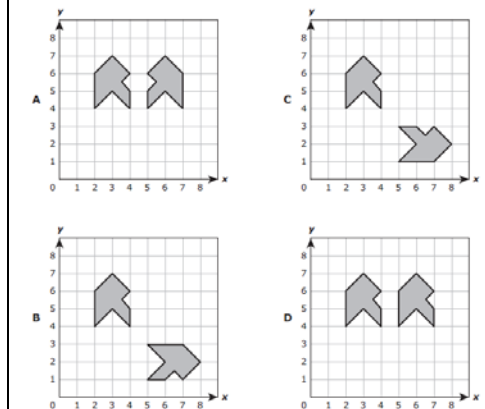
The list below shows ordered pairs representing the location of five vertices of the polygon.

- $(\frac{2}{3}, \frac{2}{3}), (\frac{2}{3}, 1\frac{2}{3}), (1\frac{1}{3}, \frac{2}{3}), (1\frac{1}{3}, 2\frac{2}{3}), (3\frac{1}{3}, 1\frac{2}{3})$

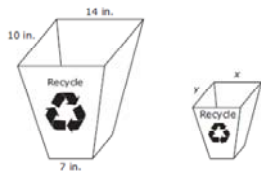
Which vertex is NOT represented by an ordered pair in the list?

- F Vertex P
- G Vertex Q
- H Vertex R
- J Vertex S

Which coordinate grid shows only a translation?



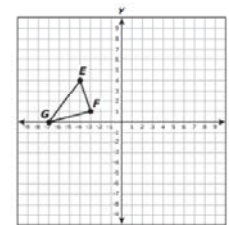
Mrs. Hussien has two similar recycling bins in her office. The dimensions of the smaller bin can be found by dilating the dimensions of the larger bin by a scale factor of 0.75.



What are the measurements of  $x$  and  $y$  on the smaller recycling bin?

- F  $x = 13.25$  in. and  $y = 9.25$  in.
- G  $x = 10.5$  in. and  $y = 6.5$  in.
- H  $x = 11.5$  in. and  $y = 7.5$  in.
- J  $x = 10.5$  in. and  $y = 7.5$  in.

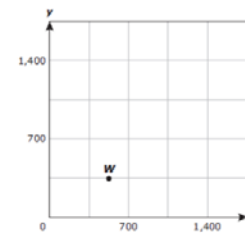
Triangle  $EFG$  is shown on the grid below.



If triangle  $EFG$  is reflected across the  $y$ -axis to form triangle  $E'F'G'$ , which ordered pair represents the coordinates of  $F'$ ?

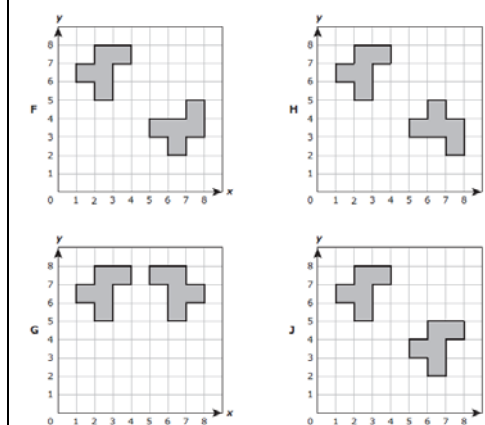
- F (3, -1)
- G (3, 1)
- H (-3, -1)
- J (1, -3)

Which ordered pair appears to be located 350 units to the right and 700 units up from point  $W$ ?

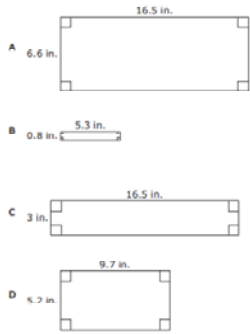


- A (1,050, 875)
- B (700, 1,050)
- C (875, 1,050)
- D (1,225, 700)

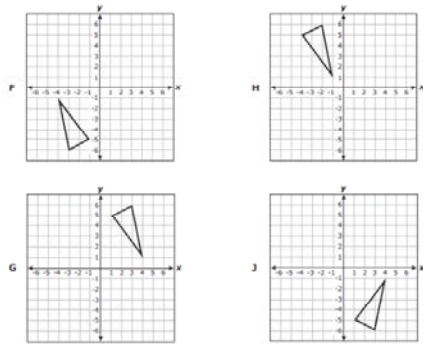
Which coordinate grid shows only a rotation?



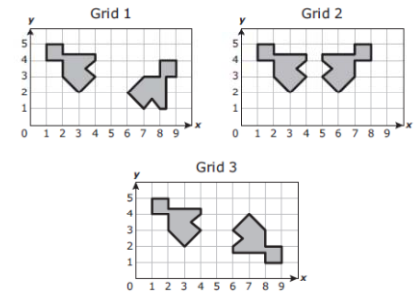
A rectangle has a length of 7.5 inches and a width of 3 inches. This rectangle is dilated by a scale factor of 2.2 to create a new rectangle. Which figure represents the new rectangle?



The vertices of a triangle are  $(-1, 5)$ ,  $(-4, 1)$ , and  $(-3, 6)$ . Which grid represents the result of reflecting the triangle across the  $x$ -axis?



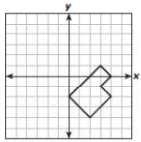
Each coordinate grid below shows a single transformation.



Which list describes the transformations in grids 1, 2, and 3 in order?

- F Translation, reflection, rotation
- G Rotation, reflection, rotation
- H Reflection, translation, rotation
- J Rotation, reflection, reflection

The graph of a figure is shown below.



Which graph represents the reflection of this figure across the  $x$ -axis?

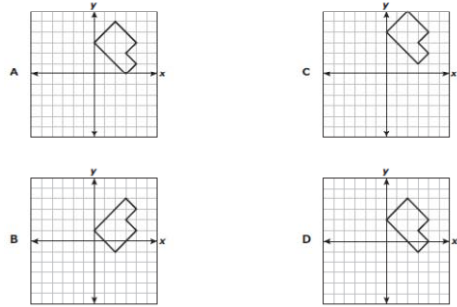
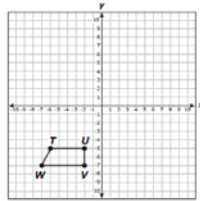
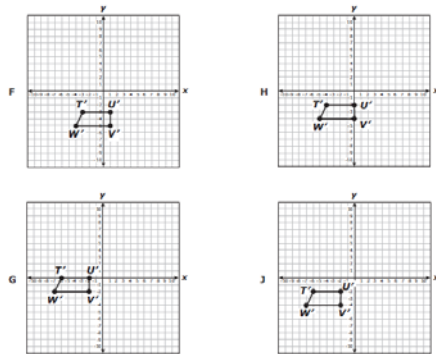


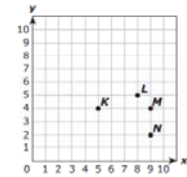
Figure  $TUWV$  is shown on the grid below.



Which of the following shows the figure  $TUWV$  translated 3 units up and 2 units to the right to form the image  $T'U'V'W'$ ?



Billy will place point  $W$  at the coordinates  $(7, 6)$  on the coordinate grid below.



Billy will then circle the point that is 2 units right and 2 units down from  $(7, 6)$ . Which point will Billy circle?

- A Point  $K$
- B Point  $L$
- C Point  $M$
- D Point  $N$

A three-dimensional figure made of identical cubes is shown below.

Front

Which of these could be the right-side view of this figure?

A Right-side view

C Right-side view

B Right-side view

D Right-side view

The top, front, and right-side views of a three-dimensional figure made of identical cubes are shown below.

Top view      Front view      Right-side view

Which three-dimensional figure is represented by these views?

F Front

H Front

G Front

J Front

Line  $m$  is shown on the coordinate grid below.

Which ordered pair represents a point that is located below line  $m$ ?

F (3, 5)

G (10, 6)

H (2, 8)

J (4, 10)

Pentagon  $PQRST$  below models one side of a building.

The sum of the interior angles of the pentagon is  $540^\circ$ , the measure of angle  $R$  is  $100^\circ$ , and  $\angle Q \cong \angle S$ . What is the measure of  $\angle Q$ ?

F  $92^\circ$

G  $130^\circ$

H  $108^\circ$

J Not here

Which group of three squares will form a right triangle when joined at their vertices?

F 12 cm, 7 cm, 3 cm

H 18 cm, 10 cm, 8 cm

G 12 cm, 9 cm, 6 cm

J 17 cm, 15 cm, 8 cm

Which points on the coordinate grid below satisfy the conditions  $x > -3\frac{1}{2}$  and  $y < 1\frac{4}{5}$ ?

F Points  $P$  and  $U$

G Points  $Q$ ,  $R$ , and  $T$

H Points  $Q$ ,  $S$ ,  $T$ , and  $W$

J Points  $P$ ,  $S$ , and  $W$

Math  
Vertical Alignment by Grade

Strand: Graphing, Transformations, and Geometric Models

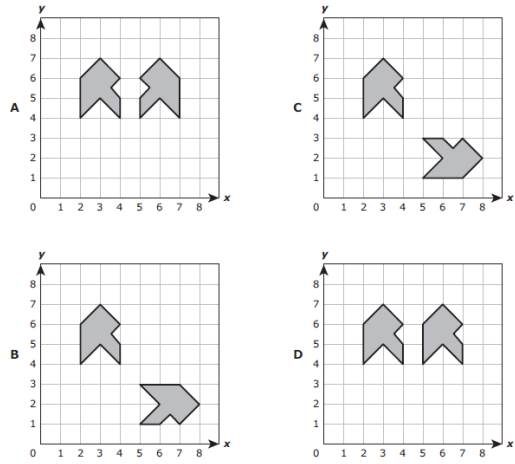
TEK: the student models transformations TEK: the student recognizes the connection between ordered pairs of numbers and locations of points on a plane	TEK: the students connects transformations to congruence and symmetry TEK: the student recognizes the connection between numbers and their properties and points on a line	TEK: the student recognizes congruence and symmetry TEK: the student recognizes that a line can be used to represent numbers and fractions and their properties and relationships	TEK: the student recognizes that a line can be used to represent a set of numbers and its properties
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5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade
SE <b>5.8A – (R)</b> sketch the results of translations, rotations, and reflections on a Quadrant I coordinate grid <b>5.8B – (S)</b> identify the transformation that generates one figure from the other when given two congruent figures on a Quadrant I coordinate grid <b>5.9 – (S)</b> locate and name points on a coordinate grid using ordered pairs of whole numbers	SE <b>4.9A –</b> demonstrate translations, reflections, and rotations using concrete models <b>4.9B – (R)</b> use translations, reflections, and rotations to verify that two shapes are congruent <b>4.9C – (S)</b> use reflections to verify that a shape has symmetry <b>4.10 – (R)</b> locate and name points on a number line using whole numbers, fractions such as halves and fourths, and decimals such as tenths	SE <b>3.9A – (S)</b> identify congruent two-dimensional figures <b>3.9B –</b> create two-dimensional figures with lines of symmetry using concrete models and technology <b>3.9C – (S)</b> identify lines of symmetry in two-dimensional geometric figures <b>3.10 – (R)</b> locate and name points on a number line using whole numbers and fractions including halves and fourths	SE <b>2.8 – (S)</b> use whole numbers to locate and name points on a number line
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Call the axis by name (vertical is the y-axis and the horizontal is the x-axis) when constructing graphs Transformations: translation=slide, rotation=turn, reflection=flip 4 <sup>th</sup> grade students plot halves, fourths, tenths and hundredths on the number line...build on this prior knowledge	Call the axis by name (vertical is the y-axis and the horizontal is the x-axis) when constructing graphs Transformations: translation=slide, rotation=turn, reflection=flip Locate and name points on a number line... including whole numbers, decimals, and fractions	Call the axis by name (vertical is the y-axis and the horizontal is the x-axis) when constructing graphs Locate and name points on a number line... including whole numbers and fractions	Locate and name points on a number line... whole numbers Find the difference between two numbers to determine the ‘rule’ of the number line Kindergarten and 1 <sup>st</sup> grade supports this TEK by exposing students to number lines
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-journal writing-students form definitions using attributes -pictorial representations on geoboard grid paper -quadrant I is positive numbers -must work with and understand the concept of congruent -pictorial representations on geoboard grid paper (often tested on grids) -students should only work in quadrant I which uses only positive numbers -focus on concept and position of points on a coordinate grid related to written coordinate	-translations include up-down and left-right, diagonal -journal writing-form definitions with attributes -students use concrete models to show rotational turn, reflections, and translations -use real world application -this concept is introduced in 4 <sup>th</sup> grade -identify vertical, horizontal and diagonal lines of symmetry -students use concrete models to show symmetry -include shapes with more than one line of symmetry -reflections are introduced in 4 <sup>th</sup> grade -number lines do not always begin with ‘0’	-journal writing (create definitions of two-dimensional figures using attributes) -use concrete examples and pictorial representations -use real world application -two-dimensional figures (circle, polygon, triangle, square, rectangle, quadrilateral, rhombus, trapezoid, parallelogram, pentagon, hexagon, octagon) -the concept of congruency is introduced in 3 <sup>rd</sup> grade -given any two-dimensional geometric figures,	-use numbers from 0 to 99. The number line should be straight with arrows on both ends, equally spaced divisions with whole numbers written at some of the division marks. -this is the first time a number line is introduced in the TEKS.

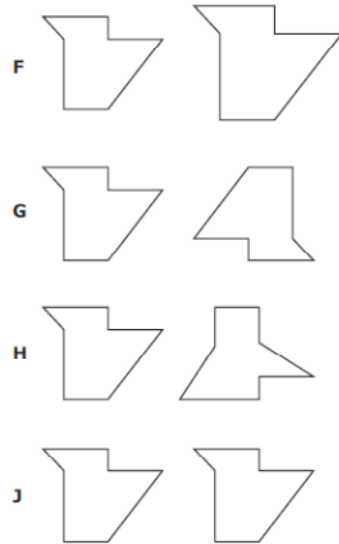


<p>-combine the concept of x-axis, y-axis and ordered pairs -points on a grid is a new concept introduced in 5<sup>th</sup> grade</p>	<p>-concept of points on a line -use pictorial representations Whole numbers, halves, and fourths -decimals of tenths -a number line is considered a number line: fractions such as halves and fourths, implies rulers may be tested up to 'halves and fourths' -clocks, gauges and thermometers are also number lines -decimals on a number line are introduced in 4<sup>th</sup> grade</p>	<p>determine all lines of symmetry -use pictorial representations -the concept of symmetry is introduced in 3<sup>rd</sup> grade -use whole numbers, halves and fourths on the number line -number lines do not always begin with '0' -the ruler is consideration -fractions such as halves and fourths should be taught on rulers -ruler is a new concept (tool) introduced in 3<sup>rd</sup> grade -developing the concept of points on a number line with help children with skills such as the ruler, thermometer, and clock</p>																																																	
Vocabulary	Vocabulary	Vocabulary	Vocabulary																																																
<p>Transformations, translation, rotations, reflections, coordinate plane, quadrant I, congruent, locate, ordered pairs, y-axis, x-axis, origin</p>	<p>Transformation, translation, rotation, reflection, symmetry, congruent, number line, whole number, fractions, decimals, hash mark, rule, interval, point</p>	<p>Congruent, lines of symmetry, locate, number line, interval, increase, decrease, rule, halves, fourths</p>	<p>Number line, interval, increase, decrease, rule, locate</p>																																																
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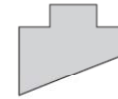
Which coordinate grid shows only a translation?



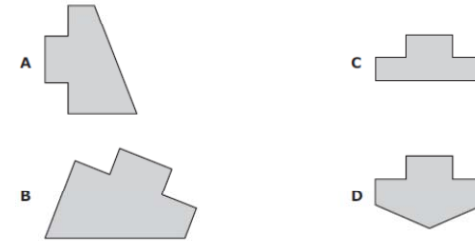
Which pair of figures shows only a translation?



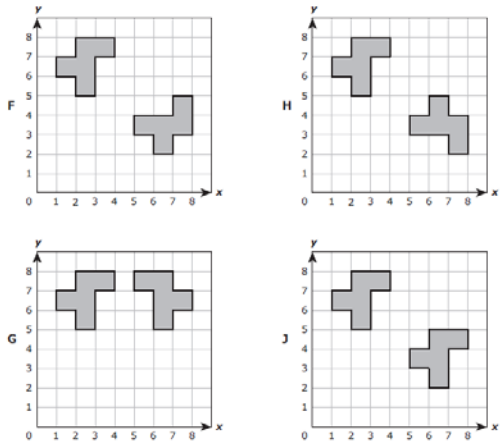
Sarah drew and shaded the figure shown below.



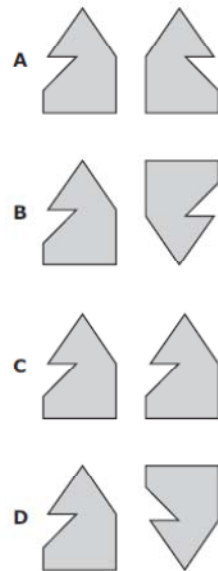
Which figure appears to be congruent to the one Sarah drew?



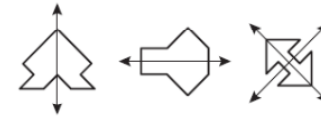
Which coordinate grid shows only a rotation?



Which pair of figures shows only a rotation?



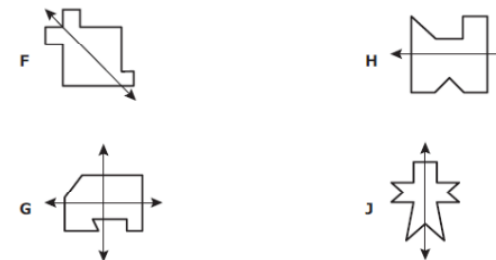
The figures below all have a common characteristic.



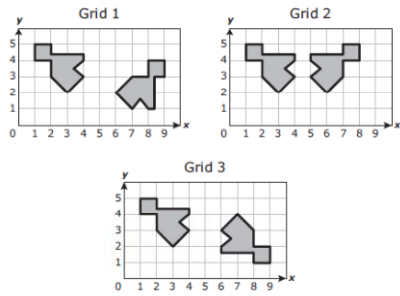
These figures do not have the common characteristic.



Which figure also has the common characteristic?



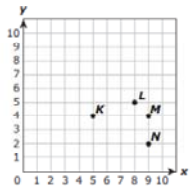
Each coordinate grid below shows a single transformation.



Which list describes the transformations in grids 1, 2, and 3 in order?

- F Translation, reflection, rotation
- G Rotation, reflection, rotation
- H Reflection, translation, rotation
- J Rotation, reflection, reflection

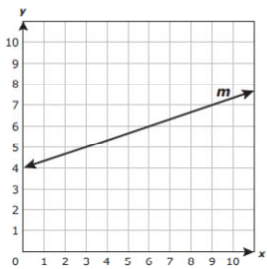
Billy will place point *W* at the coordinates (7, 6) on the coordinate grid below.



Billy will then circle the point that is 2 units right and 2 units down from (7, 6). Which point will Billy circle?

- A Point *K*
- B Point *L*
- C Point *M*
- D Point *N*

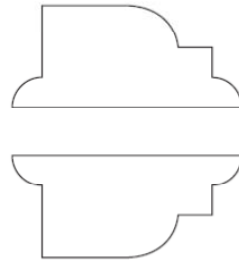
Line *m* is shown on the coordinate grid below.



Which ordered pair represents a point that is located below line *m*?

- F (3, 5)
- G (10, 6)
- H (2, 8)
- J (4, 10)

Which single transformation is shown below?



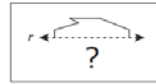
- F Rotation
- G Translation
- H Reflection
- J No transformation is shown.

1 Which point best represents 13 on the number line below?

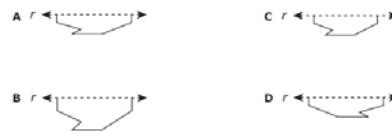


- A Point *W*
- B Point *X*
- C Point *Y*
- D Point *Z*

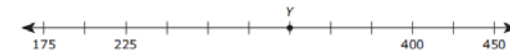
The top part of a figure is shown. The bottom part of the figure is missing. Line *r* is a line of symmetry.



Which of the following shows the bottom part of the figure?

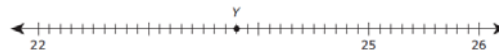


20 What number does point *Y* best represent on the number line below?



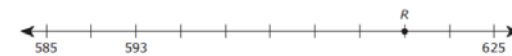
- F 350
- G 300
- H 275
- J 325

5 Which number does point *Y* best represent on the number line below?



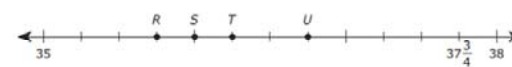
- A 24.8
- B 23.2
- C 24.2
- D 23.8

30 Which number does point *R* best represent on the number line below?



- F 617
- G 599
- H 623
- J 609

46 Which point best represents  $36\frac{1}{4}$  on the number line below?



- F Point *R*
- G Point *S*
- H Point *T*
- J Point *U*

37 What number does point *L* best represent on the number line below?



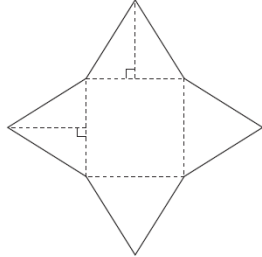
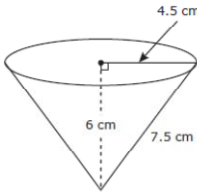
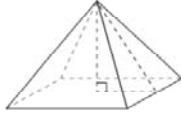
- A 21
- B  $21\frac{2}{4}$
- C  $20\frac{3}{4}$
- D  $20\frac{2}{4}$

Math  
Vertical Alignment by Grade

Strand: Measuring

TEK:	TEK:	TEK:	TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations	TEK:	TEK:	TEK: the student uses procedures to determine measures of three-dimensional figures TEK: the student uses indirect measurement to solve problems TEK: the student describes how changes in dimensions affect, linear, area, and volume measures
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade																
SE:	SE:	SE:	SE: <b>GEOM.8D – (R)</b> find surface area and volume of prisms, pyramids, spheres, cones, cylinders, and composites of these figures in problem situations	SE:	SE:	SE: <b>8.8A – (S)</b> find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models) <b>8.8B – (S)</b> connect models of prisms, cylinders, pyramids, spheres and cones to formulas for volume of these objects																
Specifics	Specifics	Specifics	Specifics (description of lesson, include any “tricks”)	Specifics	Specifics	Specifics (description of lesson, include any “tricks”)																
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						-use various methods to connect the surface area to the net – explain verbally and numerically, with and without formulas -students should be able to build solids (prisms, pyramids, and cylinders) from the nets created and identify the lateral and total surface area -through exploration students must make connections between the concrete models and the symbolic representations -use various methods to connect the volume to the model and to the formula focusing on the (‘B’) area of the base -explain verbally and numerically; use patterns, use hands-on, data tables, etc.																
Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary																
						Lateral surface area, total surface area, nets, formulas																
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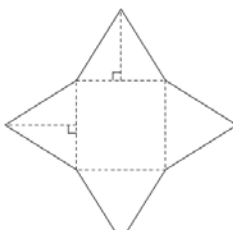
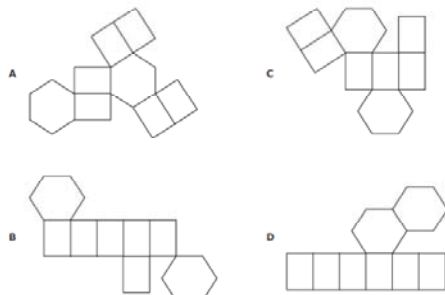
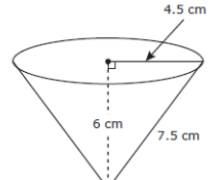
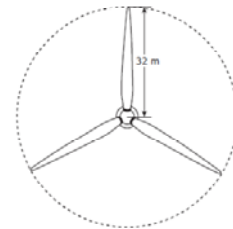
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Math  
Vertical Alignment by Grade

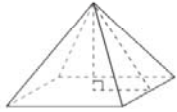
Strand: Measuring

TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations	TEK: the student uses procedures to determine measures of three-dimensional figures TEK: the student uses indirect measurement to solve problems TEK: the student describes how changes in dimensions affect, linear, area, and volume measures	TEK: the student solves application problems involving estimation and measurement	TEK: the student solves application problems involving estimation and measurement of length, area, time, temperature, volume, weight, and angles
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Geometry	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>GEOM.8D – (R)</b> find surface area and volume of prisms, pyramids, spheres, cones, cylinders, and composites of these figures in problem situations	SE: <b>8.8A – (S)</b> find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models) <b>8.8B – (S)</b> connect models of prisms, cylinders, pyramids, spheres and cones to formulas for volume of these objects	SE <b>7.8B – (S)</b> make a net (two-dimensional model) of the surface area of a three-dimensional figure <b>7.9A – (R)</b> estimate measurements and solve application problems involving length (including perimeter and circumference) and area of polygons and other shapes <b>7.9B – (S)</b> connect models for volume of prisms (triangular and rectangular) and cylinders to formulas of prisms (triangular and rectangular) and cylinders	SE <b>6.8A – (S)</b> estimate measurements (including circumference) and evaluate reasonableness of results <b>6.8B – (R)</b> select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-use various methods to connect the surface area to the net – explain verbally and numerically, with and without formulas -students should be able to build solids (prisms, pyramids, and cylinders) from the nets created and identify the lateral and total surface area -through exploration students must make connections between the concrete models and the symbolic representations -use various methods to connect the volume to the model and to the formula focusing on the (‘B’) area of the base -explain verbally and numerically; use patterns, use hands-on, data tables, etc.	-use various methods to connect the surface area to the net – explain verbally and numerically, with and without formulas -students should be able to build solids (prisms, pyramids, and cylinders) from the nets created and identify the lateral and total surface area -through exploration students must make connections between the concrete models and the symbolic representations -use various methods to connect the volume to the model and to the formula focusing on the (‘B’) area of the base -explain verbally and numerically; use patterns, use hands-on, data tables, etc.	-nets are a new concept to 7 <sup>th</sup> grade -only make nets: use prisms, pyramids, and cylinders -do not calculate surface area -students should estimate before computing -estimate from a table, verbal description, and/or concrete -use reasonableness to connect estimation to problem situation -through exploration, make connections between the concrete models and the symbolic representations -use various methods to connect the volume to the model and to the formula – explain verbally and numerically -use patterns, hands-on, data tables, cubes, etc.	-estimate measurements (including circumference) and evaluate reasonableness of results -students should estimate before measuring -estimate from a table, verbal description, and/or concrete model -use reasonableness to compare estimation to actual measurement -measurements are customary and SI (metric) -units of measure should be include in the problem solving process -emphasize the need to use a common unit which may require students to convert measurements -choose appropriate tool and unit, Ex. Choose to measure in inches, feet or yards -include problems that require students to use

		-students should be able to connect the area of the base to the 'B' in volume formulas -volume of cylinders is introduced in 7 <sup>th</sup> grade	dimension of a figure to help solve the problem -given the perimeter of a square find the area																																												
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	Lateral surface area, total surface area, nets, formulas, STAAR measurement chart, B, P, pi	Nets, formulas, B, STAAR measurement chart, pi	Estimate, reasonableness, circumference, appropriate units, formula, STAAR measurement chart, customary, metric, conversion, linear units, square units, cubic units, pi																																												
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<p>A conical paper cup is shown in the diagram below.</p>  <p>Which value is closest to the maximum volume of water this cup can hold?</p> <p>F 159 cm<sup>3</sup> G 32 cm<sup>3</sup> H 127 cm<sup>3</sup> J 40 cm<sup>3</sup></p>		<p>The diagram below models the length from the center of a wind turbine to the tip of one of its blades.</p>  <p>Which of these is closest to the total area covered by the blade when the turbine makes 1 revolution?</p> <p>F 3,215 m<sup>2</sup> G 100 m<sup>2</sup> H 1,024 m<sup>2</sup> J 201 m<sup>2</sup></p>	<p>Stephanie and Tamara both started running a race at 8:15 A.M. Stephanie finished the race in 4 hours 30 minutes. Tamara finished the race in 1 hour 15 minutes after Stephanie did. At what time did Tamara finish the race?</p> <p>F 2:00 P.M. G 12:45 P.M. H 1:00 P.M. J Not here</p>																																												

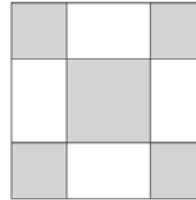
The main entrance to the Louvre art museum is shaped like a pyramid. The pyramid is 71 feet tall and has a slant height of approximately 91 feet. Each side of the square base measures 115 feet.



Which of the following is closest to the lateral surface area of the pyramid?

- A 20,930 ft<sup>2</sup>
- B 16,330 ft<sup>2</sup>
- C 10,465 ft<sup>2</sup>
- D 34,155 ft<sup>2</sup>

Use the ruler provided to measure the dimensions of the figure below to the nearest centimeter.



Which of the following is closest to the area of the shaded rectangles of the figure?

- F 25 cm<sup>2</sup>
- G 49 cm<sup>2</sup>
- H 16 cm<sup>2</sup>
- J 24 cm<sup>2</sup>

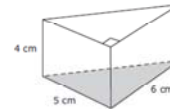
Use the ruler provided to measure the diameter of the coin shown below to the nearest tenth of a centimeter.



Which of these is closest to the circumference of the coin?

- F 7.3 cm
- G 4.5 cm
- H 9.4 cm
- J 3.1 cm

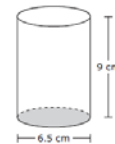
Evelyn cut a wedge of cheese into the shape of a triangular prism like the one shown below. The shaded part represents one of the bases of the prism.



A formula for the volume of a triangular prism is  $V = Bh$ . Which equation can be used to find  $B$ , the area of the shaded base in square centimeters?

- F  $B = 5(6)$
- G  $B = \frac{5(6)}{2}$
- H  $B = 4(5)$
- J  $B = \frac{4(5)}{2}$

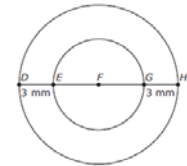
The cylindrical toothbrush holder modeled below has a diameter of 6.5 centimeters and a height of 9 centimeters. The shaded part represents the base of the cylinder.



A formula for finding the volume of a cylinder is  $V = Bh$ . Which equation can be used to find  $B$ , the area of this cylinder's base in square centimeters?

- A  $B = \pi \left( \frac{6.5}{2} \right)^2$
- B  $B = \pi \left( \frac{6.5}{2} \right)$
- C  $B = \pi(6.5)^2$
- D  $B = \pi(6.5)$

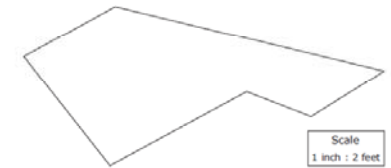
The diagram below shows 2 circles with the same center at point  $F$ . Points  $E$ ,  $F$ , and  $G$  are on line segment  $DH$ . The diameter of the larger circle is 14 mm.



What is the radius of the smaller circle?

- F 4 mm
- G 7 mm
- H 11 mm
- J 8 mm

The figure below is a scale drawing of a design on a gym wall. Use the ruler provided to measure the dimensions of the figure to the nearest  $\frac{1}{4}$  inch.



Each inch on the scale drawing represents 2 feet of the actual design on the gym wall. Which of the following is closest to the perimeter of the actual design on the gym wall?

- A 11 ft
- B 24 ft
- C 12 ft
- D 22 ft



Math  
Vertical Alignment by Grade

Strand: Measuring

TEK: the student solves application problems involving estimation and measurement of length, area, time, temperature, volume, weight, and angles	TEK: the student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems TEK: the student applies measurement concepts. The student measures time and temperature (in degrees Fahrenheit and Celsius)	TEK: the student applies measurement concepts. The student expected to estimate and measure to solve problems involving length (including perimeter) and area. The student uses measurement tools to measure capacity/volume and weight/mass. TEK: the student applies measurement concepts. The student measures time and temperature (in degrees Fahrenheit and Celsius)	TEK: the student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language, to solve problems and answer questions. The student selects and uses standard units to describe length, area, capacity/volume, and weight/mass TEK: the student reads and writes time and measures temperature in degrees Fahrenheit to solve problems
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
SE <b>6.8A – (S)</b> estimate measurements (including circumference) and evaluate reasonableness of results <b>6.8B – (R)</b> select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter), area, time, temperature, volume, and weight	SE <b>5.10B – (S)</b> connect models for perimeter, area, and volume with their respective formulas <b>5.10C – (R)</b> select and use appropriate units and formulas to measure length, perimeter, area and volume	SE <b>4.11A – (R)</b> estimate and use measurement tools to determine length (including perimeter), area, capacity and weight/mass using standard units SI (metric) and customary <b>4.11C – (S)</b> use concrete models of standard cubic units to measure volume <b>4.11D – (S)</b> estimate volume in cubic units <b>4.11E – (S)</b> explain the difference between weight and mass	SE <b>3.11A – (S)</b> use linear measurement tools to estimate and measure lengths using standard units <b>3.11B – (R)</b> use standard units to find perimeter of a shape <b>3.11C – (S)</b> use concrete and pictorial models of square units to determine the area of two-dimensional surface <b>3.11D</b> – identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass <b>3.11E</b> – identify concrete models that approximate standard units for capacity and use them to measure capacity <b>3.11F</b> – use concrete models that approximate cubic units to determine the volume of given container or other three-dimensional geometric figure
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Students should be exposed to measurement everyday Ask PE and Art teachers to include measurement into their lessons Provide learning experience that can be done at home that connects to measurement	Students should be exposed to measurement everyday Ask PE and Art teachers to include measurement into their lessons Provide learning experience that can be done at home that connects to measurement	Use estimation for finding volume	
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-estimate measurements (including circumference) and evaluate reasonableness of	-always estimate first -measurement should be hands-on application	-measurement should be hands-on application -include and make connections between the	-ruler: measure up to the nearest ¼ inch -always estimate first

<p>results</p> <ul style="list-style-type: none"> <li>-students should estimate before measuring</li> <li>-estimate from a table, verbal description, and/or concrete model</li> <li>-use reasonableness to compare estimation to actual measurement</li> <li>-measurements are customary and SI (metric)</li> <li>-units of measure should be include in the problem solving process</li> <li>-emphasize the need to use a common unit which may require students to convert measurements</li> <li>-choose appropriate tool and unit, Ex. Choose to measure in inches, feet or yards</li> <li>-include problems that require students to use dimension of a figure to help solve the problem</li> <li>-given the perimeter of a square find the area</li> </ul>	<ul style="list-style-type: none"> <li>-length (customary units such as: inch, foot, yard, mile) (metric units such as: centimeter, decimeter, meter, millimeter, kilometer)</li> <li>-comparison of measurements</li> <li>-capacity, mass, weight</li> <li>-metric conversion is a new concept introduced in 5<sup>th</sup> grade</li> <li>-5<sup>th</sup> grade converts in both metric and customary units</li> <li>-student should use STAAR chart</li> <li>-students should construct models and discover formulas</li> <li>-apply formula in problem situations</li> <li>-formulas for area, perimeter, and volume are new concepts introduces in 5<sup>th</sup> grade</li> <li>-student should use the STAAR chart</li> <li>-the distance around an object is perimeter</li> <li>-the cover the floor of a space is area</li> <li>-the amount of space a three dimensional figure takes up is volume</li> </ul>	<p>representations: concrete, pictorial, abstract</p> <ul style="list-style-type: none"> <li>-metric and customary units of measurement</li> <li>-estimate first</li> <li>-capacity: the amount of something you can pour into a container; always use a scale and measure weight (gravitational pull on an object)</li> <li>-use conversion of customary measurements</li> <li>-concrete models should include cubes and blocks</li> <li>-standard cubic units are both metric and customary</li> <li>-student must use concrete models to build layers reflecting the area model</li> <li>-estimate before actually finding the volume through exploration</li> <li>-use linking cubes, foam cubes, wooden cubes, etc.</li> <li>-volume is taught with concrete objects</li> </ul>	<p>-standard means both metric/customary</p> <ul style="list-style-type: none"> <li>-use linear dimensions -students should use STAAR chart</li> <li>-using standard units and tools is introduced in 3<sup>rd</sup> grade</li> <li>-always include units with numbers</li> <li>-emphasis perimeter is linear</li> <li>-variety of geometric shapes</li> <li>-area arrays and include the linear dimensions</li> <li>-teach both customary and metric</li> <li>-emphasis area is square units</li> <li>-1/2 of the square unit is taught in 3<sup>rd</sup> grade</li> <li>-use tiles to form area arrays and use linear units to denote linear dimensions</li> <li>-hand-on application by building area arrays and measuring to determine the area of the model</li> <li>-scales measure weight/balances measure mass</li> <li>-use items to approximate units of weight/mass/capacity</li> <li>-volume is only assessed in cubic units</li> <li>-explore building 3-dimensional shapes noting the layers &amp; counting of cubes</li> <li>-explore filling rectangular prism with cubes &amp; counting total number of cubes</li> <li>-this is the first time students have counted objects that approximated cubic units to determine volume.</li> </ul>
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Vocabulary	Vocabulary	Vocabulary	Vocabulary
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<p>Estimate, reasonableness, circumference, appropriate units, formula, STAAR measurement chart, customary, metric, conversion, linear units, square units, cubic units, pi</p>	<p>Perimeter, area, volume, formula, length, width, height, base, linear units, square units, cubic units, customary, metric, conversion, STAAR measurement chart, distance</p>	<p>Length, ruler, metric, customary, inch, yard, foot, milliliter, meter, mile, kilometer, meter stick, yard stick, measuring tape, STAAR measurement chart, capacity, liter, milliliter, kiloliter, gallon, pint, quart, cup, ounce, liquid, holds, weight, gravity, pound, tons, mass, matter, gram, kilogram, milligram, perimeter, around, distance, linear units, side, rim, edges, area, width, square units, covers, array, volume, height, cubic units, 3D figures</p>	<p>Length, perimeter, standard units, measurement, inch, yard, foot, mile, centimeter, meter, kilometer, area, weight, mass, capacity, volume, square units, arrays, linear units, balance, scales, STAAR measurement chart, customary, metric, estimate, ruler, measuring tape, cubic units, grams, ounces, kilogram, pounds, liter, milliliter, kiloliter, milligram, cups, gallon, pints, quarts, distance</p>
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At 7:26 A.M., Dante started delivering packages.

- At 10:34 A.M., he delivered the last package.
- He delivered a total of 18 packages.
- He spent about the same amount of time delivering each package.

Which of the following is the best estimate of the number of minutes Dante spent delivering each package?

F 10 min  
G 180 min  
H 60 min  
J 20 min

Stephanie and Tamara both started running a race at 8:15 A.M. Stephanie finished the race in 4 hours 30 minutes. Tamara finished the race in 1 hour 15 minutes after Stephanie did. At what time did Tamara finish the race?

F 2:00 P.M.  
G 12:45 P.M.  
H 1:00 P.M.  
J Not here

11C	1	76%	14D
11E	1	50%	16B

Harman is painting a rectangular wall. He has already painted the rectangular shaded section, as shown below.

What is the area of the shaded section Harman has already painted?

F 80 square feet  
G 140 square feet  
H 56 square feet  
J 280 square feet

21 The diagram below models the bus route Sofia takes to get from her house to a shopping center. Use the ruler provided to measure Sofia's route to the nearest inch.

If 2 inches in the drawing represents 1 mile, which distance is closest to the length of the actual bus route Sofia takes to get from her house to the shopping center?

A 24 mi  
B 6 mi  
C 5 mi  
D 12 mi

11B	3	68%	14B,16B
11C	1	77%	14D

The model below represents the length and width of a rectangular exercise mat.

What is the area of this mat in square meters?

A 15 square meters  
B 45 square meters  
C 54 square meters  
D 30 square meters

Use the ruler provided to measure the side lengths of the figures below to the nearest centimeter.

What is the difference between the perimeters of these figures?

F 2 cm  
G 9 cm  
H 29 cm  
J 5 cm

11B	3	68%	14B,16B
11C	1	77%	14D

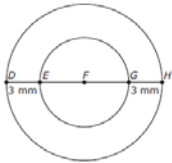
Halley saw two bluebonnets like the ones shown below. Use the ruler provided to measure the height of each bluebonnet to the nearest centimeter.

What is the difference between the heights of these two bluebonnets?

A 13 cm  
B 7 cm  
C 25 cm  
D 16 cm

Ian has a paintbrush that is  $5\frac{1}{2}$  inches long. Use the ruler provided to measure the length of the line segment below each paintbrush to the nearest  $\frac{1}{2}$  inch. Which paintbrush is closest to  $5\frac{1}{2}$  inches?

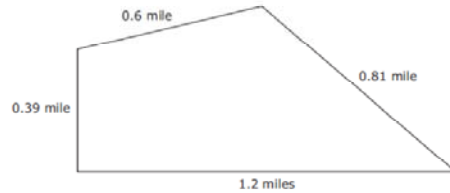
The diagram below shows 2 circles with the same center at point F. Points E, F, and G are on line segment DH. The diameter of the larger circle is 14 mm.



What is the radius of the smaller circle?

- F 4 mm
- G 7 mm
- H 11 mm
- J 8 mm

The side lengths of a field are shown below.



What is the perimeter of the field?

- A 1.41 mi
- B 3.18 mi
- C 3 mi
- D 2 mi

Benito has 4 video-game players like the one shown below. The line segment represents the width of the video-game player.



Use the ruler provided to measure the line segment beside the video-game player to the nearest inch. What is the total width of the 4 video-game players?

- F 3 in.
- G 16 in.
- H 12 in.
- J 4 in.

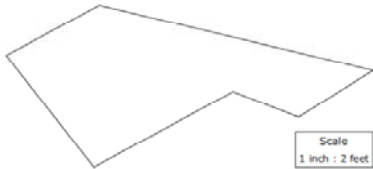
The dimensions of two rectangles are shown below.



Which statement about these rectangles is true?

- A The perimeter of Rectangle Q is 19 millimeters less than the perimeter of Rectangle R.
- B The perimeter of Rectangle Q is 38 millimeters less than the perimeter of Rectangle R.
- C The perimeter of Rectangle Q is 14 millimeters less than the perimeter of Rectangle R.
- D The perimeter of Rectangle Q is 42 millimeters less than the perimeter of Rectangle R.

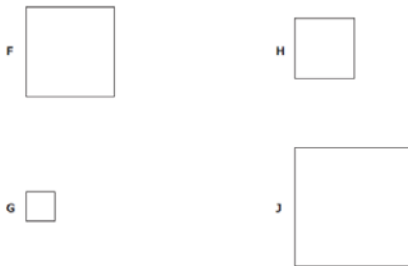
The figure below is a scale drawing of a design on a gym wall. Use the ruler provided to measure the dimensions of the figure to the nearest  $\frac{1}{4}$  inch.



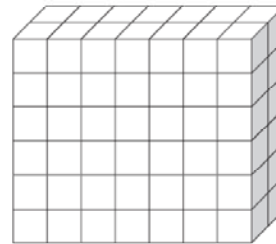
Each inch on the scale drawing represents 2 feet of the actual design on the gym wall. Which of the following is closest to the perimeter of the actual design on the gym wall?

- A 11 ft
- B 24 ft
- C 12 ft
- D 22 ft

Wesley has a cube with a volume of 8 cubic centimeters. Use the ruler provided to measure the dimensions of each square below to the nearest centimeter. Which square is congruent to a face of Wesley's cube?



The model below is made with 1-unit cubes.



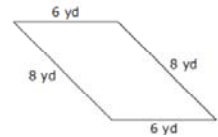
What is the volume of this model in cubic units?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

The pull of gravity on Venus is different from the pull of gravity on Mercury. Which statement about an object on Venus and the same object on Mercury is true?

- F The mass of the object would be different on each planet, because mass changes according to the pull of gravity.
- G The height of the object would be different on each planet, because height changes according to the pull of gravity.
- H The weight of the object would be different on each planet, because weight changes according to the pull of gravity.
- J The length of the object would be different on each planet, because length changes according to the pull of gravity.

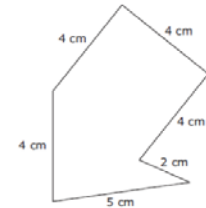
The side lengths of Terry's sandbox are shown below.



Terry buys 30 yards of fence. Does he have enough fence to go completely around his sandbox?

- A No, because  $8 \times 4 = 32$  and  $32 > 30$
- B Yes, because  $8 + 6 = 14$  and  $14 < 30$
- C No, because  $8 \times 6 = 48$  and  $48 > 30$
- D Yes, because  $8 + 6 + 8 + 6 = 28$  and  $28 < 30$

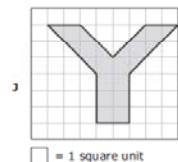
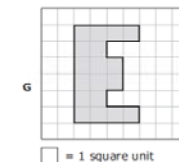
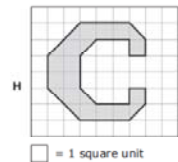
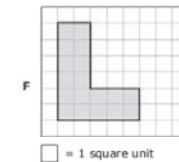
The side lengths of a figure are shown below.



What is the perimeter of the figure in centimeters?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Which of the following shaded letters does NOT have an area of 18 square units?



Math  
Vertical Alignment by Grade

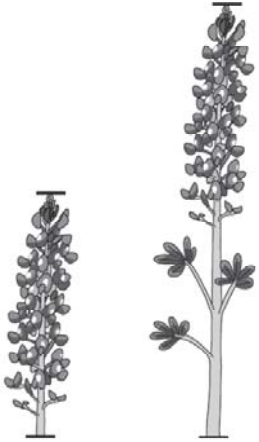
Strand: Measuring

<p>TEK: the student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language, to solve problems and answer questions. The student selects and uses standard units to describe length, area, capacity/volume, and weight/mass</p> <p>TEK: the student reads and writes time and measures temperature in degrees Fahrenheit to solve problems</p>	<p>TEK: the student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language, to solve problems and answer questions. The student selects and uses nonstandard units to describe length, area, capacity, and weight/mass. The student recognizes and uses models that approximate standard units (from both SI, also known as metric and customary systems) of length, weight/mass, capacity and time</p> <p>TEK: the student uses standard tools to estimate and measure time and temperature (in degrees Fahrenheit)</p>	<p>TEK: the student directly compares attributes of length, area, weight/mass, capacity, and temperature. The students uses comparative language to solve problems and answer questions. The student selects and uses nonstandard units to describe length.</p> <p>TEK: the student understands that time can be measured. The student uses time to describe and compare situations</p>	<p>TEK: the student directly compares the attributes of length, area, weight/mass, capacity, and/or relative temperature. The student uses comparative language, to solve problems and answer questions</p> <p>TEK: the students uses time to describe, compare and order events and situations</p>
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3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
<p>SE</p> <p><b>3.11A – (S)</b>use linear measurement tools to estimate and measure lengths using standard units</p> <p><b>3.11B – (R)</b>use standard units to find perimeter of a shape</p> <p><b>3.11C – (S)</b>use concrete and pictorial models of square units to determine the area of two-dimensional surface</p> <p><b>3.11D –</b> identify concrete models that approximate standard units of weight/mass and use them to measure weight/mass</p> <p><b>3.11E –</b> identify concrete models that approximate standard units for capacity and use them to measure capacity</p> <p><b>3.11F –</b> use concrete models that approximate cubic units to determine the volume of given container or other three-dimensional geometric figure</p>	<p>SE</p> <p><b>2.9A – (R)</b>identify concrete models that approximate standard units of length and use them to measure length</p> <p><b>2.9B – (S)</b>select a non-standard unit of measure, such as square tiles to determine the area of two-dimensional surface</p> <p><b>2.9C – (S)</b>select a non-standard unit of measure, such as a bathroom cup or a jar, to determine the capacity of a given container</p> <p><b>2.9D – (S)</b>select a non-standard unit of measure, such as beans or marbles, to determine the weight/mass of a given object</p>	<p>SE</p> <p><b>1.7A – (R)</b>estimate and measure length using nonstandard units, such as paperclips or sides of color tiles</p> <p><b>1.7B – (S)</b>compare and order two or more concrete objects according to length (from longest to shortest)</p> <p><b>1.7D – (S)</b>compare and order the area of two or more two-dimensional surfaces (from covers the most to covers the least)</p> <p><b>1.7E – (S)</b>compare and order two or more containers according to capacity (from holds the most to holds the least)</p> <p><b>1.7F – (S)</b>compare and order two or more objects according to weight/mass (from heaviest to lightest)</p>	<p>SE</p> <p><b>K.10A – (R)</b>compare and order two or three concrete objects according to length (longer/shorter than, or the same)</p> <p><b>K.10B – (S)</b>compare the area of two flat surfaces of two-dimensional figures (covers more, covers less, or covers the same)</p> <p><b>K.10C – (S)</b>compare two containers according to capacity (holds more, holds less, or holds the same)</p> <p><b>K.10D – (S)</b>compare two objects according to weight/mass (heavier than, lighter than, or equal to)</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
	Capacity, weight, and mass will be covered in the science curriculum as well 2 <sup>nd</sup> grade will start introducing students to standard units of measurement 2 <sup>nd</sup> grade will start introducing students to ½ square units for area models	The longer/bigger the object the longer/bigger the non-standard unit you would use to measure it Use only non-standard units of measurement (cubes, paperclips, crayons, yarn, etc.)	The longer/bigger the object the longer/bigger the non-standard unit you would use to measure it Use only non-standard units of measurement (cubes, paperclips, crayons, yarn, etc.)
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-ruler: measure up to the nearest ¼ inch -always estimate first -standard means both metric/customary	-non standard units should be close to the size of standard units -examples – use 1 inch color tiles, centimeter cubes, link	-use a variety of materials ex: straws, toothpicks, etc. -emphasize the ‘length’ of the object being	-emphasis is on ‘covers’ when discussing area -compare 2 dimensional shapes

<p>-use linear dimensions -students should use STAAR chart</p> <p>-using standard units and tools is introduced in 3<sup>rd</sup> grade</p> <p>-always include units with numbers</p> <p>-emphasis perimeter is linear</p> <p>-variety of geometric shapes</p> <p>-area arrays and include the linear dimensions</p> <p>-teach both customary and metric</p> <p>-emphasis area is square units</p> <p>-1/2 of the square unit is taught in 3<sup>rd</sup> grade</p> <p>-use tiles to form area arrays and use linear units to denote linear dimensions</p> <p>-hand-on application by building area arrays and measuring to determine the area of the model</p> <p>-scales measure weight/balances measure mass</p> <p>-use items to approximate units of weight/mass/capacity</p> <p>-volume is only assessed in cubic units</p> <p>-explore building 3-dimensional shapes noting the layers &amp; counting of cubes</p> <p>-explore filling rectangular prism with cubes &amp; counting total number of cubes</p> <p>-this is the first time students have counted objects that approximated cubic units to determine volume.</p>	<p>cubes, etc.</p> <p>-this is the first time students ‘count’ for area/capacity</p> <p>-teacher information: the difference between weight and mass is a 4<sup>th</sup> grade TEKS</p> <p>-do not use the term weight when using a balance</p>	<p>used to measure</p> <p>-emphasis: student understand that the smaller the unit, the more units it will take to measure an object (this is a pre-requisite for learning to convert measurements)</p> <p>-example: given a sheet of paper, post-it note, and note card – student order from ‘covers the most to covers the least’</p> <p>-use different manipulatives to cover specific surface and compare</p> <p>-manipulatives do not have to be similar shapes</p> <p>-pour contents of containers from one to another to determine which holds more. (students are not to count, just compare)</p> <p>-containers do not have to be the same shape</p> <p>-the weight of object A is heavier than the weight of object B. the mass of object A is greater than the mass of object B</p> <p>-do not use the term ‘weight’ when using a balance</p>	<p>such as a regular sheet of paper and a post-it note</p> <p>-include different shapes when comparing area</p> <p>-compare containers such as a small frozen orange juice can and a coffee can; regular size cereal box to the small frozen orange juice can</p> <p>-weight corresponds to gravity and is found with a spring scales or typical bathroom scales. Mass is the correct term when using pan balance. Students do not need to know the difference between weight and mass at this point</p>																
<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>	<p>Vocabulary</p>																
<p>Length, perimeter, standard units, measurement, inch, yard, foot, mile, centimeter, meter, kilometer, area, weight, mass, capacity, volume, square units, arrays, linear units, balance, scales, STAAR measurement chart, customary, metric, estimate, ruler, measuring tape, cubic units, grams, ounces, kilogram, pounds, liter, milliliter, kiloliter, milligram, cups, gallon, pints, quarts, distance</p>	<p>Length, non-standard, measurement, area, capacity, weight, mass, inch, distance</p>	<p>Length, longest, shortest, area, covers the most, covers the least, capacity, holds the most, holds the least, weight, mass, heaviest, lightest, measurement, non-standard</p>	<p>Longer than, shorter than, equal to, length, covers more, covers less, covers the same, area, flat surface, capacity, holds more, holds less, holds the same, weight, mass, heavier than, lighter than, larger than, smaller than</p>																
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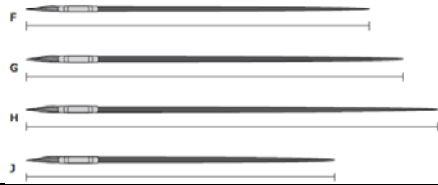
Hailey saw two bluebonnets like the ones shown below. Use the ruler provided to measure the height of each bluebonnet to the nearest centimeter.



What is the difference between the heights of these two bluebonnets?

- A 13 cm
- B 7 cm
- C 25 cm
- D 16 cm

Ian has a paintbrush that is  $5\frac{1}{2}$  inches long. Use the ruler provided to measure the length of the line segment below each paintbrush to the nearest  $\frac{1}{2}$  inch. Which paintbrush is closest to  $5\frac{1}{2}$  inches?



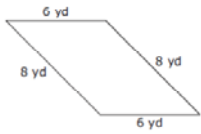
The dimensions of two rectangles are shown below.



Which statement about these rectangles is true?

- A The perimeter of Rectangle Q is 19 millimeters less than the perimeter of Rectangle R.
- B The perimeter of Rectangle Q is 38 millimeters less than the perimeter of Rectangle R.
- C The perimeter of Rectangle Q is 14 millimeters less than the perimeter of Rectangle R.
- D The perimeter of Rectangle Q is 42 millimeters less than the perimeter of Rectangle R.

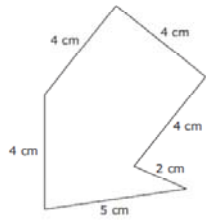
The side lengths of Terry's sandbox are shown below.



Terry buys 30 yards of fence. Does he have enough fence to go completely around his sandbox?

- A No, because  $8 \times 4 = 32$  and  $32 > 30$
- B Yes, because  $8 + 6 = 14$  and  $14 < 30$
- C No, because  $8 \times 6 = 48$  and  $48 > 30$
- D Yes, because  $8 + 6 + 8 + 6 = 28$  and  $28 < 30$

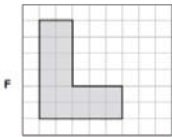
The side lengths of a figure are shown below.



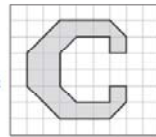
What is the perimeter of the figure in centimeters?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

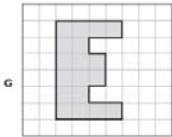
Which of the following shaded letters does **NOT** have an area of 18 square units?



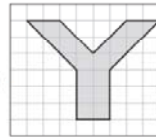
= 1 square unit



= 1 square unit



= 1 square unit



= 1 square unit


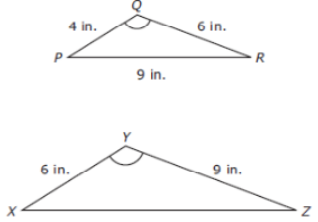
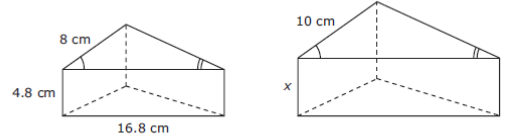


Math  
Vertical Alignment by Grade

Strand: Proportional Reasoning in Measurement

TEK:	TEK:	TEK:	TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations TEK: the student applies the concepts of similarity to justify properties of figures and solve problems	TEK:	TEK:	TEK: the student uses indirect measurement to solve problems TEK: the student describes how changes in dimensions affect, linear, area, and volume measures
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade
SE:	SE:	SE:	SE: <b>GEOM.8B – (S)</b> find areas of sectors and arc lengths of circles using proportional reasoning <b>GEOM.11D – (R)</b> describe the effect on perimeter, area, and volume when one or more dimensions of a figure are changed and apply this idea in solving problems	SE:	SE:	SE: <b>8.9B – (R)</b> use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements <b>8.10A – (S)</b> describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally <b>8.10B – (S)</b> describe the resulting effect on volume when dimensions of a solid are changed proportionally
Specifics	Specifics	Specifics	Specifics (description of lesson, include any “tricks”)	Specifics	Specifics	Specifics (description of lesson, include any “tricks”)
Rationale	Rationale	Rationale	Rationale (clarification of TEKS/SE)	Rationale	Rationale	Rationale (clarification of TEKS/SE)
						<ul style="list-style-type: none"> <li>-use various methods to connect the surface area to the net – explain verbally and numerically, with and without formulas</li> <li>-students should be able to build solids (prisms, pyramids, and cylinders) from the nets created and identify the lateral and total surface area</li> <li>-through exploration students must make connections between the concrete models and the symbolic representations</li> <li>-use various methods to connect the volume to the model and to the formula focusing on the ('B') area of the base</li> <li>-explain verbally and numerically; use patterns, use hands-on, data tables, etc.</li> <li>-estimate volume or surface area before computing</li> <li>-include rectangular prisms, triangular prisms, cylinders and composite figures (a combination of two or more shapes)</li> <li>-compare estimation to actual volumes or surface areas</li> <li>-make nets of rectangular prisms and cylinders to find lateral and total surface area</li> <li>-determining surface area of three dimensional figures is introduced in 8<sup>th</sup> grade</li> <li>-relate reasonableness of solution to problem situation</li> <li>-given any 2 dimensions, find missing value</li> <li>-recognize c, the hypotenuse, is always the longest side</li> <li>-do not use cross products</li> </ul>

						-use proportional relationships such as unit rate and scale factor -find missing measurement in similar figures is introduced in 8 <sup>th</sup> grade -use concrete models, relate to dilations through scale factors -use patterns, tables, and verbal descriptions to support results																												
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						Similar figures, dimensions																												
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			The hand on the circular clock in the figure below measures 10 cm.  Which of the following is closest to the distance that the tip of the hand travels as it moves from the 12 to the 3? <ul style="list-style-type: none"> <li>A 79 cm</li> <li>B 21 cm</li> <li>C 63 cm</li> <li>D 16 cm</li> </ul>			Triangle PQR is similar to triangle XYZ.  What is the length of $\overline{XZ}$ ? <ul style="list-style-type: none"> <li>F 11 in.</li> <li>G 13.5 in.</li> <li>H 9 in.</li> <li>J 20.25 in.</li> </ul>																												
			The side length of a smaller square is one-third the side length of a larger square. Which of the following statements describes the area of the smaller square? <ul style="list-style-type: none"> <li>F The area of the smaller square is <math>\frac{1}{27}</math> the area of the larger square.</li> <li>G The area of the smaller square is <math>\frac{1}{6}</math> the area of the larger square.</li> <li>H The area of the smaller square is <math>\frac{1}{9}</math> the area of the larger square.</li> <li>J The area of the smaller square is <math>\frac{1}{3}</math> the area of the larger square.</li> </ul>			The two triangular prisms shown below are similar.  What is the value of x, the height of the larger prism? <ul style="list-style-type: none"> <li>A 6.8 cm</li> <li>B 4 cm</li> <li>C 6 cm</li> <li>D 7.2 cm</li> </ul>																												

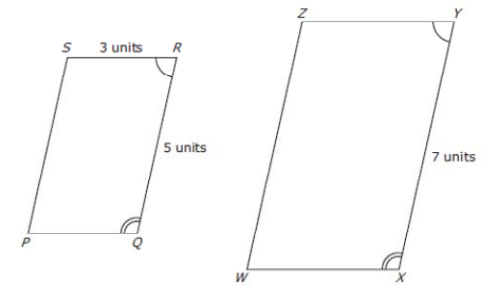
The volume of a rectangular prism is 960 cubic inches. If the dimensions of the base are doubled and the height remains the same to create a new prism, what will be the volume of the new rectangular prism in cubic inches?

Record your answer and fill in the bubbles on your answer document.

A triangle is enlarged by multiplying each of its dimensions by 4. Based on this information, which of the following statements is true?

- F The perimeter of the new triangle is 12 times the perimeter of the original triangle.
- G The perimeter of the new triangle is 16 times the perimeter of the original triangle.
- H The perimeter of the new triangle is 18 times the perimeter of the original triangle.
- J The perimeter of the new triangle is 4 times the perimeter of the original triangle.

Parallelogram  $PQRS$  is similar to parallelogram  $WXYZ$ .



What is the length of  $\overline{YZ}$ ?

- F 3 units
- G  $11\frac{2}{3}$  units
- H 5 units
- J  $4\frac{1}{5}$  units

A regular pentagon is dilated by a scale factor of  $\frac{3}{2}$  to create a new pentagon. Which of the following statements is true?

- F The perimeter of the new pentagon is  $\frac{9}{4}$  the perimeter of the original pentagon.
- G The perimeter of the new pentagon is  $\frac{9}{2}$  the perimeter of the original pentagon.
- H The perimeter of the new pentagon is  $\frac{15}{2}$  the perimeter of the original pentagon.
- J The perimeter of the new pentagon is  $\frac{3}{2}$  the perimeter of the original pentagon.

A sphere is dilated by a scale factor of 1.04 to create a new sphere. How does the volume of the new sphere compare with the volume of the original sphere?

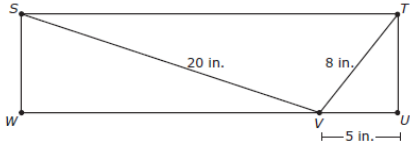
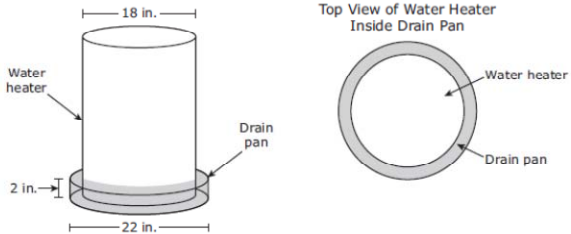
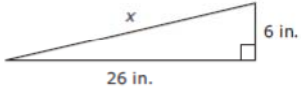
- A The volume of the new sphere is 1.04 times the volume of the original sphere.
- B The volume of the new sphere is  $(1.04)^3$  times the volume of the original sphere.
- C The volume of the new sphere is  $(1.04)^2$  times the volume of the original sphere.
- D The volume of the new sphere is  $(2.08)^2$  times the volume of the original sphere.

Math  
Vertical Alignment by Grade

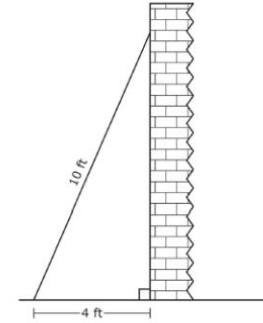
Strand: Solving Problems Using Measurement

TEK:	TEK:	TEK:	TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations	TEK:	TEK:	TEK: the student uses procedures to determine measures of three-dimensional figures TEK: the student uses indirect measurement to solve problems
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade																				
SE:	SE:	SE:	SE: <b>GEOM.8C – (R)</b> derive, extend, and use the Pythagorean Theorem	SE:	SE:	SE: <b>8.8C – (R)</b> estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume <b>8.9A – (R)</b> use the Pythagorean Theorem to solve real-life problems																				
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			<p>Rectangle <math>STUW</math> is shown below.</p>  <p>What is <math>ST</math>?</p> <p>A 33 in.  B 24 in.  C <math>\sqrt{464}</math> in.  D <math>\sqrt{361}</math> in.</p>						<p>Juanita covered the outside of a gift box shaped like a rectangular prism with paper. The box is 3.2 feet long, 2.1 feet wide, and 2.7 feet high. Which of the following is closest to the total surface area of this box?</p> <p>A <math>34 \text{ ft}^2</math>  B <math>42 \text{ ft}^2</math>  C <math>30 \text{ ft}^2</math>  D <math>18 \text{ ft}^2</math></p>
			<p>Two motorcycles start at the same point. One motorcycle travels 15 km due north and stops. The second motorcycle travels 32 km due west and stops. Which value is closest to the distance between the motorcycles when they stop?</p> <p>F 28.3 km  G 47.0 km  H 35.3 km  J 21.9 km</p>						<p>A water heater has a diameter of 18 inches. It sits in a drain pan that has a diameter of 22 inches and a height of 2 inches, as modeled in the diagram below.</p>  <p>Water that leaks out of the water heater sits in the drain pan. Which of the following is closest to the maximum amount of water that the drain pan can contain with the water heater in the position shown?</p> <p>A <math>13 \text{ in.}^3</math>  B <math>1,005 \text{ in.}^3</math>  C <math>251 \text{ in.}^3</math>  D <math>50 \text{ in.}^3</math></p>
									<p>Yadira made a wooden cone with a radius of 1.9 inches and a height of 15 inches. Which of the following is the best estimate of the volume of this cone?</p> <p>A <math>60 \text{ in.}^3</math>  B <math>30 \text{ in.}^3</math>  C <math>180 \text{ in.}^3</math>  D <math>90 \text{ in.}^3</math></p>
									<p>The diagram below represents the side view of a bike ramp.</p>  <p>Which of the following is closest to the value of <math>x</math>?</p> <p>A 27 in.  B 32 in.  C 25 in.  D 20 in.</p>

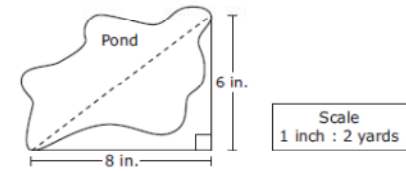
A 10-foot ladder is leaning against a wall. The bottom of the ladder is 4 feet from the base of the wall, as shown below.



Which of the following is closest to the distance from the top of the ladder to the base of the wall?

- A 9 ft
- B 11 ft
- C 6 ft
- D 14 ft

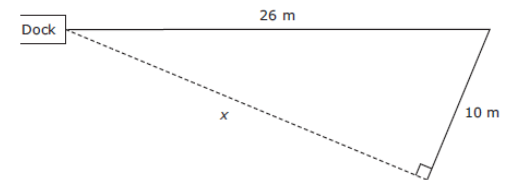
In the drawing below, the dashed line segment represents the distance across a pond.



What is the actual distance, in yards, across the pond?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Leland swam from the dock east 26 meters. He turned and swam another 10 meters, as shown in the diagram below.



What is the value of  $x$ , the distance Leland swam to return to the dock?

- F 36 m
- G 24 m
- H 4 m
- J 16 m

Math  
Vertical Alignment by Grade

Strand: Solving Problems Using Measurement

TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations	TEK: the student uses procedures to determine measures of three-dimensional figures TEK: the student uses indirect measurement to solve problems	TEK: the student solves application problems involving estimation and measurement	TEK: the student solves application problems involving estimation and measurement of length, area, time, temperature, volume, weight, and angles
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Geometry	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE: <b>GEOM.8C – (R)</b> derive, extend, and use the Pythagorean Theorem	SE: <b>8.8C – (R)</b> estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume <b>8.9A – (R)</b> use the Pythagorean Theorem to solve real-life problems	SE <b>7.9C – (S)</b> estimate measurements and solve application problems involving volume of prisms (rectangular and triangular) and cylinders	SE <b>6.8C – (S)</b> measure angles <b>6.8D – (S)</b> convert measures within the same measurement system (customary and metric) based on relationships between units
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
	<ul style="list-style-type: none"> <li>-estimate volume or surface area before computing</li> <li>-include rectangular prisms, triangular prisms, cylinders and composite figures (a combination of two or more shapes)</li> <li>-compare estimation to actual volumes or surface areas</li> <li>-make nets of rectangular prisms and cylinders to find lateral and total surface area</li> <li>-determining surface area of three dimensional figures is introduced in 8<sup>th</sup> grade</li> <li>-relate reasonableness of solution to problem situation</li> <li>-given any 2 dimensions, find missing value</li> <li>-recognize c, the hypotenuse, is always the longest side</li> <li>-do not use cross products</li> <li>-use proportional relationships such as unit rate and scale factor</li> <li>-find missing measurement in similar figures is introduced in 8<sup>th</sup> grade</li> <li>-use concrete models, relate to dilations through scale factors</li> <li>-use patterns, tables, and verbal descriptions to support results</li> </ul>	<ul style="list-style-type: none"> <li>-use reasonableness to connect estimation to problem situation</li> <li>-estimate before solving problems</li> </ul>	<ul style="list-style-type: none"> <li>-measurements are customary and SI (metric)</li> <li>-units of measure should be include in the problem solving process</li> <li>-emphasize the need to use a common unit which may require students to convert measurements</li> <li>-choose appropriate tool and unit, Ex. Choose to measure in inches, feet or yards</li> <li>-include problems that require students to use dimension of a figure to help solve the problem</li> <li>-given the perimeter of a square find the area</li> <li>-use various methods including a protractor, pattern blocks, corner of page, etc.</li> <li>-measurements of angles on a protractor does not necessarily begin at zero</li> <li>-measure angles of polygons such as trapezoids and hexagons</li> <li>-this is the first time students use a tool, such as a protractor, to measure angles</li> <li>-use proportional relationships and compare to models to address reasonableness</li> <li>-focus on equivalent relationships, not cross products</li> <li>-include relationships such as: 1 ft. = 1/3 yard, 1 in = 1/12 ft introduced in 4<sup>th</sup> grade</li> </ul>
Vocabulary	Vocabulary	Vocabulary	Vocabulary
	Formulas, lateral surface area, total surface area, Pythagorean Theorem, B, P, pi, hypotenuse	Volume, formulas, B, cubic units	Conversion, customary, metric, angles, protractor, obtuse, acute, right, straight, degrees

STAAR 2012			
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8D	2	41%	11A

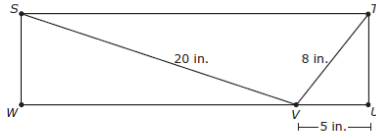
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9A	4	68%	14B

STAAR 2013			
SE	# of Questions	Percent	Dual Coded
9C	3	46%	13A,13B,13C

STAAR 2013			
SE	# of Questions	Percent	Dual Coded
8C	2	57%	11D
8D	2	46%	13A,11A

Rectangle  $STUV$  is shown below.



What is  $ST$ ?

- A 33 in.
- B 24 in.
- C  $\sqrt{464}$  in.
- D  $\sqrt{361}$  in.

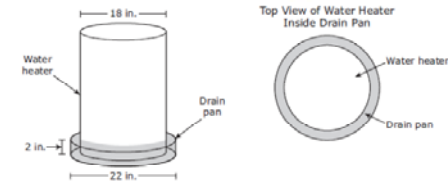
Two motorcycles start at the same point. One motorcycle travels 15 km due north and stops. The second motorcycle travels 32 km due west and stops. Which value is closest to the distance between the motorcycles when they stop?

- F 28.3 km
- G 47.0 km
- H 35.3 km
- J 21.9 km

Jusnita covered the outside of a gift box shaped like a rectangular prism with paper. The box is 3.2 feet long, 2.1 feet wide, and 2.7 feet high. Which of the following is closest to the total surface area of this box?

- A  $34 \text{ ft}^2$
- B  $42 \text{ ft}^2$
- C  $30 \text{ ft}^2$
- D  $18 \text{ ft}^2$

A water heater has a diameter of 18 inches. It sits in a drain pan that has a diameter of 22 inches and a height of 2 inches, as modeled in the diagram below.



Water that leaks out of the water heater sits in the drain pan. Which of the following is closest to the maximum amount of water that the drain pan can contain with the water heater in the position shown?

- A  $13 \text{ in.}^3$
- B  $1,005 \text{ in.}^3$
- C  $251 \text{ in.}^3$
- D  $50 \text{ in.}^3$

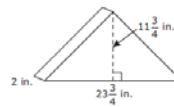
Yadira made a wooden cone with a radius of 1.9 inches and a height of 15 inches. Which of the following is the best estimate of the volume of this cone?

- A  $60 \text{ in.}^3$
- B  $30 \text{ in.}^3$
- C  $180 \text{ in.}^3$
- D  $90 \text{ in.}^3$

A storage trunk is shaped like a rectangular prism. The trunk's volume is 18 cubic feet. The length of the trunk is 6 feet, and the width of the trunk is 2 feet. What is the height of this trunk?

- F 12 feet
- G  $3\frac{1}{3}$  feet
- H 6 feet
- J Not here

The triangular prism shown below represents a display case.



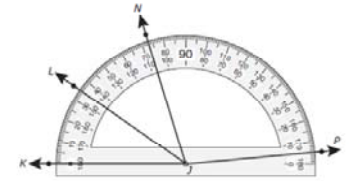
Which of the following is the best estimate of the volume of the display case in cubic inches?

- A  $144 \text{ in.}^3$
- B  $576 \text{ in.}^3$
- C  $288 \text{ in.}^3$
- D  $72 \text{ in.}^3$

Simon is filling a cylindrical water dispenser that has a radius of 7 inches and a height of 20 inches. Which of these is the best estimate of the volume of this water dispenser?

- F  $140 \text{ in.}^3$
- G  $2,940 \text{ in.}^3$
- H  $840 \text{ in.}^3$
- J  $11,760 \text{ in.}^3$

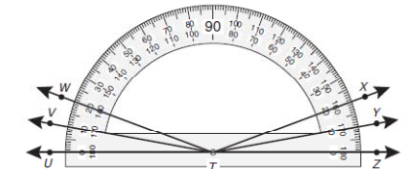
Angle  $NJP$  and angle  $KJL$  are shown below.



What is the difference between the measures of angle  $NJP$  and angle  $KJL$  to the nearest degree?

- F  $107^\circ$
- G  $67^\circ$
- H  $102^\circ$
- J  $35^\circ$

Which angle does NOT appear to have a measure of  $160^\circ$ ?



- A  $\angle VTY$
- B  $\angle WTZ$
- C  $\angle WTY$
- D  $\angle UTX$

The measurements in the list below have a characteristic in common.

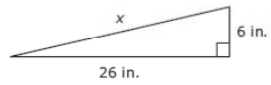
- 2 miles
- 72,000 inches
- 3,000 feet

Which statement describes the common characteristic?

- A Each measurement is less than 4,000 yards.
- B Each measurement is greater than 1,760 yards.
- C Each measurement is equivalent to 1,000 yards.
- D Each measurement is equivalent to 3,520 yards.



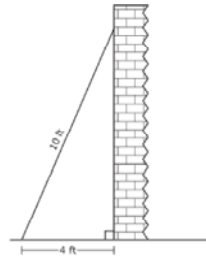
The diagram below represents the side view of a bike ramp.



Which of the following is closest to the value of  $x$ ?

- A 27 in.
- B 32 in.
- C 25 in.
- D 20 in.

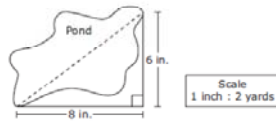
A 10-foot ladder is leaning against a wall. The bottom of the ladder is 4 feet from the base of the wall, as shown below.



Which of the following is closest to the distance from the top of the ladder to the base of the wall?

- A 9 ft
- B 11 ft
- C 6 ft
- D 14 ft

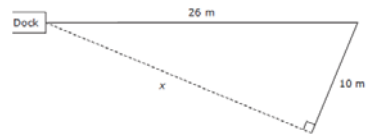
In the drawing below, the dashed line segment represents the distance across a pond.



What is the actual distance, in yards, across the pond?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Leland swam from the dock east 26 meters. He turned and swam another 10 meters, as shown in the diagram below.



What is the value of  $x$ , the distance Leland swam to return to the dock?

- F 36 m
- G 24 m
- H 4 m
- J 16 m

An adult human body contains about 10 pints of blood. How many fluid ounces is the equivalent of 10 pints?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Math  
Vertical Alignment by Grade

Strand: Solving Problems Using Measurement

TEK: the student solves application problems involving estimation and measurement of length, area, time, temperature, volume, weight, and angles	TEK: the student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems TEK: the student applies measurement concepts. The student measures time and temperature (in degrees Fahrenheit and Celsius)	TEK: the student applies measurement concepts. The student expected to estimate and measure to solve problems involving length (including perimeter) and area. The student uses measurement tools to measure capacity/volume and weight/mass. TEK: the student applies measurement concepts. The student measures time and temperature (in degrees Fahrenheit and Celsius)	TEK: the student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language, to solve problems and answer questions. The student selects and uses standard units to describe length, area, capacity/volume, and weight/mass TEK: the student reads and writes time and measures temperature in degrees Fahrenheit to solve problems
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
SE <b>6.8C – (S)</b> measure angles <b>6.8D – (S)</b> convert measures within the same measurement system (customary and metric) based on relationships between units	SE <b>5.10A – (S)</b> perform simple conversions within the same measurement system SI (metric) or customary <b>5.11A – (S)</b> solve problems involving changes in temperature <b>5.11B – (S)</b> solve problems involving elapsed time	SE <b>4.11B – (S)</b> perform simple conversions between different units of length, between different units of capacity, and between different units of weight within the customary measurement system <b>4.12A – (S)</b> use a thermometer to measure temperature and changes in temperature <b>4.12B – (S)</b> use tools, such as a clock with gears or a stopwatch, to solve problems involving elapsed time	SE <b>3.12A – (S)</b> use thermometer to measure temperature <b>3.12B – (S)</b> tell and write time shown on analog and digital clocks
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
	Use an Anchor Chart to compare fractional parts of time and money... to show that the whole is different (not out of 100 for time) Label your clock... $3 - \frac{1}{4}$ , $6 - \frac{1}{2}$ , $9 - \frac{3}{4}$ Students have a difficult time understanding that a fraction of an hour is not out of 100	Use an Anchor Chart to compare fractional parts of time and money... to show that the whole is different (not out of 100 for time) Label your clock... $3 - \frac{1}{4}$ , $6 - \frac{1}{2}$ , $9 - \frac{3}{4}$ Students have a difficult time understanding that a fraction of an hour is not out of 100	Use an Anchor Chart to compare fractional parts of time and money... to show that the whole is different (not out of 100 for time) Connect that the clock and thermometer are both number lines
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-measurements are customary and SI (metric) -units of measure should be include in the problem solving process -emphasize the need to use a common unit which may require students to convert measurements -choose appropriate tool and unit, Ex. Choose to measure in inches, feet or yards -include problems that require students to use dimension of a figure to help solve the problem	-students use thermometers to measure Fahrenheit and Celsius -include both analog and digital clocks -work with a range of time and elapsed time -range of time has been tested since third grade -fourth grade uses tools to solve problems with elapsed time	-celsius is introduced in 4 <sup>th</sup> grade -students measure with actual thermometers -students solve problems using clocks with gears -include both analog and digital -elapsed time, range of time -use T-charts to record	-conduct hands-on measuring tools with increments of 2 degrees -Fahrenheit only -measuring temperature is introduced in 3 <sup>rd</sup> grade -using both a digital or analog clock, students tell and write time -tell time to the minute/hour -includes range of time

-given the perimeter of a square find the area  
 -use various methods including a protractor, pattern blocks, corner of page, etc.  
 -measurements of angles on a protractor does not necessarily begin at zero  
 -measure angles of polygons such as trapezoids and hexagons  
 -this is the first time students use a tool, such as a protractor, to measure angles  
 -use proportional relationships and compare to models to address reasonableness  
 -focus on equivalent relationships, not cross products  
 -include relationships such as: 1 ft. = 1/3 yard, 1 in = 1/12 ft introduced in 4<sup>th</sup> grade

Vocabulary

Conversion, customary, metric, angles, protractor, obtuse, acute, right, straight, degrees

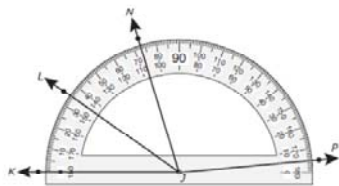
STAAR 2012

SE	# of Questions	Percent	Dual Coded
8C	1	60%	
8D	2	41%	11A

STAAR 2013

SE	# of Questions	Percent	Dual Coded
8C	2	57%	11D
8D	2	46%	13A,11A

Angle *NJP* and angle *KJL* are shown below.



What is the difference between the measures of angle *NJP* and angle *KJL* to the nearest degree?

- F 107°
- G 67°
- H 102°
- J 35°

Vocabulary

Conversions, customary, metric, increase, decrease, rise, fall, temperature, thermometer, Fahrenheit, Celsius, range of time, elapsed time

STAAR 2012

SE	# of Questions	Percent	Dual Coded
10A	2	42%	14A
11A	1	73%	14A
11B	1	45%	14B

STAAR 2013

SE	# of Questions	Percent	Dual Coded
10A	2	51%	14A,14B
11A	1	73%	14A
11B	1	44%	14A

A coffeemaker at a restaurant can brew 42 cups. How many pints can this coffeemaker brew?

- F 84 pints
- G 21 pints
- H 336 pints
- J 420 pints

Vocabulary

Temperature, thermometer, increase, decrease, rise, drop, warmer, cooler, Celsius, Fahrenheit, interval, elapsed time, past, hour, minute, conversions, tables

STAAR 2012

SE	# of Questions	Percent	Dual Coded
11B	2	67%	14A
12A	1	69%	14A

STAAR 2013

SE	# of Questions	Percent	Dual Coded
11B	1	74%	16B
12A	1	67%	14A
12B	1	81%	14D

Mrs. Taylor wants to pour 8 quarts of juice into 16 glasses. Each glass holds one pint. Does Mrs. Taylor have enough juice to fill 16 glasses?

- A No, because there are 4 quarts in 1 gallon and  $16 \div 4 = 4$
- B No, because there are 4 quarts in 1 gallon and  $4 \times 16 = 64$
- C Yes, because there are 2 pints in 1 quart and  $2 \times 8 = 16$
- D Yes, because there are 2 pints in 1 quart and  $8 \div 2 = 4$

Vocabulary

Thermometer, interval, temperature, increase, rise, decrease, fall, time, analog, digital, minute, hour, increment, second, longer, shorter

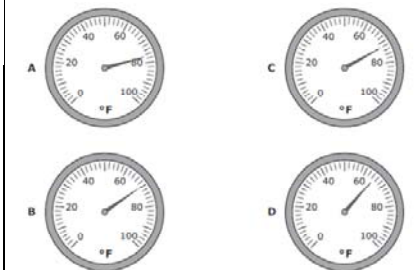
STAAR 2012

SE	# of Questions	Percent	Dual Coded
12A	1	56%	16A
12B	1	42%	14D

STAAR 2013

SE	# of Questions	Percent	Dual Coded
12A	1	65%	14A
12B	1	65%	14D

The outside temperature on a summer morning was between 75°F and 80°F. Which thermometer shows a temperature between 75°F and 80°F?



Which angle does NOT appear to have a measure of 160°?

A  $\angle VTY$   
 B  $\angle WTZ$   
 C  $\angle WTY$   
 D  $\angle UTX$

Oneesha swims a total of 13 kilometers each week. What is the total number of meters Oneesha swims in 3 weeks?

F 39 m  
 G 13,000 m  
 H 3,900 m  
 J 39,000 m

The measurements in the list below have a characteristic in common.

- 2 miles
- 72,000 inches
- 3,000 feet

Which statement describes the common characteristic?

A Each measurement is less than 4,000 yards.  
 B Each measurement is greater than 1,760 yards.  
 C Each measurement is equivalent to 1,000 yards.  
 D Each measurement is equivalent to 3,520 yards.

Gavin started hiking at 8:00 A.M. when the temperature was 64°F.

- The temperature rose 17°F by noon.
- The temperature then fell 25°F by the time Gavin finished hiking.

What was the temperature when Gavin finished hiking?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

An adult human body contains about 10 pints of blood. How many fluid ounces is the equivalent of 10 pints?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

39 The sign below shows the starting time of a music concert.

Evander plans to leave his house 1 hour 40 minutes before the concert starts. At what time should Evander leave his house?

A 5:45 P.M.  
 B 6:45 P.M.  
 C 5:35 P.M.  
 D 9:05 P.M.

The thermometer below shows the temperature of some milk in a pan.

The milk was heated until the temperature increased 21°F. Which thermometer shows the temperature of the milk after it was heated?

A C   
 B D

The clocks below show the times that Reid started and finished computer class one morning.

Which digital clock shows a time when Reid was in computer class?

F H   
 G J

The clock below shows the time Vicente's football practice began.

Football practice lasted 1 hour 15 minutes. Which digital clock shows the time football practice ended?




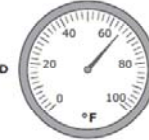






A C   
 B D

Math  
Vertical Alignment by Grade

Strand: Solving Problems Using Measurement

<p>TEK: the student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language, to solve problems and answer questions. The student selects and uses standard units to describe length, area, capacity/volume, and weight/mass</p> <p>TEK: the student reads and writes time and measures temperature in degrees Fahrenheit to solve problems</p>	<p>TEK: the student directly compares the attributes of length, area, weight/mass, and capacity, and uses comparative language, to solve problems and answer questions. The student selects and uses nonstandard units to describe length, area, capacity, and weight/mass. The student recognizes and uses models that approximate standard units (from both SI, also known as metric and customary systems) of length, weight/mass, capacity and time</p> <p>TEK: the student uses standard tools to estimate and measure time and temperature (in degrees Fahrenheit)</p>	<p>TEK: the student directly compares attributes of length, area, weight/mass, capacity, and temperature. The student uses comparative language to solve problems and answer questions. The student selects and uses nonstandard units to describe length.</p> <p>TEK: the student understands that time can be measured. The student uses time to describe and compare situations</p>	<p>TEK: the student directly compares the attributes of length, area, weight/mass, capacity, and/or relative temperature. The student uses comparative language, to solve problems and answer questions</p> <p>TEK: the students uses time to describe, compare and order events and situations</p>
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3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
<p>SE</p> <p><b>3.12A – (S)</b>use thermometer to measure temperature</p> <p><b>3.12B – (S)</b>tell and write time shown on analog and digital clocks</p>	<p>SE</p> <p><b>2.10A – (S)</b>read a thermometer to gather data</p> <p><b>2.10B - (R)</b>read and write times shown on an analog and digital clock using five-minute increments</p> <p><b>2.10C – (S)</b>describe activities that take approximately one second, one minute, and one hour</p>	<p>SE</p> <p><b>1.7C – (S)</b>describe the relationship between the size of the unit and the number of units needed to measure length of an object</p> <p><b>1.7G – (S)</b>compare and order two or more objects according to relative temperature (from hottest to coldest)</p> <p><b>1.8A – (R)</b>order three or more events according to duration</p> <p><b>1.8B – (R)</b>read time to the hour and half-hour using analog and digital clocks</p>	<p>SE</p> <p><b>K.10E – (S)</b>compare situations or objects according to relative temperature (hotter/colder than, or the same as)</p> <p><b>K.11A – (S)</b>compare events according to duration such as more time than or less time than</p> <p><b>K.11B – (S)</b>sequence events (up to three)</p> <p><b>K.11C – (S)</b>read calendar using days, weeks, and months</p>
<p>Specifics (description of lesson, include any “tricks”)</p>	<p>Specifics (description of lesson, include any “tricks”)</p>	<p>Specifics (description of lesson, include any “tricks”)</p>	<p>Specifics (description of lesson, include any “tricks”)</p>
<p>Use an Anchor Chart to compare fractional parts of time and money... to show that the whole is different (not out of 100 for time)</p> <p>Connect that the clock and thermometer are both number lines</p>	<p>Connect that the clock and thermometer are both number lines</p> <p>Time to the one minute increments</p> <p>Danger Zone – section of the clock between 45 minutes and 60 minutes</p> <p>Hour hand looks back, circle the hour hand</p>	<p>Time to the hour and half-hour, difference between analog and digital</p> <p>Students are not held accountable for writing time, but students are exposed to writing the time</p>	
<p>Rationale (clarification of TEKS/SE)</p>	<p>Rationale (clarification of TEKS/SE)</p>	<p>Rationale (clarification of TEKS/SE)</p>	<p>Rationale (clarification of TEKS/SE)</p>
<p>-conduct hands-on measuring tools with increments of 2 degrees</p> <p>-Fahrenheit only</p> <p>-measuring temperature is introduced in 3<sup>rd</sup> grade</p> <p>-using both a digital or analog clock, students tell and write time</p> <p>-tell time to the minute/hour</p>	<p>-this is the first time the thermometer is introduced, including reading to nearest 2 degrees or when each division on the thermometer equals two degrees</p> <p>-this is the first time students held accountable for ‘writing’ times shown on a clock</p>	<p>-compare temperature in real life situations</p> <p>-thermometer is introduced in 2<sup>nd</sup></p> <p>-given a digital clock student can match to an analog clock with the same time</p> <p>-should not write time when given a clock</p> <p>-writing time is introduced in 2<sup>nd</sup></p>	<p>-thermometer is introduced in 2<sup>nd</sup></p> <p>-kindergarten will compare a bowl of ice cream to a bowl of soup (hotter, colder)</p> <p>-does it take more time for a bath or to wash your hands</p> <p>-given a calendar, show that a week is 7 days</p> <p>-given a calendar, student can find the month</p>

<p>-includes range of time</p>	<p>-analog clocks have 'faces'</p>		<p>-given a date, find the day of the week on the calendar                      -know the days of the week in order                      -know the months of the year in order                      -kindergarten is the only time calendar is mentioned in the math TEKS</p>												
<p>Vocabulary</p> <p>Thermometer, interval, temperature, increase, rise, decrease, fall, time, analog, digital, minute, hour, increment, second, longer, shorter</p>	<p>Vocabulary</p> <p>Thermometer, interval, temperature, increase, rise, decrease, fall, time, analog, digital, minute, hour, increment, second, longer, shorter</p>	<p>Vocabulary</p> <p>Temperature, hottest, coldest, time, analog, digital, clock, hour, half-hour, minute</p>	<p>Vocabulary</p> <p>Temperature, hotter than, colder than, time, more time, less time, longer than, shorter than, less than, greater than, calendar, day, week, year</p>												
<p>STAAR 2012</p> <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>12A</td> <td>1</td> <td>56%</td> <td>16A</td> </tr> <tr> <td>12B</td> <td>1</td> <td>42%</td> <td>14D</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	12A	1	56%	16A	12B	1	42%	14D	<p>STAAR 2012</p>	<p>STAAR 2012</p>	<p>STAAR 2012</p>
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<p>The outside temperature on a summer morning was between 75°F and 80°F. Which thermometer shows a temperature between 75°F and 80°F?</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center;">  <p>A</p> </div> <div style="text-align: center;">  <p>C</p> </div> <div style="text-align: center;">  <p>B</p> </div> <div style="text-align: center;">  <p>D</p> </div> </div>															
<p>The clocks below show the times that Reid started and finished computer class one morning.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Start</p> </div> <div style="text-align: center;">  <p>Finish</p> </div> </div> <p>Which digital clock shows a time when Reid was in computer class?</p> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center;">  <p>F</p> </div> <div style="text-align: center;">  <p>H</p> </div> <div style="text-align: center;">  <p>G</p> </div> <div style="text-align: center;">  <p>J</p> </div> </div>															

Math  
Vertical Alignment by Grade

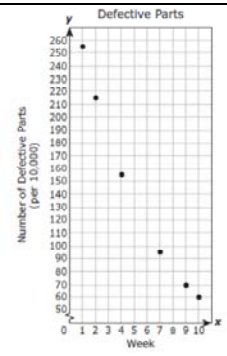
Strand: Displaying and Interpreting Data

<p>TEK: the student develops and applies skills used in college and careers, including reasoning, planning and communication, to make decisions and solve problems in applied situations involving numerical reasoning, probability, statistical analysis, finance, mathematical selection, and modeling with algebra, geometry, trigonometry, and discrete mathematics</p> <p>TEK: the student analyzes and evaluates risk and return in the context of real-world problems</p> <p>TEK: the student makes decisions based on understanding, analysis, and critique of reported statistical information and statistical summaries</p> <p>TEK: the student applies statistical methods to design and conduct a study that addresses one or more particular question(s)</p> <p>TEK: the student communicates the results of reported and student-generated statistical studies</p> <p>-the student models data, makes predictions, and judges the validity of a prediction</p>	<p>TEK: the student uses functions and their properties, tools and technology, to model and solve meaningful problems</p>	<p>TEK: the student uses graphical and numerical techniques to study patterns and analyze data</p> <p>TEK: the student develops and implements a plan for collecting and analyzing data (qualitative and quantitative) in order to make decisions</p> <p>TEK: the student uses functional relationships to solve problems related to personal income</p>	<p>TEK:</p>	<p>TEK: the student uses properties and attributes of functions and applies functions to problem situations</p>
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AQR	Pre-Cal	MMA	Geometry	Algebra II
<p>SE</p> <p><b>AQR.1A</b> – gather data, conduct investigations, and apply mathematical concepts and models to solve problems in mathematics and other disciplines</p> <p><b>AQR.3A</b> – determine and interpret conditional probabilities and probabilities of compound events by constructing and analyzing representations, including tree diagrams, Venn diagrams, and area models, to make decisions in problem situations</p> <p><b>AQR.4A</b> – identify limitations or lack of information in studies reporting statistical information, including when studies are reported in condensed form</p> <p><b>AQR.4B</b> – interpret and compare the results of polls, given a margin of error</p> <p><b>AQR.4C</b> – identify uses and misuses of statistical analyses in studies reporting statistics or using statistics to justify particular conclusions</p> <p><b>AQR.4D</b> – describe strengths and weaknesses of sampling techniques, data and graphical displays, and interpretations of summary statistics or other results appearing in a study</p> <p><b>AQR.5A</b> – determine the purpose of a statistical investigation and what type of statistical analysis can be used to answer a specific question or set of questions</p> <p><b>AQR.5B</b> – identify the population of interest, select an appropriate sampling technique, and collect data</p> <p><b>AQR.5C</b> – identify the variables to be used in a study</p> <p><b>AQR.5D</b> – determine possible sources of statistical bias in a study and how such bias may affect the ability to generalize the results</p>	<p>SE</p> <p><b>PC.3C</b> – use regression to determine the appropriateness of a linear function to model real-life data (including using technology to determine the correlation coefficient)</p>	<p>SE</p> <p><b>MMA.2A</b> – interpret information from various graphs, including line graphs, bar graphs, circle graphs, histograms, scatterplots, line plots, stem and leaf plots, and box and whisker plots to draw conclusions from data</p> <p><b>MMA.2B</b> – analyze numerical data using measures of central tendency, variability, and correlation in order to make inferences</p> <p><b>MMA.2C</b> – analyze graphs from journals, newspapers, and other sources to determine the validity of stated arguments</p> <p><b>MMA.2D</b> – use regression methods available through technology to describe various methods for data such as linear, quadratic, exponential, etc. select the most appropriate model, and use the model to interpret information</p> <p><b>MMA.3A</b> – formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions</p>	<p>SE</p>	<p>SE</p> <p><b>ALGII.1B – (R)</b> collect and organize data, make and interpret scatterplots, fit the graph of a function to the data, interpret the results, and proceed to model, predict, and make decisions and critical judgments</p>







A factory began producing new parts. Data were collected on the number of defective parts per 10,000 parts produced. The graph shown displays some of the data for the first 10 weeks of production. Based on the graph, during which week were approximately 130 defective parts per 10,000 produced?

- F Week 3
- G Week 5
- H Week 6
- J Week 8

Math  
Vertical Alignment by Grade

Strand: Displaying and Interpreting Data

TEK: the student uses properties and attributes of functions and applies functions to problem situations	TEK: the student understands that a function represents a dependence of one quantity on another and can be described in a variety of ways TEK: the student uses the properties and attributes of functions	TEK: the student uses statistical procedures to describe data TEK: the student evaluates predictions and conclusions based on statistical data	TEK: the student understands that the way a set of data is displayed influences its interpretation TEK: the student uses measures of central tendency and range to describe a set of data TEK: the student understands that the way a set of data is displayed influences its interpretation	TEK: the student uses statistics representations to analyze data
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Algebra II	Algebra I	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE <b>ALGII.1B – (R)</b> collect and organize data, make and interpret scatterplots, fit the graph of a function to the data, interpret the results, and proceed to model, predict, and make decisions and critical judgments	SE: <b>ALG.1B – (R)</b> gather independent and dependent quantities in functional relationships <b>ALG.1E – (R)</b> interpret and make decisions, predictions, and critical judgments from functional relationships <b>ALG.2D – (R)</b> collect and organize data, make and interpret scatterplots (including recognizing positive, negative, or no correlation for data approximating linear situations), and model, predict, and make decisions and critical judgments in problem situations	SE <b>8.12A – (S)</b> select the appropriate measure of central tendency or range to describe a set of data and justify the choice for a particular situation <b>8.12B – (S)</b> draw conclusions and make predictions by analyzing trends in scatter plots <b>8.12C – (S)</b> select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, stem and leaf plots, circle graphs, bar graphs, box and whisker plots, histograms, and Venn diagrams, with and without the use of technology <b>8.13A – (S)</b> evaluate methods of sampling to determine validity of an inference made from a set of data <b>8.13B – (R)</b> recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis	SE <b>7.11A – (S)</b> select and use an appropriate representation for presenting and displaying relationships amount collected data, including line plot, line graph, bar graph, stem and leaf plot, circle graph, and Venn diagrams, and justify the selection <b>7.11B – (R)</b> make inferences and convincing arguments based on an analysis of given or collected data <b>7.12A – (S)</b> describe a set of data using mean, median, mode and range <b>7.12B – (R)</b> choose among mean, median, mode, or range to describe set of data and justify the choice for a particular situation	SE <b>6.10A – (S)</b> select and use an appropriate representation for presenting and displaying different graphical representations of the same data including line plot, line graph, bar graph, and stem and leaf plot <b>6.10B – (S)</b> identify mean (using concrete objects and pictorial models), median, mode and range of a set of data <b>6.10C – (S)</b> sketch circle graphs to display data <b>6.10D – (R)</b> solve problems by collecting, organizing, displaying, and interpreting data
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
		Guide students to the ‘best’ use of the data Label Graphs: title, x-axis, y-axis	Guide students to the ‘best’ use of the data Label Graphs: title, x-axis, y-axis	
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)

		<ul style="list-style-type: none"> <li>-choose 'best' representation – explain choice based on particular situation</li> <li>-when adding another data point explain which measure is affected most – mean, median, mode, or range</li> <li>-discuss the affect of outliers</li> <li>-include correlation – positive, negative, or no trend</li> <li>-use labels – titles and axis</li> <li>-validate predictions and conclusions</li> <li>-correlations are introduced in 8<sup>th</sup> grade</li> <li>-box and whisker plots and histograms are introduced in 8<sup>th</sup> grade</li> <li>-students should know when it's appropriate to display data unit the different forms</li> <li>-students should understand the term 'inference' (to arrive at a conclusion by reasoning from evidences)</li> <li>-this concept is introduced in 8<sup>th</sup> grade</li> </ul>	<ul style="list-style-type: none"> <li>-use the situation, and the connection between data and representation to provide a justification</li> <li>-choose best representation for data depending on situation</li> <li>-sketching circle graphs is introduced in 6<sup>th</sup> grade, however; 7<sup>th</sup> grade is the first time they construct circle graphs (use angle measurements)</li> <li>-Venn diagrams are introduced in 7<sup>th</sup> grade</li> <li>-students should understand the term 'inference' (to arrive at a conclusion by reasoning from evidence)</li> <li>-use data from a model, table, graph, and/or situation</li> <li>-students must describe what the mean, median, mode and range tell about the data – not just how to find each</li> <li>-explain the relationship for each central tendency based on a particular situation</li> <li>-choose 'best' representation – explain choice based on particular situation</li> <li>-when adding another data point to a given set of data, explain how each measure will be effected, and which will be affected the most</li> </ul>	<ul style="list-style-type: none"> <li>-line graphs must use data that is continuous (change over time)</li> <li>-line plots are used to record frequency of data items (line plots are introduced in 5<sup>th</sup> grade)</li> <li>-bar graphs are used to compare quantities</li> <li>-stem and leaf plots are used to display groups of data arranged by place value (introduced in 6<sup>th</sup> grade)</li> <li>-Venn diagrams are not in 6<sup>th</sup> grade, introduced in 7<sup>th</sup> grade</li> <li>-mean is introduced 6<sup>th</sup> grade and should be introduced using concrete models (example: stack blocks and 'level off', share equally, etc.</li> <li>-median, mode, and range were introduced in 5<sup>th</sup> grade</li> <li>-make sketch: a drawing that approximates the actual circle graph (introduced in 6<sup>th</sup> grade)</li> <li>-do not use protractors to construct angles for circle graphs</li> <li>-circle graphs relate part to whole</li> <li>-include line, bar, circle graphs, stem-and-leaf plots, and line graphs</li> </ul>																																																																								
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		Measures of central tendency, predict, scatter plots, line plots, line graphs, stem and leaf plots, circle graphs, bar graphs, box and whisker plots, histograms, Venn diagrams, validity, evaluate	Data, line plot, line graph, bar graph, circle graph, stem and leaf plot, Venn diagrams, inference, analysis, measures of central tendencies, mean, median, mode, range, justify	Data, represent, line plot, line graph, bar graph, stem and leaf plot, mean, median, mode, range, measures of central tendencies, circle graph, collecting, organizing, displaying, interpreting, quantities, frequency, continuous, over time																																																																								
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1B	2	50%
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1B	1	70%
1E	2	54%
2D	2	63%

12B	1	66%	14D
12C	1	69%	15A
13A	1	43%	16B
13B	2	51%	14B,15A

11B	3	51%	15B
12A	1	36%	
12B	3	46%	13A 14A 15B

10C	1	59%	13B
10D	4	52%	12A, 11B, 13A

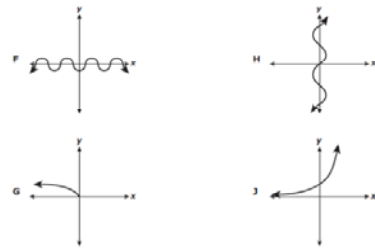
An object is launched into the air. The table below shows the object's height above the ground at various times.

Elapsed Time (seconds)	Height Above the Ground (meters)
1	78
2	109
3	131
4	143
5	145
6	137

Based on the data in the table, which of the following is closest to the object's height above the ground 9 seconds after being launched?

A 110 m  
B 55 m  
C 10 m  
D 95 m

Which graph does not represent  $y$  as a function of  $x$ ?



A librarian recorded the number of books that were checked out on each of the last 9 days, as shown below.

142, 136, 125, 148, 150, 152, 115, 131, 136

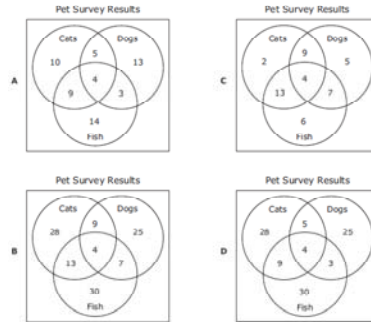
Which measure of data does NOT describe a typical number of books checked out on these days?

- A Mean
- B Median
- C Mode
- D Range

Isaac surveyed his classmates to find out what types of pets they had. The pet survey results are listed below.

- A total of 25 students had dogs.
- A total of 28 students had cats.
- A total of 30 students had fish.
- There were 9 students who had only dogs and cats.
- There were 13 students who had only cats and fish.
- There were 7 students who had only dogs and fish.
- There were 4 students who had dogs, cats, and fish.

Which Venn diagram best represents the pet survey results?

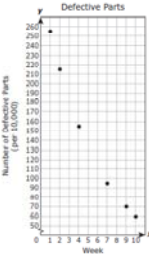


The list below shows the number of rides at nine different rodeos.

28, 7, 13, 7, 8, 12, 22, 14, 6

What is the median number of rides at these rodeos?

- A 8
- B 22
- C 7
- D 12



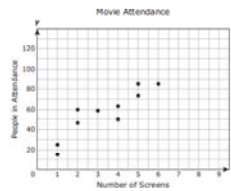
A factory began producing new parts. Data were collected on the number of defective parts per 10,000 parts produced. The graph shows displays some of the data for the first 10 weeks of production. Based on the graph, during which week were approximately 130 defective parts per 10,000 produced?

- F Week 7
- G Week 5
- H Week 6
- J Week 8

The population of a town is currently 9,000. The function  $p = 9,000 + 8t^2$  can be used to estimate  $p$ , the population of the town  $t$  years from now. Based on this function, which statement is true?

- F The population of the town is increasing at a constant rate.
- G The population of the town will reach 10,000 between 11 and 12 years from now.
- H The population of the town will increase by 256 people two years from now.
- J The population of the town will increase and then decrease.

The scatterplot below shows movie theaters with different numbers of screens and their average weekly attendance.



Based on the trend in the scatterplot, approximately how many people will be in attendance at a movie theater with 8 screens?

- F 90
- G 105
- H 85
- J 140

The table below shows the number of minutes Melissa ran each day during three weeks when she was training for a race.

	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
Week 1	10	10	10	10	12	12	0
Week 2	15	18	9	18	20	0	20
Week 3	22	22	20	24	24	0	26

Which statement is best supported by the data in the table?

- F The total number of minutes Melissa ran in Week 2 is twice the total number of minutes she ran in Week 1.
- G The total number of minutes Melissa ran each day decreased from Week 1 to Week 2.
- H The total number of minutes Melissa ran in Week 3 is more than the total number of minutes she ran in Weeks 1 and 2 combined.
- J The total number of minutes Melissa ran each week increased by about 5 minutes per week.

The table below shows the number of teeth of each type in Ava's mouth.

Type	Number
Incisor	8
Canine	4
Premolar	8
Molar	12

Ava wants to make a circle graph to represent the information in the table. What percentage of the circle graph should she use to represent the percentage of teeth in her mouth that are incisors?

- F 25%, because  $\frac{8}{32} = \frac{1}{4}$  and  $\frac{1}{4} = \frac{25}{100}$
- G 8%, because  $\frac{8}{100} = 8\%$
- H 24%, because  $32 - 8 = 24$
- J 76%, because  $\frac{12 + 8 + 4}{100} = \frac{24}{100}$  and  $\frac{100 - 24}{100} = \frac{76}{100}$

The dishwasher at a restaurant is loaded with the same number of dishes every time it is used. The table below shows the total number of dishes washed as a function of the number of times the dishwasher is used.

Number of Times Used	Total Number of Dishes Washed
2	52
4	104
6	156
8	208

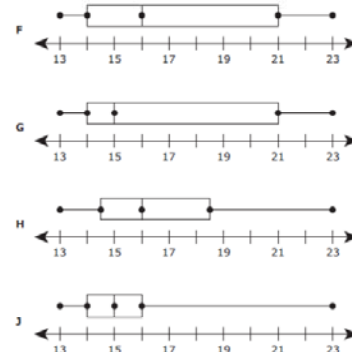
Based on the data in the table, what is the total number of dishes that will have been washed when the dishwasher is used 9 times?

Record your answer and fill in the bubbles on your answer document.

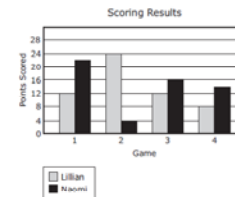
The ages of the members of a volunteer group are shown below.

13, 14, 14, 14, 15, 15, 15, 16, 21, 23

Which box and whisker plot best represents these data?



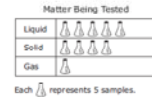
The number of points scored by Lillian and Naomi during four basketball games is shown in the graph below.



Which statement is best supported by the information in the graph?

- A In Game 1 the number of points scored by Lillian was more than half the number of points scored by Naomi.
- B The total number of points scored by Lillian and Naomi in Game 4 was more than the number of points scored by Lillian in Game 2.
- C In Game 4 the number of points scored by Naomi was two times the number of points scored by Lillian.
- D The total number of points scored by Lillian and Naomi in Game 3 was seven times the number of points scored by Lillian in Game 2.

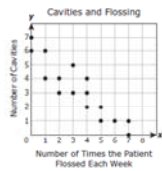
The pictograph below shows the number of samples of matter being tested in an experiment.



Which statement is best supported by the information in the pictograph?

- A There are a total of 10 samples being tested in this experiment.
- B The ratio of the number of gas samples being tested to the number of liquid samples is 1 to 10.
- C The difference between the number of solid samples being tested and the number of gas samples is 3.
- D The ratio of the number of liquid samples being tested to the total number of samples is 1 to 2.

A dentist made the scatterplot below to show the number of cavities her patients had as it relates to the number of times they flossed their teeth each week.

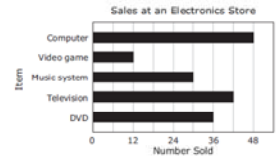


- Which of the following best describes the correlation for the data?
- A Positive correlation
  - B Nonlinear correlation
  - C Negative correlation
  - D No correlation

Hi. Hank surveyed 50 high school students in his driver-education course to determine how many times most motorists have taken a driver-education course. Which of the following best explains why the results of Hi. Hank's survey may NOT be valid?

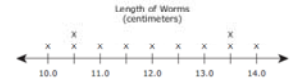
- F He did not include motorists from other driver-education courses.
- G He should have included adults who have taken driver-education courses.
- H He should have included taxi drivers in his survey.
- J The sample used in his survey may not have been representative of most motorists.

The graph below shows the number of items sold at an electronics store one weekend.



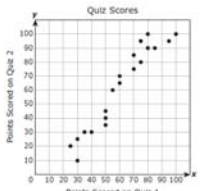
- Which statement is best supported by the information in the graph?
- F The number of video games sold was  $\frac{1}{3}$  of the number of computers sold.
  - G The number of music systems sold was 36 more than the number of video games sold.
  - H The number of televisions sold was 12 more than the number of DVDs sold.
  - J The number of televisions sold was  $\frac{1}{4}$  of the total number of items sold.

William made the line plot below to show the length of 11 worms he found in his garden.



- After he completed the line plot, he found a twelfth worm, which is modeled below. Use the ruler provided to measure the length of the worm to the nearest 0.5 centimeter.
- 
- If the data for the twelfth worm are added to the line plot, which statement would be true?
- F Exactly  $\frac{1}{2}$  of the worms have a length that is less than 12.5 cm.
  - G For every worm that is 14.0 cm long, there are two worms that are 12.0 cm long.
  - H For every worm that is 11.0 cm long, there is one worm that is 11.5 cm long.
  - J Exactly  $\frac{2}{3}$  of the worms have a length that is greater than 11.0 cm.

A teacher collected data on 20 students for two different quizzes. The scatterplot below shows the relationship between the number of points scored on Quiz 1 and the number of points scored on Quiz 2.



- Which statement describes the data?
- F The number of points scored on Quiz 2 was less than the number of points scored on Quiz 1 for any student who scored at least 50 points on Quiz 1.
  - G The number of points scored on Quiz 2 was greater than the number of points scored on Quiz 1 for any student who scored 50 or fewer points on Quiz 1.
  - H The number of points scored on Quiz 2 was greater than the number of points scored on Quiz 1 for any student who scored at least 50 points on Quiz 1.
  - J The number of points scored on Quiz 2 was less than the number of points scored on Quiz 1 for any student who scored 50 or fewer points on Quiz 1.

Ted created a graph to show the percentage of time he spends on different activities during a school day.



- Ted concluded from the graph that he spends about 48 hours at school and doing homework during a five-day school week. Which statement about Ted's conclusion is true?
- F Ted's conclusion is invalid because  $\frac{1}{4}$  of 120 is 30.
  - G Ted's conclusion is invalid because 40% of 24 is 9.6.
  - H Ted's conclusion is valid because 40% of 120 is 48.
  - J Ted's conclusion is valid because  $\frac{1}{4}$  of 192 is 48.

The table below shows the number of cotton bales imported by the United States from different countries and regions in one year.

Cotton Imports	
Country or Region	Bales (thousands)
Egypt	450
Hong Kong	475
India	1,250
Italy	1,100
Japan	925
Mexico	1,750
Taiwan	1,050

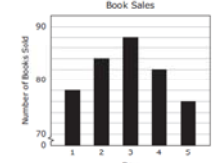
What is the mean number of cotton bales imported from these countries, in thousands? Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

The graph below shows the number of garbage cans that were emptied in five neighborhoods.



- Which statement is best supported by the information in the graph?
- A A total of 500 garbage cans were emptied in these 5 neighborhoods.
  - B The combined number of garbage cans emptied in Neighborhood M and Neighborhood N is 50 more than the number of garbage cans emptied in Neighborhood P.
  - C The difference between the greatest number of garbage cans emptied and the least number of garbage cans emptied is 110.
  - D The combined number of garbage cans emptied in Neighborhood P and Neighborhood O is 375 more than the number of garbage cans emptied in Neighborhood R.

The graph below shows the number of books sold at a book fair in 5 days.



- Based on the graph, which statement is true?
- A The number of books sold on Day 3 was twice the number of books sold on Day 1.
  - B The number of books sold on Day 5 was half the number of books sold on Day 2.
  - C The number of books sold on Day 5 was about 93% of the number of books sold on Day 4.
  - D The number of books sold on Day 1 was about 12% of the number of books sold on Day 3.

The list below shows the number of minutes Addison spent reading on each of six days.

90, 60, 85, 94, 60, 93

- Which two measures of these data best describe the typical number of minutes Addison spent reading each day?
- F Mean and mode
  - G Mean and median
  - H Mode and range
  - J Median and range

The list below shows Wendy's bowling scores in her last five games.

112, 123, 136, 145, 159

- Which measure of data best describes how much these bowling scores varied?
- A Mean
  - B Median
  - C Mode
  - D Range
- Monica recorded the high temperature each day for one week. She will report the most common high temperature during that week to her class. Which measure of data should Monica report?
- F Mode, because the mode of a data set is always the greatest value
  - G Median, because the median of a data set is always the middle value
  - H Mode, because the mode of a data set is always the value that appears the greatest number of times
  - J Median, because the median of a data set is always the value that appears most often

The graph below shows how the prices of two different menu items at a restaurant have changed from Year 1 to Year 7.



- If the prices continue to change in this same way, which statement is true?
- A In Year 8, the price of a hamburger will be \$7.00.
  - B In Year 9, the price of a chicken sandwich will be \$9.00.
  - C In Year 8, the difference between the price of a chicken sandwich and the price of a hamburger will be \$1.00.
  - D In Year 9, the price of a chicken sandwich plus the price of a hamburger will be \$16.50.

Math  
Vertical Alignment by Grade

Strand: Displaying and Interpreting Data

TEK: the student uses statistics representations to analyze data	TEK: the student solves problems by collecting, organizing, displaying and interpreting sets of data	TEK: the student solve problems by collecting, organizing, displaying, and interpreting sets of data	TEK: the student solves problems by collecting, organizing, displaying, and interpreting sets of data
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade
<p>SE</p> <p><b>6.10A – (S)</b>select and use an appropriate representation for presenting and displaying different graphical representations of the same data including line plot, line graph, bar graph, and stem and leaf plot</p> <p><b>6.10B – (S)</b>identify mean (using concrete objects and pictorial models), median, mode and range of a set of data</p> <p><b>6.10C – (S)</b>sketch circle graphs to display data</p> <p><b>6.10D – (R)</b>solve problems by collecting, organizing, displaying, and interpreting data</p>	<p>SE</p> <p><b>5.13A – (S)</b>use tables of related number pairs to make line graph</p> <p><b>5.13B – (R)</b>describe characteristics of data presented in tables and graphs including median, mode, and range</p> <p><b>5.13C – (S)</b>graph a given set of data using an appropriate graphical representation such as a picture or line graph</p>	<p>SE</p> <p><b>4.13B – (R)</b>interpret bar graphs</p>	<p>SE</p> <p><b>3.13A – (R)</b>collect, organize, record, and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data</p> <p><b>3.13B – (S)</b>draw conclusions and answer questions based on picture graphs and bar-type graphs</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
	<p>Start a line graph by demonstrating a bar graph (with change over time). Connect each bar with a line at the top of the bar, then remove the bars to make a line graph</p> <p>This is a good connection to students prior understanding of bar graphs</p>		
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
<ul style="list-style-type: none"> <li>-line graphs must use data that is continuous (change over time)</li> <li>-line plots are used to record frequency of data items (line plots are introduced in 5<sup>th</sup> grade)</li> <li>-bar graphs are used to compare quantities</li> <li>-stem and leaf plots are used to display groups of data arranged by place value (introduced in 6<sup>th</sup> grade)</li> <li>-Venn diagrams are not in 6<sup>th</sup> grade, introduced in 7<sup>th</sup> grade</li> <li>-mean is introduced 6<sup>th</sup> grade and should be introduced using concrete models (example: stack blocks and ‘level off’, share equally, etc.</li> <li>-median, mode, and range were introduced in 5<sup>th</sup> grade</li> <li>-make sketch: a drawing that approximates the</li> </ul>	<ul style="list-style-type: none"> <li>-coordinate grids</li> <li>-write and read ordered pairs (2,5)</li> <li>-label points on grid</li> <li>-a line graph is a new concept in 5<sup>th</sup> grade</li> <li>-students may be assessed on double line graphs</li> <li>-journals: to verbally ‘describe’ the data</li> <li>-tables of data may be a source of information for students to connect with graphs</li> <li>-derive the median, mode, and range from graphs</li> <li>-median: the middle number when numbers are arranged in order</li> <li>-mode: the number of numbers that occur most often in a set of numbers</li> <li>-range: can refer to the difference between the highest and the lowest number (it can also refer</li> </ul>	<ul style="list-style-type: none"> <li>-pictographs and bar graphs</li> <li>-graphs read vertically and horizontally</li> <li>-children need to complete portions of graph</li> <li>-interpret graph by combining information on graph</li> <li>-may be tested over double-bar graphs</li> <li>-must construct graphs by:               <ul style="list-style-type: none"> <li>collecting data</li> <li>organizing data</li> <li>recording data</li> <li>displaying data</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>-use both pictographs and bar graphs</li> <li>-use graphs read vertically and horizontally</li> <li>-children need to complete portions of graph</li> <li>-to construct graphs, students must collect data, organize data, record data, and display data</li> <li>-‘pictographs’ are picture graphs which contain a key such as a picture of an apple may represent 5 apples</li> <li>-the key using one object to represent more than one unit is introduced in 3<sup>rd</sup> grade</li> <li>-complete portions of graph</li> <li>-interpret graph by combining information on graph</li> <li>-pictographs keys show one object representing 2 items, 3 items, 5 items, etc.</li> </ul>

<p>actual circle graph (introduced in 6<sup>th</sup> grade)                  -do not use protractors to construct angles for circle graphs                  -circle graphs relate part to whole                  -include line, bar, circle graphs, stem-and-leaf plots, and line graphs</p>	<p>to any number contained in spread of the data)                  -include pictographs, bar graphs, line graphs                  -graphs read vertically and horizontally                  -children may need to complete a portion of graph                  -interpret graph by combining information on graph                  -Students much construct graphs by: collect data, organize data, record data, display data                  -line graphs are introduced in 5<sup>th</sup> grade</p>																																																										
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<p>Data, represent, line plot, line graph, bar graph, stem and leaf plot, mean, median, mode, range, measures of central tendencies, circle graph, collecting, organizing, displaying, interpreting, quantities, frequency, continuous, over time</p>	<p>Tables, related pairs, ordered pairs, line graph, bar graph, pictograph, median, range, mode, data, represent, horizontal, vertical</p>	<p>Collect, organize, , record, data, display, bar graphs, title, interval, labels, vertical, horizontal, input, output, interpret</p>	<p>Collect, organize, , record, data, pictographs, bar graphs, title, interval, labels, vertical, horizontal, input, output, key</p>																																																								
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The list below shows the number of rides at nine different rodeos.

28, 7, 13, 7, 8, 12, 22, 14, 6

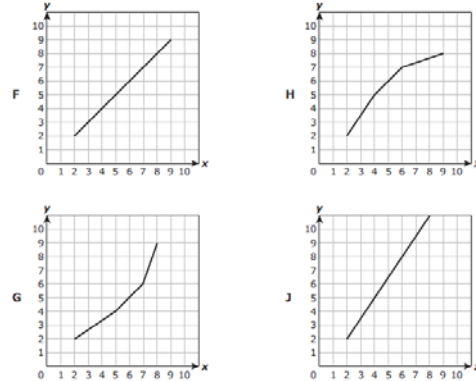
What is the median number of rides at these rodeos?

- A 8
- B 22
- C 7
- D 12

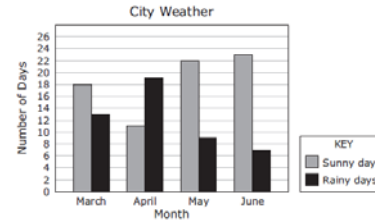
Isaiah recorded the coordinates of four points in the table below.

x	y
2	2
4	5
6	7
9	8

Which line graph represents the data in the table?



The graph below shows the number of sunny days and rainy days in a city during four months.



Based on the graph, how many more sunny days than rainy days did this city have during the months of April, May, and June?

- A 21
- B 56
- C 26
- D 20

The graph below shows the number of packages Blanca delivered on five days.



Which table best represents the information in the graph?

F

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Number of Packages	48	30	66	54	42

G

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Number of Packages	48	36	72	48	60

H

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Number of Packages	48	30	66	42	54

J

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Number of Packages	48	30	42	66	54

The table below shows the number of teeth of each type in Ava's mouth.

Type	Number
Incisor	8
Canine	4
Premolar	8
Molar	12

Ava wants to make a circle graph to represent the information in the table. What percentage of the circle graph should she use to represent the percentage of teeth in her mouth that are incisors?

- F 25%, because  $\frac{8}{32} = \frac{1}{4}$  and  $\frac{1}{4} = \frac{25}{100}$
- G 8%, because  $\frac{8}{100} = 8\%$
- H 24%, because  $32 - 8 = 24$
- J 76%, because  $\frac{12 + 8 + 4}{100} = \frac{24}{100}$  and  $\frac{100}{100} - \frac{24}{100} = \frac{76}{100}$

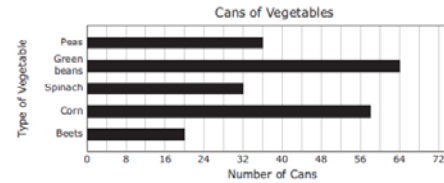
The graph below shows the number of pages Joaquín read each day for six days last week.



What is the median number of pages in this set of data?

- F 35
- G 40
- H 20
- J 80

The graph below shows the number of cans of different types of vegetables on a grocery store shelf.



Based on the graph, how many more cans of corn than cans of peas are on the shelf?

- F 20, because  $60 - 40 = 20$
- G 16, because  $50 - 40 = 16$
- H 28, because  $64 - 36 = 28$
- J 22, because  $58 - 36 = 22$

The table below shows the number of games won by four people during a sporting event.

Name	Number of Games Won
Yolanda	48
William	32
Barbara	36
Javier	60

The pictograph below represents the same information.

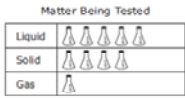


Which key completes the pictograph?

- A Each symbol means 8 games won.
- B Each symbol means 2 games won.
- C Each symbol means 6 games won.
- D Each symbol means 4 games won.



The pictograph below shows the number of samples of matter being tested in an experiment.



Each represents 5 samples.

Which statement is best supported by the information in the pictograph?

- A There are a total of 10 samples being tested in this experiment.
- B The ratio of the number of gas samples being tested to the number of liquid samples is 1 to 10.
- C The difference between the number of solid samples being tested and the number of gas samples is 3.
- D The ratio of the number of liquid samples being tested to the total number of samples is 1 to 2.

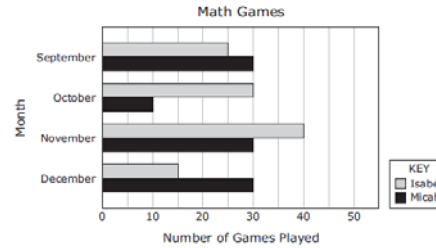
The table below shows the grades Rene earned on some reading assignments.

Grades on Reading Assignments												
Assignment Number	1	2	3	4	5	6	7	8	9	10	11	12
Grade	78	92	85	80	92	100	79	88	92	100	95	89

What is the range of these grades?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

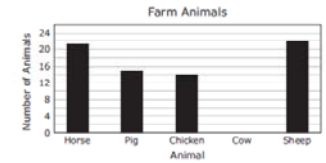
The graph below shows the number of math games two people played on a computer during four months.



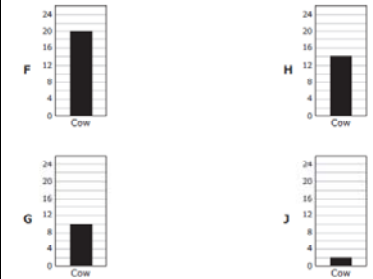
Based on the graph, which statement is true?

- F In September Micah played 5 fewer games than Isabel.
- G In October Isabel played 4 times as many games as Micah.
- H In November Isabel played 2 more games than Micah.
- J In December Micah played 2 times as many games as Isabel.

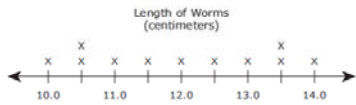
The graph below shows the number of each kind of animal on a farm. The bar for the number of cows on the farm is missing.



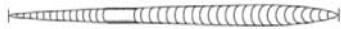
There is a total of 82 animals on the farm. Which bar completes the graph?



William made the line plot below to show the length of 11 worms he found in his garden.



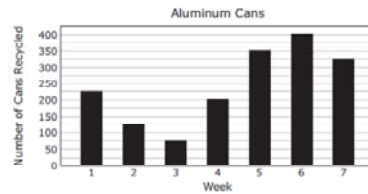
After he completed the line plot, he found a twelfth worm, which is modeled below. Use the ruler provided to measure the length of the worm to the nearest 0.5 centimeter.



If the data for the twelfth worm are added to the line plot, which statement would be true?

- F Exactly  $\frac{1}{2}$  of the worms have a length that is less than 12.5 cm.
- G For every worm that is 14.0 cm long, there are two worms that are 12.0 cm long.
- H For every worm that is 11.0 cm long, there is one worm that is 11.5 cm long.
- J Exactly  $\frac{2}{3}$  of the worms have a length that is greater than 11.0 cm.

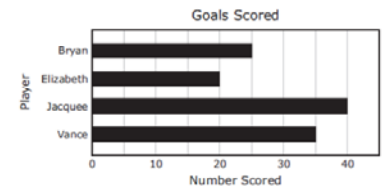
Wade's class is recycling aluminum cans. The graph below shows the number of cans his class recycled each week for 7 weeks.



What is the range of the number of cans recycled?

- A 100
- B 325
- C 225
- D 200

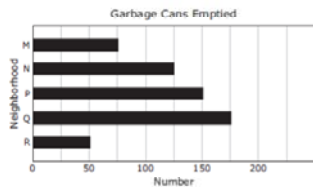
The graph below shows the number of goals four players scored during a soccer season.



Based on the graph, what is the difference between the number of goals Vance scored and the number of goals Elizabeth scored?

- F 15
- G 3
- H 20
- J 10

The graph below shows the number of garbage cans that were emptied in five neighborhoods.



Which statement is best supported by the information in the graph?

- A A total of 500 garbage cans were emptied in these 5 neighborhoods.
- B The combined number of garbage cans emptied in Neighborhood M and Neighborhood N is 50 more than the number of garbage cans emptied in Neighborhood P.
- C The difference between the greatest number of garbage cans emptied and the least number of garbage cans emptied is 110.
- D The combined number of garbage cans emptied in Neighborhood P and Neighborhood Q is 375 more than the number of garbage cans emptied in Neighborhood R.

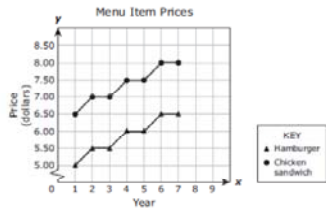
The table below shows the number of customers at a coffee shop each hour for nine hours.

Coffee Shop Customers									
Hour	1	2	3	4	5	6	7	8	9
Number of Customers	15	28	42	58	36	62	28	45	50

Which statement about the data for the number of customers is true?

- F The mode is 35.
- G The mode is 47.
- H The mode is 28.
- J The mode is 42.

The graph below shows how the prices of two different menu items at a restaurant have changed from Year 1 to Year 7.



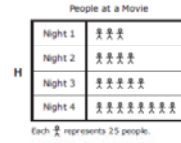
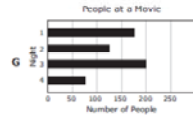
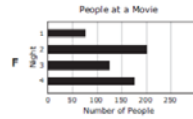
If the prices continue to change in this same way, which statement is true?

- A In Year 8, the price of a hamburger will be \$7.00.
- B In Year 9, the price of a chicken sandwich will be \$9.00.
- C In Year 8, the difference between the price of a chicken sandwich and the price of a hamburger will be \$1.00.
- D In Year 9, the price of a chicken sandwich plus the price of a hamburger will be \$16.50.

The table below shows the number of people who went to a movie each night on four nights.

Night	1	2	3	4
Number of People	75	200	125	175

Which graph represents the data in the table?

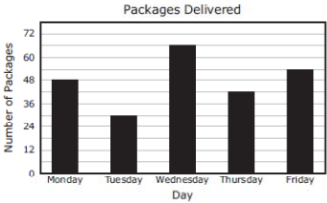


Math  
Vertical Alignment by Grade

Strand: Displaying and Interpreting Data

TEK: the student solves problems by collecting, organizing, displaying, and interpreting sets of data	TEK: the student organizes data to make it useful for interpreting information	TEK: the student displays data in an organized form TEK: the student uses information from organized data	TEK: the student constructs and uses graphs of real objects or pictures to answer questions
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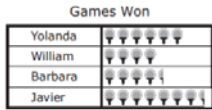
3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
SE <b>3.13A – (R)</b> collect, organize, record, and display data in pictographs and bar graphs where each picture or cell might represent more than one piece of data <b>3.13B – (S)</b> draw conclusions and answer questions based on picture graphs and bar-type graphs	SE <b>2.11A – (S)</b> construct picture graphs and bar-type graphs <b>2.11B – (R)</b> draw conclusions and answer questions based on picture graphs and bar-type graphs	SE <b>1.9A – (S)</b> collect and sort data <b>1.9B – (R)</b> use organized data to construct real object graphs, picture graphs, and bar-type graphs <b>1.10A – (R)</b> draw conclusions and answer questions using information organized in real-object graphs, picture graphs, and bar graphs	SE <b>K.12A – (S)</b> construct graphs using real objects or pictures in order to answer questions <b>K.12B – (R)</b> use information from a graph of real objects or pictures in order to answer questions
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
	Students need lots of exposure to constructing graphs...focus on parts of the graph) Students have a good understanding of interpreting graphs when they enter 2 <sup>nd</sup> grade	Gather data from classmates Sort/organize the data Construct the graph themselves...focus on the parts of the graph Draw conclusions from graphs Good lessons in Region 4 books 'Starburst' graph	Construct real object and picture graphs Use graph to answer questions about data Kindergarten students will begin collecting their own data to construct graphs and answer questions
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
-use both pictographs and bar graphs -use graphs read vertically and horizontally -children need to complete portions of graph -to construct graphs, students must collect data, organize data, record data, and display data -'pictographs' are picture graphs which contain a key such as a picture of an apple may represent 5 apples -the key using one object to represent more than one unit is introduced in 3 <sup>rd</sup> grade -complete portions of graph -interpret graph by combining information on graph -pictographs keys show one object representing 2 items, 3 items, 5 items, etc.	-on a picture graph each picture represents one piece of data. -third grade introduces pictographs where one object/picture may represent more than one piece of data. -a pictograph includes a key to explain the value of each symbol. -when bar graphs are introduced, begin by representing each piece of data with an individual cell/box -on a picture graph each picture represent one piece of data	-use resources such as: attendance charts, transportation charts; including graphs, and bar-type graphs -construct both horizontal and vertical graphs -use post-it notes, unifix cubes, etc. -on a picture graph each picture represents one unit of data -third grade introduces pictographs: where one object may represent more than one unit of data -when bar type graphs are introduced, begin by representing each piece of data with an individual cell/box -example: answer questions such as: how many more frogs than ducks?	-using pictures or real objects students can construct graphs (include horizontal and vertical) -bar-type graphs are introduced in the first grade -teachers ask questions such as 'how many like green apples? How many liked red apples?'
Vocabulary	Vocabulary	Vocabulary	Vocabulary
Collect, organize, , record, data, pictographs, bar graphs,	Construct, create, pictographs, bar graphs,	Graph, picture graph, bar graph, real object	Graph, picture graph, real object graph

<p>title, interval, labels, vertical, horizontal, input, output, key</p>	<p>title, interval, labels, vertical, horizontal, input, output</p>	<p>graph, horizontal, vertical</p>																																																	
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<p>The graph below shows the number of packages Blanca delivered on five days.</p>  <p>Which table best represents the information in the graph?</p> <p><b>F</b></p> <table border="1"> <caption>Packages Delivered</caption> <thead> <tr> <th>Day</th> <th>Monday</th> <th>Tuesday</th> <th>Wednesday</th> <th>Thursday</th> <th>Friday</th> </tr> </thead> <tbody> <tr> <td>Number of Packages</td> <td>48</td> <td>30</td> <td>66</td> <td>54</td> <td>42</td> </tr> </tbody> </table> <p><b>G</b></p> <table border="1"> <caption>Packages Delivered</caption> <thead> <tr> <th>Day</th> <th>Monday</th> <th>Tuesday</th> <th>Wednesday</th> <th>Thursday</th> <th>Friday</th> </tr> </thead> <tbody> <tr> <td>Number of Packages</td> <td>48</td> <td>36</td> <td>72</td> <td>48</td> <td>60</td> </tr> </tbody> </table> <p><b>H</b></p> <table border="1"> <caption>Packages Delivered</caption> <thead> <tr> <th>Day</th> <th>Monday</th> <th>Tuesday</th> <th>Wednesday</th> <th>Thursday</th> <th>Friday</th> </tr> </thead> <tbody> <tr> <td>Number of Packages</td> <td>48</td> <td>30</td> <td>66</td> <td>42</td> <td>54</td> </tr> </tbody> </table> <p><b>J</b></p> <table border="1"> <caption>Packages Delivered</caption> <thead> <tr> <th>Day</th> <th>Monday</th> <th>Tuesday</th> <th>Wednesday</th> <th>Thursday</th> <th>Friday</th> </tr> </thead> <tbody> <tr> <td>Number of Packages</td> <td>48</td> <td>30</td> <td>42</td> <td>66</td> <td>54</td> </tr> </tbody> </table>	Day	Monday	Tuesday	Wednesday	Thursday	Friday	Number of Packages	48	30	66	54	42	Day	Monday	Tuesday	Wednesday	Thursday	Friday	Number of Packages	48	36	72	48	60	Day	Monday	Tuesday	Wednesday	Thursday	Friday	Number of Packages	48	30	66	42	54	Day	Monday	Tuesday	Wednesday	Thursday	Friday	Number of Packages	48	30	42	66	54			
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The table below shows the number of games won by four people during a sporting event.

Games Won	
Name	Number of Games Won
Yolanda	48
William	32
Barbara	36
Javier	60

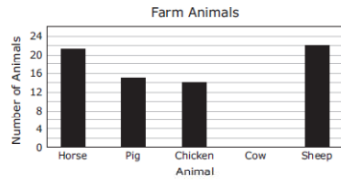
The pictograph below represents the same information.



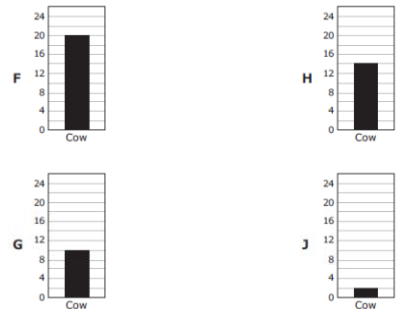
Which key completes the pictograph?

- A Each 🏆 means 8 games won.
- B Each 🏆 means 2 games won.
- C Each 🏆 means 6 games won.
- D Each 🏆 means 4 games won.

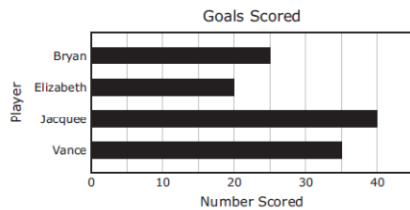
The graph below shows the number of each kind of animal on a farm. The bar for the number of cows on the farm is missing.



There is a total of 82 animals on the farm. Which bar completes the graph?



The graph below shows the number of goals four players scored during a soccer season.



Based on the graph, what is the difference between the number of goals Vance scored and the number of goals Elizabeth scored?

- F 15
- G 3
- H 20
- J 10

Math  
Vertical Alignment by Grade

Strand: Probability

TEK: the student analyzes and evaluates risk and return in the context of real-world problems	TEK:	TEK: the student uses probability models to describe everyday situations involving chance	TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations	TEK:	TEK:	TEK: the student applies concepts of theoretical and experimental probability to make predictions
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I	8 <sup>th</sup> Grade
SE <b>AQR.3A</b> – determine and interpret conditional probabilities and probabilities of compound events by constructing and analyzing representations, including tree diagrams, Venn diagrams, and area models, to make decisions in problem situation <b>AQR.3B</b> – use probabilities to make and justify decisions about risks in everyday life <b>AQR.3C</b> – calculate expected value to analyze mathematical fairness, payoff, and risk	SE	SE <b>MMA.4A</b> – compare theoretical and empirical probability <b>MMA.4B</b> – use experiments to determine the reasonableness of a theoretical model such as binomial, geometric, etc.	SE <b>GEOM.8E – (S)</b> use area models to connect geometry to probability and statistics	SE:	SE:	SE: <b>8.11A – (R)</b> find the probabilities of dependent and independent events <b>8.11B – (S)</b> use theoretical probabilities and experimental results to make predictions and decisions <b>8.11C</b> – select and use different models to simulate an event
Specifics (description of lesson, include any “tricks”)	Specifics	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics	Specifics	Specifics (description of lesson, include any “tricks”)
Rationale (clarification of TEKS/SE)	Rationale	Rationale (clarification of TEKS/SE)	Rationale	Rationale	Rationale	Rationale (clarification of TEKS/SE)
						-use the sample space and a model to illustrate and determine the numerical value of the probability -two events A and B are independent when the outcome of the second event is not influenced by the outcome of the first event -dependent event is one where the outcome of the second event is influenced by the outcome of the first event -differentiate between theoretical and



						<p>A cafeteria manager surveyed a random sample of students at a school to determine which of 2 meal choices they prefer. The results of the survey are shown below.</p> <ul style="list-style-type: none"><li>• Chicken is preferred by 30 students.</li><li>• Pasta is preferred by 18 students.</li></ul> <p>Based on the results of the survey, how many of the 240 students at the school can be expected to prefer chicken?</p> <p>Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.</p>
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Math  
Vertical Alignment by Grade

## Strand: Probability

TEK: the student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations	TEK: the student applies concepts of theoretical and experimental probability to make predictions	TEK: the student recognizes that a physical or mathematical model can be used to describe the experimental and theoretical probability of real-life events	TEK: the student uses experimental and theoretical probability to make predictions
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Geometry	8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade
SE <b>GEOM.8E – (S)</b> use area models to connect geometry to probability and statistics	SE: <b>8.11A – (R)</b> find the probabilities of dependent and independent events <b>8.11B – (S)</b> use theoretical probabilities and experimental results to make predictions and decisions <b>8.11C –</b> select and use different models to simulate an event	SE <b>7.10A – (S)</b> construct sample spaces for simple or composite experiments <b>7.10B – (S)</b> find the probability of independent events	SE <b>6.9A – (S)</b> construct sample spaces using lists and tree diagrams <b>6.9B – (S)</b> find the probabilities of a simple event and its complement and describe the relationship between the two
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
Rationale	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
	-use the sample space and a model to illustrate and determine the numerical value of the probability -two events A and B are independent when the outcome of the second event is not influenced by the outcome of the first event -dependent event is one where the outcome of the second event is influenced by the outcome of the first event -differentiate between theoretical and experimental -experimental: data collected through experimentation -theoretical the ratio of the number of possible outcomes to total outcomes -such as a picture, diagram, spinners, dice, cards, counters in paper bags, calculators, etc.	-list all the possible outcomes -students should know and understand the difference between a simple experiment and a composite experiment -use the sample space and/or models to create visual representations to illustrate and determine the numerical value of the probability -independent events: two events A and B are independent if the occurrence of one does not affect the probability of the other occurring -students should know and understand the definition of independent events	-students need to construct sample space, not use the counting method to determine the possible number of outcomes -the sample space is the set of all possible outcomes for an event or experiment -simple event: chance of getting one red marble from a bag of marbles -complement: the chance of not getting a red marble from the same bag -probability can be written in simplest form
Vocabulary	Vocabulary	Vocabulary	Vocabulary
	Probability, dependent event, independent event, predictions, experimental results, simulate, theoretical results, outcome, sample	Sample space, simple experiment, composite experiment, probability, independent events, outcome	Sample spaces, tree diagrams, probability, simple event, experiment, complement, simplest form



Math  
Vertical Alignment by Grade

Strand: Probability

TEK: the student uses experimental and theoretical probability to make predictions	TEK: the student describes and predicts the results of a probability experiment	TEK: the student solves problems by collecting, organizing, displaying, and interpreting sets of data	TEK: the student solves problems by collecting, organizing, displaying, and interpreting sets of data
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6 <sup>th</sup> Grade	5 <sup>th</sup> Grade	4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade																																												
SE <b>6.9A – (S)</b> construct sample spaces using lists and tree diagrams <b>6.9B – (S)</b> find the probabilities of a simple event and its complement and describe the relationship between the two	SE <b>5.12A – (S)</b> use fractions to describe the results of an experiment <b>5.12B – (R)</b> use experimental results to make predictions <b>5.12C – (S)</b> list all possible outcomes of a probability experiment such as tossing a coin	SE <b>4.13A – (S)</b> use concrete objects or pictures to make generalizations about determining all possible combinations of a given set of data or of objects in a problem situation	SE <b>3.13C – (S)</b> use data to describe events as more likely than, less likely than, or equally likely as																																												
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)																																												
Connect probability vocabulary to graphs...most likely, least likely, favorite, impossible, certain, equally, etc.	Connect probability vocabulary to graphs...most likely, least likely, favorite, impossible, certain, equally, etc.	Connect probability vocabulary to graphs...most likely, least likely, favorite, impossible, certain, equally, etc.	Connect probability vocabulary to graphs...most likely, least likely, favorite, impossible, certain, equally, etc.																																												
Rationale (clarification of TEKS/SE) -students need to construct sample space, not use the counting method to determine the possible number of outcomes -the sample space is the set of all possible outcomes for an event or experiment -simple event: chance of getting one red marble from a bag of marbles -complement: the chance of not getting a red marble from the same bag -probability can be written in simplest form	Rationale (clarification of TEKS/SE) -experiments to derive data -record results in lists, tables, diagrams, and graphs -gather data through experimental activities -students must state and understand the concepts of ‘one out of four’ and $\frac{1}{4}$ -assessment answers may be in fraction form, word form or number form	Rationale (clarification of TEKS/SE) -this concept is introduced in 4 <sup>th</sup> grade -random number generators/number cubes, spinners, calculators or computers are helpful manipulatives	Rationale (clarification of TEKS/SE) -conduct experiments to model each outcome -explain and make generalizations about at least three different outcomes -use lists, tables, and graphs -events that are equally likely are introduced in 3 <sup>rd</sup> grade -second grade teaches more and/or less likely																																												
Vocabulary	Vocabulary	Vocabulary	Vocabulary																																												
Sample spaces, tree diagrams, probability, simple event, experiment, complement, simplest form	Results, experimental, predictions, possible outcomes, probability, data	Probability, combinations, all possible, likely	Data, more likely than, less likely than, equally likely as																																												
STAAR 2012 <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>9A</td> <td>1</td> <td>72%</td> <td>11C</td> </tr> <tr> <td>9B</td> <td>1</td> <td>61%</td> <td>11A</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	9A	1	72%	11C	9B	1	61%	11A	STAAR 2012 <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>12A</td> <td>1</td> <td>79%</td> <td>14A</td> </tr> <tr> <td>12B</td> <td>3</td> <td>56%</td> <td>14A</td> </tr> <tr> <td>12C</td> <td>1</td> <td>54%</td> <td>14C</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	12A	1	79%	14A	12B	3	56%	14A	12C	1	54%	14C	STAAR 2012 <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>13A</td> <td>2</td> <td>75%</td> <td>14A</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	13A	2	75%	14A	STAAR 2012 <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>13C</td> <td>2</td> <td>32%</td> <td>14A</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	13C	2	32%	14A
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STAAR 2013			
SE	# of Questions	Percent	Dual Coded
9A	1	82%	11C
9B	1	15%	11A

STAAR 2013			
SE	# of Questions	Percent	Dual Coded
12A	1	55%	14B
12B	3	59%	14A,16B
12C	1	84%	14C

STAAR 2013			
SE	# of Questions	Percent	Dual Coded
13A	2	60%	14C

STAAR 2013			
SE	# of Questions	Percent	Dual Coded
13C	2	71%	14A

Mona is buying a new car.

- She can choose a car with 2 doors or 4 doors.
- She can choose seat covers made of leather, fabric, or vinyl.
- She can choose a car color of silver, black, or white.

The list below shows some of the possible outcomes of 1 number of doors, 1 type of seat cover, and 1 color.

2 doors, leather, silver	2 doors, leather, black	2 doors, leather, white
2 doors, fabric, silver	2 doors, fabric, black	2 doors, fabric, white
4 doors, leather, silver	4 doors, leather, black	4 doors, leather, white
4 doors, fabric, silver	4 doors, fabric, black	4 doors, fabric, white

Which list shows all the other possible outcomes of 1 number of doors, 1 type of seat cover, and 1 color?

**A**

2 doors, vinyl, silver	2 doors, vinyl, black	2 doors, vinyl, white
------------------------	-----------------------	-----------------------

**B**

4 doors, vinyl, silver	4 doors, vinyl, black	4 doors, vinyl, white
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**C**

2 doors, vinyl, silver	2 doors, vinyl, black	2 doors, vinyl, white
4 doors, vinyl, silver	4 doors, vinyl, black	4 doors, vinyl, white

**D**

2 doors, vinyl, silver	4 doors, vinyl, black	2 doors, vinyl, white
4 doors, vinyl, silver	4 doors, vinyl, black	2 doors, vinyl, white

Mitsu will be randomly assigned to a seat on an airplane. There are a total of 50 seats on the plane. Of these seats, 16 are aisle seats, and the rest are window seats. What decimal represents the probability that Mitsu will be assigned to a window seat?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

Nancy has a bag that contains the following shapes.

- 12 hexagons
- 7 pentagons
- 20 octagons
- 16 parallelograms
- 5 trapezoids

She will randomly select one shape from this bag. What is the probability that the shape Nancy selects will have 5 or more sides?

**A**  $\frac{39}{60}$

**B**  $\frac{1}{7}$

**C**  $\frac{32}{60}$

**D**  $\frac{1}{5}$

Sakina spun the arrow on a spinner 80 times. The table below shows the number of times the arrow landed on each of the six colored sections.

Spinner Colors	
Color	Number of Times
Red	12
Blue	18
Green	30
Yellow	10
Pink	4
Orange	6

Based on the information in the table, which statement about the next spin is **NOT** true?

- F** The arrow is less likely to land on a pink section than on a red section.
- G** The arrow is 3 times as likely to land on a green section as on a yellow section.
- H** The arrow is more likely to land on an orange section than on a blue section.
- J** The arrow is 2 times as likely to land on a red section as on an orange section.

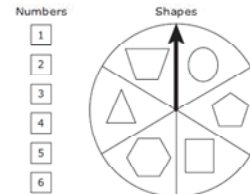
A machine gives out a random sticker each time a person puts in money. The table below shows the number of stickers of each type that were given out in 36 times.

Stickers	
Type	Number Given Out
Robot	12
Superhero	8
Car	6
Airplane	4
Sports	6

Based on the information in the table, which statement about the next sticker to come out of the machine is true?

- A** It is 3 times as likely to be a robot sticker as an airplane sticker.
- B** It is certain to be a sports sticker.
- C** It is 2 times as likely to be a car sticker as an airplane sticker.
- D** It is certain to be a robot sticker.

Each player in a game will roll a number cube and spin the arrow on a spinner one time. The numbers on each face of the number cube and the shapes on the spinner are shown below.



How many different combinations of 1 odd number and 1 shape are possible?

- A** 18
- B** 12
- C** 9
- D** 36

Zia is buying a T-shirt for her brother. Her choices of teams, colors, and sizes are shown below.

Teams	Colors	Sizes
Lions	Green	Small
Panthers	Black	Medium
Owls	Purple	Large
Eagles	Yellow	

How many different combinations of 1 team, 1 color, and 1 size are possible?

- F** 64
- G** 11
- H** 48
- J** 16

A store has different flavors of jelly in jars. The table below shows the number of jars of each flavor of jelly.

Jars of Jelly	
Flavor	Number of Jars
Grape	17
Apple	8
Strawberry	14
Peach	11
Orange	6
Blackberry	8

If 1 jar is chosen at random, which two flavors of jelly have an equal chance of being chosen?

- F** Strawberry and peach
- G** Apple and blackberry
- H** Orange and blackberry
- J** Grape and strawberry

Pam has 18 gold medals, 12 silver medals, and 9 bronze medals in a box. She will choose 1 of these medals at random. Which statement about Pam's choice is true?

- A** It is certain that Pam will choose a gold medal.
- B** Pam is less likely to choose a bronze medal than a silver medal.
- C** Pam is more likely to choose a silver medal than a gold medal.
- D** It is impossible for Pam to choose a bronze medal.

The table below shows the number of votes for different school mascots.

Votes for Mascots				
Mascot	Tiger	Eagle	Bobcat	Duck
Number of Votes	18	24	3	30

Based on the information in the table, what is the most reasonable prediction of the number of votes for eagle out of the next 25 votes?

**F** 72

**G** 8

**H** 1

**J** 21

The places Teresa can choose to go on Friday or Saturday are listed below. She can go to 1 place each day.

- Concert
- Movie
- Park
- Gym

Which list shows all the possible outcomes of 1 place and 1 day?

**A** Concert, Friday  
Movie, Friday  
Park, Saturday  
Gym, Saturday

**C** Concert, Friday  
Gym, Saturday

**B** Concert, Friday  
Concert, Saturday  
Concert, Movie  
Movie, Saturday  
Park, Friday  
Park, Saturday  
Gym, Park  
Gym, Saturday

**D** Concert, Friday  
Concert, Saturday  
Movie, Friday  
Movie, Saturday  
Park, Friday  
Park, Saturday  
Gym, Friday  
Gym, Saturday

Math  
Vertical Alignment by Grade

Strand: Probability

TEK: the student solves problems by collecting, organizing, displaying, and interpreting sets of data	TEK: the student organizes data to make it useful for interpreting information	TEK: the student uses information from organized data	TEK:
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3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten								
SE <b>3.13C – (S)</b> use data to describe events as more likely than, less likely than, or equally likely as	SE <b>2.11C – (S)</b> use data to describe events as more likely or less likely such as drawing a certain color crayon from a bag of seven red crayons and three green crayons	SE <b>1.10B – (S)</b> identify events as certain or impossible such as drawing a red crayon from a bag of green crayons	SE:								
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)								
Connect probability vocabulary to graphs...most likely, least likely, favorite, impossible, certain, equally, etc.	Connect probability vocabulary to graphs...most likely, least likely, favorite, impossible, certain, etc.	Connect probability vocabulary to graphs...most likely, least likely, favorite, impossible, certain, etc.	Connect probability vocabulary to graphs...most likely, least likely, favorite, impossible, certain, etc.								
Rationale (clarification of TEKS/SE) -conduct experiments to model each outcome -explain and make generalizations about at least three different outcomes -use lists, tables, and graphs -events that are equally likely are introduced in 3 <sup>rd</sup> grade -second grade teaches more and/or less likely	Rationale (clarification of TEKS/SE) -use concrete manipulatives and hands on experiences with probability -use manipulatives such as: spinners, items in a bag, and flipping coins -include situations that would be impossible: 4 red squares and 2 blue squares in a bag – impossible to draw a circle. If only red squares, it is certain that you will draw a red square.	Rationale (clarification of TEKS/SE) -use concrete manipulatives and hands on experiences with probability	Rationale (clarification of TEKS/SE)								
Vocabulary	Vocabulary	Vocabulary	Vocabulary								
Data, more likely than, less likely than, equally likely as	Predict, chance, least likely, most likely, more likely, favorite, probability, certain, impossible, data	Least likely, most likely, favorite, impossible, certain, predict, possible									
STAAR 2012 <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>13C</td> <td>2</td> <td>32%</td> <td>14A</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	13C	2	32%	14A	STAAR 2012	STAAR 2012	STAAR 2012
SE	# of Questions	Percent	Dual Coded								
13C	2	32%	14A								
STAAR 2013 <table border="1"> <thead> <tr> <th>SE</th> <th># of Questions</th> <th>Percent</th> <th>Dual Coded</th> </tr> </thead> <tbody> <tr> <td>13C</td> <td>2</td> <td>71%</td> <td>14A</td> </tr> </tbody> </table>	SE	# of Questions	Percent	Dual Coded	13C	2	71%	14A	STAAR 2013	STAAR 2013	STAAR 2013
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Jars of Jelly

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Blackberry	8

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- C** Pam is more likely to choose a silver medal than a gold medal.
- D** It is impossible for Pam to choose a bronze medal.

Math  
Vertical Alignment by Grade

Strand: Prop. & Attributes of Functions / Linear Functions

TEK: the student analyzes and evaluates risk and return in the context of real-world problems	TEK:	TEK: the student uses probability models to describe everyday situations involving chance	TEK:	TEK:	TEK: the student understands how algebra can be used to express generalizations and recognizes and uses the power of symbols to represent situations
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AQR	Pre-Cal	MMA	Geometry	Algebra II	Algebra I								
<p>SE:</p> <p><b>AQR.1C</b> – communicate with mathematics orally and in writing as part of independent and collaborative work, including making accurate and clear presentations</p> <p><b>AQR.2C</b> – use arrays to efficiently manage large collections of data and add, subtract, and multiply matrices to solve applied problems</p> <p><b>AQR.2D</b> – apply algorithms and identify errors in recording and transmitting identification numbers</p> <p><b>AQR.8B</b> – collect numerical bivariate data; use the data to create a scatterplot; and select a function such as linear, exponential, logistic, or trigonometric to model the data</p> <p><b>AQR.10C</b> – determine, represent, and analyze mathematical models for various types of loans and investments</p> <p><b>AQR.11A</b> – solve problems involving scheduling or routing situations that can be represented by methods such as a vertex-edge graph using critical paths, Euler paths, or minimal spanning trees</p> <p><b>AQR.11B</b> – construct, analyze, and interpret flow charts in order to develop and describe problem-solving procedures</p>	SE:	<p>SE:</p> <p><b>MMA.1A</b> – compare and analyze various methods for solving a real-life problem</p> <p><b>MMA.6A</b> – analyze methods of payment available in retail purchasing and compare relative advantages and disadvantages of each option</p> <p><b>MMA.6B</b> – use amortization models to investigate home financing and compare buying and renting a home</p> <p><b>MMA.6C</b> – use amortization models to investigate automobile financing and compare buying and leasing a vehicle</p> <p><b>MMA.7A</b> – analyze types of savings involving simple and compound interest and compare relative advantages of these options</p> <p><b>MMA.7B</b> – analyze and compare coverage options and rates in insurance</p> <p><b>MMA.7C</b> – analyze and compare coverage options including stocks, bonds, annuities, and retirement plans</p>	SE:	SE:	<p>SE:</p> <p><b>ALG.3A</b> – use symbols to represent unknowns and variables</p> <p><b>ALG.5A</b> – determine whether or not given situations can be represented by linear functions</p>								
Specifics (description of lesson, include any “tricks”)	Specifics	Specifics (description of lesson, include any “tricks”)	Specifics	Specifics	Specifics (description of lesson, include any “tricks”)								
Rationale (clarification of TEKS/SE)	Rationale	Rationale (clarification of TEKS/SE)	Rationale	Rationale	Rationale (clarification of TEKS/SE)								
Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary								
STAAR 2012	STAAR 2012	STAAR 2012	STAAR 2012	STAAR 2012	STAAR 2012								
STAAR 2013	STAAR 2013	STAAR 2013	STAAR 2013	STAAR 2013	<table border="1"> <tr> <td>SE</td> <td># of Questions</td> <td>Percent</td> <td>Dual Coded</td> </tr> <tr> <td>3A</td> <td>1</td> <td>66%</td> <td></td> </tr> </table>	SE	# of Questions	Percent	Dual Coded	3A	1	66%	
SE	# of Questions	Percent	Dual Coded										
3A	1	66%											



					<p>A store manager begins each shift with the same total amount of money. She keeps \$200 in a safe and distributes the rest equally to the 5 cashiers in the store. This situation can be represented by the function <math>y = \frac{(x - 200)}{5}</math>. What does the variable <math>x</math> represent in this situation?</p> <p><b>A</b> The total amount of money the manager has at the beginning of a shift <b>B</b> The total amount of money the manager has at the end of a shift <b>C</b> The amount of money each cashier has at the beginning of a shift <b>D</b> The amount of money each cashier has at the end of a shift</p>
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Math  
Vertical Alignment by Grade

Strand: Process Standard – Math Tools to Know

TEK: the student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines and activities in and outside of school.	TEK: the student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines and activities in and outside of school.	TEK: the student applies Grade 6 mathematics to solve problems connected to everyday experiences, investigations in other disciplines and activities in and outside of school.	TEK: the student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.
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8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade	5 <sup>th</sup> Grade
<p>SE:</p> <p><b>8.14A</b> – identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics</p> <p><b>8.14B</b> – use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness</p> <p><b>8.14C</b> – select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem</p> <p><b>8.14D</b> – select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems</p>	<p>SE:</p> <p><b>7.13A</b> – identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics</p> <p><b>7.13B</b> – use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness</p> <p><b>7.13C</b> – select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem</p> <p><b>7.13D</b> – select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems</p>	<p>SE:</p> <p><b>6.11A</b> – identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics</p> <p><b>6.11B</b> – use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness</p> <p><b>6.11C</b> – select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem</p> <p><b>6.11D</b> – select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems</p>	<p>SE:</p> <p><b>5.14A</b> – identify the mathematics in everyday situations</p> <p><b>5.14B</b> – solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness</p> <p><b>5.14C</b> – select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem</p> <p><b>5.14D</b> – use tools such as real objects, manipulatives, and technology to solve problems</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
<p>Validate conclusions using problem solving strategies</p> <p>Use units with ALL numbers</p> <p>Encourage parents to involve their children in real world math</p> <p>Use comparison language (greater than, less than, at least, between)</p>	<p>Validate conclusions using problem solving strategies</p> <p>Use units with ALL numbers</p> <p>Encourage parents to involve their children in real world math</p> <p>Use comparison language (greater than, less than, at least, between)</p>	<p>Connecting reasonableness to solving problems</p> <p>Develop Homework activities based on real-life world situations that can be solved using items found at home</p> <p>Use real-life mathematical situations, applying skills to real-life; such as mileage, budgets, cell phones, shopping, etc.</p> <p>Use comparison language (greater than, less than, at least, between)</p>	<p>Make an Anchor Chart for Problem-Solving Model each Strategy</p> <p>Develop Homework activities based on real-life world situations that can be solved using items found at home</p> <p>Use real-life mathematical situations, applying skills to real-life; such as mileage, budgets, cell phones, shopping, etc.</p> <p>Use comparison language (greater than, less than, at least, between)</p>
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)
		Be prepared for possible testing of vocabulary	
Vocabulary	Vocabulary	Vocabulary	Vocabulary

						Conjecture – making a prediction Reasonable – does it make sense?			Generalizations, Reasonable – does it make sense?		
STAAR 2012			STAAR 2012			STAAR 2012			STAAR 2012		
SE	# of Questions	Percent	SE	# of Questions	Percent	SE	# of Questions	Percent	SE	# of Questions	Percent
14A	8	45%	13A	13	51%	11A	11	56%	14A	14	59%
14B	11	54%	13B	6	40%	11B	6	50%	14B	6	55%
14C	5	53%	13C	2	62%	11C	1	72%	14C	3	46%
14D	6	59%	13D	1	64%	11D	5	50%	14D	9	65%
STAAR 2013			STAAR 2013			STAAR 2013			STAAR 2013		
SE	# of Questions	Percent	SE	# of Questions	Percent	SE	# of Questions	Percent	SE	# of Questions	Percent
14A	9	55%	13A	10	54%	11A	8	49%	14A	8	60%
14B	10	60%	13B	6	49%	11B	6	52%	14B	12	54%
14C	3	70%	13C	2	60%	11C	3	70%	14C	2	66%
14D	3	66%	13D	6	66%	11D	5	54%	14D	8	64%

## Strand: Process Standard – Math Tools to Know

TEK: the student applies Grade 4 mathematics to solve problems connected to everyday experiences and activities in and outside of school.	TEK: the student applies Grade 3 mathematics to solve problems connected to everyday experiences and activities in and outside of school.	TEK: the student applies Grade 2 mathematics to solve problems connected to everyday experiences and activities in and outside of school.	TEK: the student applies Grade 1 mathematics to solve problems connected to everyday experiences and activities in and outside of school.	TEK: the student applies Kindergarten mathematics to solve problems connected to everyday experiences and activities in and outside of school.
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4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten
<p>SE:</p> <p><b>4.14A</b> – identify the mathematics in everyday situations</p> <p><b>4.14B</b> – solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness</p> <p><b>4.14C</b> – select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem</p> <p><b>4.14D</b> – use tools such as real objects, manipulatives, and technology to solve problems</p>	<p>SE:</p> <p><b>3.14A</b> – identify the mathematics in everyday situations</p> <p><b>3.14B</b> – solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness</p> <p><b>3.14C</b> – select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem</p> <p><b>3.14D</b> – use tools such as real objects, manipulatives, and technology to solve problems</p>	<p>SE:</p> <p><b>2.12A</b> – identify the mathematics in everyday situations</p> <p><b>2.12B</b> – solve problems with guidance, that incorporates the process of understanding the problem, making a plan, carrying out a plan, and evaluating the solution for reasonableness</p> <p><b>2.12C</b> – select or develop an appropriate problem-solving plan or strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem</p> <p><b>2.12D</b> –use tools such as real objects, manipulatives, and technology to solve problems</p>	<p>SE:</p> <p><b>1.11A</b> – identify the mathematics in everyday situations</p> <p><b>1.11B</b> – solve problems with guidance, that incorporates the process of understanding the problem, making a plan, carrying out a plan, and evaluating the solution for reasonableness</p> <p><b>1.11C</b> – select or develop an appropriate problem-solving plan or strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem</p> <p><b>1.11D</b> –use tools such as real objects, manipulatives, and technology to solve problems</p>	<p>SE:</p> <p><b>K.13A</b> – identify the mathematics in everyday situations</p> <p><b>K.13B</b> – solve problems with guidance, that incorporates the process of understanding the problem, making a plan, carrying out a plan, and evaluating the solution for reasonableness</p> <p><b>K.13C</b> – select or develop an appropriate problem-solving strategy including drawing a picture, looking for a pattern, systematic guessing and checking, or acting it out in order to solve a problem</p> <p><b>K.13D</b> –use tools such as real objects, manipulatives, and technology to solve problems</p>
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)
<p>Develop Homework activities based on real-life world situations that can be solved using items found at home</p> <p>Use real-life mathematical situations, applying skills to real-life; such as mileage, budgets, cell phones, shopping, etc.</p> <p>No ‘naked’ numbers...must have units; such as 13 apples</p> <p>Use comparison language (greater than, less than, at least, between)</p>	<p>Develop Homework activities based on real-life world situations that can be solved using items found at home</p> <p>Use real-life mathematical situations, applying skills to real-life; such as mileage, budgets, cell phones, shopping, etc.</p> <p>No ‘naked’ numbers...must have units; such as 13 apples</p> <p>Use comparison language (greater than, less than, at least, between)</p>	<p>Develop Homework activities based on real-life world situations that can be solved using items found at home</p> <p>Use real-life mathematical situations, applying skills to real-life; such as mileage, budgets, cell phones, shopping, etc.</p> <p>Validate/Justify answers – does it make sense?</p> <p>No ‘naked’ numbers...must have units; such as 13 apples</p> <p>Identify and apply math to everyday in and out of school</p> <p>Expose students to simple division concepts; such as – Each butterfly has 2 wings. I see 16 wings. How many</p>	<p>Develop Homework activities based on real-life world situations that can be solved using items found at home</p> <p>Use real-life mathematical situations, applying skills to real-life; such as mileage, budgets, cell phones, shopping, etc.</p> <p>No ‘naked’ numbers...must have units; such as 13 apples</p> <p>Add the ‘what it is NOT’ to ANCHOR CHARTS</p> <p>Allow students to work more independently</p> <p>Expose students to simple division concepts; such as – Each butterfly has 2 wings. I see 12 wings. How many</p>	<p>Develop Homework activities based on real-life world situations that can be solved using items found at home</p> <p>Use real-life mathematical situations, applying skills to real-life; such as mileage, budgets, cell phones, shopping, etc.</p> <p>No ‘naked’ numbers...must have units; such as 13 apples</p> <p>Allow students to work more independently</p> <p>Expose students to simple division concepts; such as – Each butterfly has 2 wings. I see 8 wings. How many butterflies are there?</p> <p>Make connections with ELA to</p>

		butterflies are there?	butterflies are there?	determine what's the 'main idea' of the problem																																				
Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)	Rationale (clarification of TEKS/SE)																																				
Vocabulary	Vocabulary	Vocabulary	Vocabulary	Vocabulary																																				
Reasonable – does it make sense?	Reasonable – does it make sense?	Reasonable – does it make sense?	Reasonable – does it make sense?	Reasonable – does it make sense?																																				
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Math  
Vertical Alignment by Grade

Strand: Process Standard – Math Ways to Show

TEK: The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models TEK: The student uses logical reasoning to make conjectures and verify conclusions	TEK: the student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models TEK: The student uses logical reasoning to make conjectures and verify conclusions	TEK: The student communicates about Grade 6 mathematics through informal and mathematical language, representations, and models TEK: The student uses logical reasoning to make conjectures and verify conclusions	TEK: the student communicates about Grade 5 mathematics using informal language TEK: The student uses logical reasoning
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8 <sup>th</sup> Grade	7 <sup>th</sup> Grade	6 <sup>th</sup> Grade	5 <sup>th</sup> Grade																																																
SE <b>8.15A</b> – communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models <b>8.15B</b> – evaluate the effectiveness of different representations to communicate ideas <b>8.16A</b> – make conjectures from patterns or sets of examples and nonexamples <b>8.16B</b> – validate his/her conclusions using mathematical properties and relationships	SE <b>7.14A</b> – communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models <b>7.14B</b> – evaluate the effectiveness of different representations to communicate ideas <b>7.15A</b> – make conjectures from patterns or sets of examples and nonexamples <b>7.15B</b> – validate his/her conclusions using mathematical properties and relationships	SE <b>6.12A</b> – communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models <b>6.12B</b> – evaluate the effectiveness of different representations to communicate ideas <b>6.13A</b> – make conjectures from patterns or sets of examples and nonexamples <b>6.13B</b> – validate his/her conclusions using mathematical properties and relationships	SE <b>5.15A</b> – explain and record observations using objects, words, pictures, numbers and technology <b>5.15B</b> – relate informal language to mathematical language and symbols <b>5.16A</b> – make generalizations from patterns or sets of examples and nonexamples <b>5.16B</b> – justify why an answer is reasonable and explain the solution process																																																
Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)	Specifics (description of lesson, include any “tricks”)																																																
Provide permission for students to use their own strategies to solve problems	Provide permission for students to use their own strategies to solve problems	Connecting reasonableness to solving problems Develop Homework activities based on real-life world situations that can be solved using items found at home Use sets of Examples and Non-examples – “What is NOT this?”	Make an Anchor Chart for Problem-Solving Model each Strategy Develop Homework activities based on real-life world situations that can be solved using items found at home Use sets of Examples and Non-examples – “What is NOT this?”																																																
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STAAR 2013			STAAR 2013			STAAR 2013			16B	1	44%
SE	# of Questions	Percent	SE	# of Questions	Percent	SE	# of Questions	Percent	SE	# of Questions	Percent
15A	14	53%	14A	10	45%	12A	14	58%	15A	1	92%
16A	1	55%	15A	1	36%	13A	2	48%	15B	2	64%
16B	2	52%	15B	7	56%	13B	8	55%	16A	5	55%
									16B	2	72%

## Vertical Alignment by Grade

Strand: Process Standard – Math Ways to Show

TEK: the student communicates about Grade 4 mathematics using informal language TEK: The student uses logical reasoning	TEK: the student communicates about Grade3 mathematics using informal language TEK: The student uses logical reasoning	TEK: the student communicates about Grade 2 mathematics using informal language TEK: The student uses logical reasoning. The student is expected to justify his or her thinking using objects, words, pictures, numbers and technology.	TEK: the student communicates about Grade 1 mathematics using informal language TEK: The student uses logical reasoning. The student is expected to justify his or her thinking using objects, words, pictures, numbers and technology.	TEK: the student communicates about Kindergarten mathematics using informal language TEK: The student uses logical reasoning. The student is expected to justify his or her thinking using objects, words, pictures, numbers and technology.
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4 <sup>th</sup> Grade	3 <sup>rd</sup> Grade	2 <sup>nd</sup> Grade	1 <sup>st</sup> Grade	Kindergarten																								
SE <b>4.15A</b> – explain and record observations using objects, words, pictures, numbers and technology <b>4.15B</b> – relate informal language to mathematical language and symbols <b>4.16A</b> – make generalizations from patterns or sets of examples and nonexamples <b>4.16B</b> – justify why an answer is reasonable and explain the solution process	SE <b>3.15A</b> – explain and record observations using objects, words, pictures, numbers and technology <b>3.15B</b> – relate informal language to mathematical language and symbols <b>3.16A</b> – make generalizations from patterns or sets of examples and nonexamples <b>3.16B</b> – justify why an answer is reasonable and explain the solution process	SE <b>2.13A</b> – explain and record observations using objects, words, pictures, numbers and technology <b>2.13B</b> – relate everyday language to mathematical language and symbols <b>2.14</b> – justify his or her thinking using objects, words, pictures, numbers, and technology	SE <b>1.12A</b> – explain and record observations using objects, words, pictures, numbers and technology <b>1.12B</b> – relate everyday language to mathematical language and symbols <b>1.13</b> – justify his or her thinking using objects, words, pictures, numbers, and technology	SE <b>K.14A</b> – communicate mathematical ideas using objects, words, pictures, numbers, and technology <b>K.14B</b> – relate everyday language to mathematical language and symbols <b>K.15</b> – justify his or her thinking using objects, words, pictures, numbers, and technology																								
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STAAR 2013			STAAR 2013			STAAR 2013	STAAR 2013	STAAR 2013
SE	# of Questions	Percent	SE	# of Questions	Percent			
15A	2	55%	15B	2	69%			
15B	1	77%	16A	2	73%			
16A	2	77%	16B	2	69%			
16B	5	67%						