Name _____   Period _____   Date _____

Expressions & Equations:Exponents

1	**Example Stem:** Select **all** expressions equivalent to $(4^5 \cdot 4^{-3})^{-2}$. A. $\frac{1}{256}$ B. 256 C. $4^{-10} \cdot 4^6$ D. $4^3 \cdot 4^{-5}$	A and C
2	**Example Stem:** Enter the value of n that makes the equation $4^5 \cdot 4^n = 4^{15}$ true.	10
3	**Example Stem 1:** Select **all** possible values for x that solve the equation $x^2 = 200$. A. $10\sqrt{20}$ B. $100\sqrt{2}$ C. $10\sqrt{2}$ D. $\sqrt{200}$	C and D

Name _____ Period _____ Date _____

4	**Example Stem 2:** Select **all** possible values for x in the equation $x^2 = 200$.
	
	    A. $10\sqrt{2}$
	    B. $10\sqrt{20}$
	    C. $20\sqrt{10}$
	    D. $-10\sqrt{2}$
	    E. $-10\sqrt{20}$
	    F. $-20\sqrt{10}$
		A and D

5	**Example Stem:** Select **all** possible values for x in the equation, $x^3 = 250$.
	
	    A. $5\sqrt[3]{2}$
	    B. $\sqrt[3]{250}$
	    C. $5\sqrt[3]{10}$
	    D. $25\sqrt[3]{10}$
		A and B

6	**Example Stem:** How many times larger than 2×10^3 is 6×10^6?
	
	    A. 3×10^2
	    B. 3×10^3
	    C. 6×10^6
	    D. 12×10^9
		B

7	**Example Stem 1:** Approximately 7.5×10^5 gallons of water flow over a waterfall each second. There are 8.6×10^4 seconds in 1 day.
	
	 Enter the approximate number of gallons of water that flow over the waterfall in 1 day.
	
	    A. 6.45×10^{21}
	    B. 6.45×10^{20}
	    C. 6.45×10^{10}
	    D. 6.45×10^9
		C

EE: Exponents A

Name _____ Period _____ Date _____

8 CLAIM 2	**Example Stem 2:** Which value is closest to $(6 \times 10^6) + (2 \times 10^4)$? A. 8.0×10^{10} B. 8.0×10^6 C. 6.0×10^{10} D. 6.0×10^6	D
9 CLAIM 3	**Example Item 3D.2b (Grade 8)** Primary Target 3D (Content Domain EE), Secondary Target 1B (CCSS 8.EE.A), Tertiary Target 3C Maggie claims that when you raise a whole number to a power, the result is always a greater number. That is, $s^n > s$. For example: $4^3 > 4$ $5^4 > 5$ $10^9 > 10$ Maggie's claim is **not** true for all values of n and s. For what values of n and s is Maggie's claim true? Complete the inequalities. $s > [\ \ ]$ $n > [\ \ ]$	$(\frac{a}{b} > 1$ and $\frac{c}{d} < 1)$

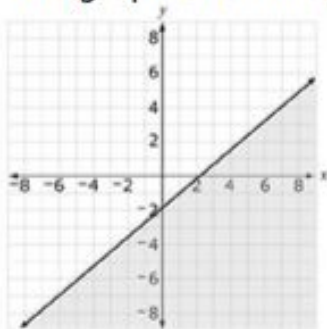Name _____ Period _____ Date _____

Functions: Analyzing A

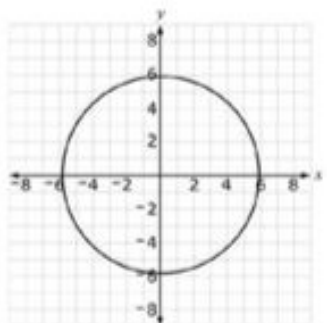**1**

Example Stem: Which relation defines y as a function of x?

A. The proportional relationship $y = 2.4x$.

B. The table showing the age in years, x, and weight in pounds, y, of five dogs.

x	y
3	30
4	38
4	21
5	9
6	42

C. The graph of an inequality as shown by the shaded region.

D. The graph of $x^2 + y^2 = 36$ as shown.

A

F: Analyzing A

Name _____   Period _____   Date _____

2	Select all that apply **Example Stem:** Which equation defines p as a function of t? A. $p = 3t + 2$ B. $t = 3p + 2$ C. $p = 0t + 2$ D. $t = 0p + 2$	A, B and C
3	**Example Stem 1:** Select **all** ordered pairs that correspond to input-output pairs for the function $y = -6x + 7$. A. $(1, 1)$ B. $(-1, 1)$ C. $(-6, 7)$ D. $(3, -11)$	A and D
4	**Example Stem 2:** A swimming pool had 30 gallons of water in it. Then water was added to the pool at a rate of 5 gallons per second. The function $y = 5t + 30$ describes the relationship between the number of gallons, y, and the number of seconds water was added, t. Select **all** of the ordered pairs that correspond to input-output pairs for the function. A. $(45, 3)$ B. $(3, 45)$ C. $(0, 30)$ D. $(30, 0)$	B and C

Name _____ Period _____ Date _____

---

5 | **D**

Example Stem 1:
Consider the function represented by this table of values.

x	y
-4	-10
-3	-7
-2	-4
-1	-1
0	2

Which function could have produced the values in the table?

A. $y = -x - 14$
B. $y = -3x + 2$
C. $y = 3x - 22$
D. $y = 3x + 2$

---

6 | **B**

Example Stem 2: A swimming pool has 30 gallons of water in it. Water is added to the pool at a rate of 5 gallons per second.

Which equation models the relationship between W, the number of gallons of water, and t, the number of seconds water is being added to the swimming pool?

A. $W = 30t + 5$
B. $W = 5t + 30$
C. $W = t + 35$
D. $W = 35t$

Name _____ Period _____ Date _____

7

Example Stem: Each relation shown defines y as a function of x. Which function has the greatest rate of change?

A. $y = \frac{7}{3}x + 4$

B. $y = 3x - 1$

C.

x	y
0	4
2	12
4	20
6	28

D.

C
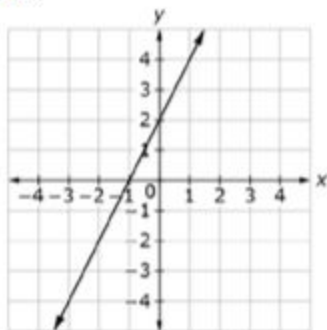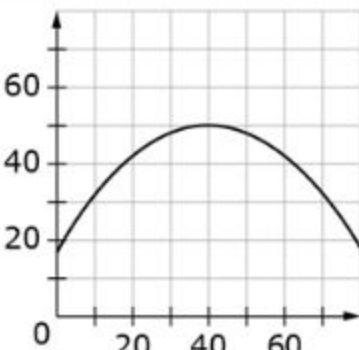
F: Analyzing A

Name _____ Period _____ Date _____

8

Example Stem: Several functions are represented in the table.

Determine whether each function could be linear.

Function	Could be linear	Cannot be linear
$y = \dfrac{3}{4}x + 2$		

x	y
−2	5
−1	9
0	13
1	17
2	21

L
N
L

9

CLAIM 2

Grades 6-8, Claim 2
Example Item 2B.1c (Grade 8):
Primary Target 2B (Content Domain F), Secondary Target 1E (CCSS 8.F.A)

Balance Assessment Consorti

This table shows some values of a linear function.

x	y
−1	−5
1	−1
3	3

Use the Add Arrow tool to draw the graph of a **different** function that has the **same** rate of change as the one shown in the table of values.
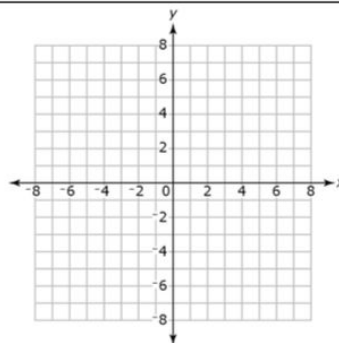
Test Writers Guidelines Zip File
Functions E

F: Analyzing A

Name _____   Period _____   Date _____

F: Analyzing A
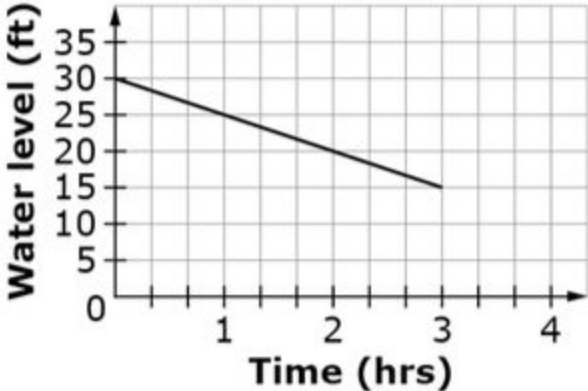
Name _____ Period _____ Date _____

Functions: Modeling A

1	**Example Stem 1:** This table of values represents a linear function.	$y=-½x-5$
		or
		$y=-0.5-5$

x	y
2	−6
3	−6.5
8	−9

Enter an equation in the form $y = mx + b$ that represents the function.

2	**Example Stem 2:** This graph represents a linear function.	$y=-4x+2$

Enter an equation in the form $y = mx + b$ that represents the function.

3	**Example Stem 3:** A swimming pool with 1600 gallons of water is emptied at a constant rate of 300 gallons every 2 hours. Enter an equation in the form $y = mx + b$ that represents the amount of water y, in gallons, remaining in the pool after x hours.	$y=-150x+1600$

F: Modeling A

Name _____ Period _____ Date _____

4	**Example Stem 1:** In this table, y is a linear function of x.	-5

x	y
0	50
2	40
4	30
6	20

Enter the rate of change of this function.

5	**Example Stem 2:** This table shows water level in a tank as a linear function of time.	-5

Time (hr)	Water Level (ft)
0	50
2	40
4	30
6	20

Enter the rate of change of the water level, in feet per hour.

6	**Example Stem 3:** This graph shows water level in a tank as a linear function of time.	30

Water Tank level

Enter the initial water level, in feet, of the water tank.

F: Modeling A

Name _____ Period _____ Date _____

| 7	**Example Stem:** A swimming pool containing 1600 gallons of water is emptied at a constant rate of 300 gallons every 2 hours. Determine whether each statement about the amount of water in the pool is true. Select True or False for each statement.	T T F

Statement	True	False
The initial amount of water in the pool is 1600 gallons.		
The amount of water in the pool decreases by 150 gallons every 1 hour.		
The amount of water in the pool at 3 hours is 450 gallons.		

8	**Example Stem:** This graph shows the water temperature as a function of time.	T F F

Water Temperatures
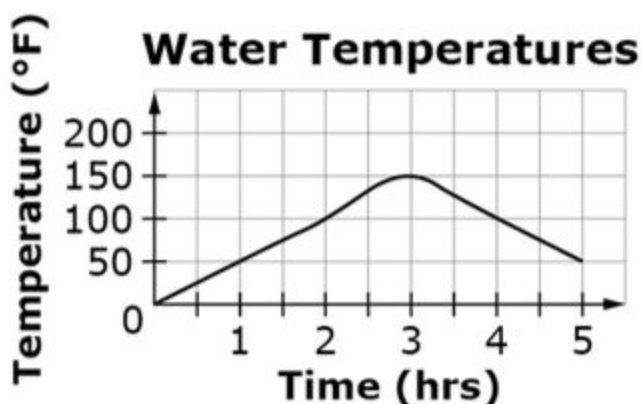
Based on the graph, determine whether each statement is true. Select True or False for each statement.

Statement	True	False
The water temperature is increasing between hour 1 and hour 2.		
The water temperature is increasing between hour 3 and hour 4.		
The water temperature is constant between hour 0 and hour 1.		

F: Modeling A

Name _____ Period _____ Date _____
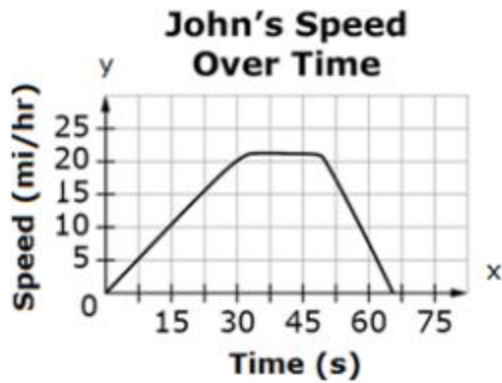
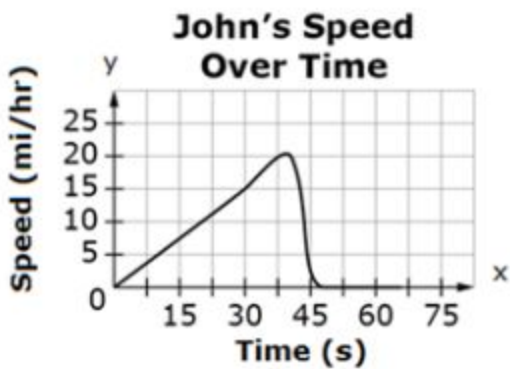| 9	**Example Stem:** John is riding his bike.	A

- He increases his speed for 30 seconds.
- He stays approximately the same speed for the next 20 seconds.
- He slows down to a stop during the last 15 seconds.

Select the graph that best represents John's speed over time.

A.

John's Speed Over Time

B.

John's Speed Over Time

F: Modeling A

Name _____   Period _____   Date _____

C.

John's Speed Over Time

D.

John's Speed Over Time

| 10 | **Example Stem:** John is riding his bike. | Graph |

- He increases his speed for 30 seconds.
- He stays at the same speed for the next 20 seconds.
- He slows down to a stop during the last 15 seconds.

Use the Connect Line tool to draw a graph that represents John's speed over time.

F: Modeling A

Name _____ Period _____ Date _____

11
CLAIM 2
	Example Item 2A.3d (Grade 8):
	Primary Target 2A (Content Domain F), Secondary Target 1E (CCSS 8.F.A), Tertiary Target 2D
	
	Helga wants to have a lot of helium-filled balloons at her party.
	  • The helium tank costs \$58 to rent.
	  • Balloons cost \$0.29 each.
	  • She wants to have 5 helium-filled balloons for each party guest.
	
	Enter an equation that represents the total cost, *C*, in dollars of the helium-filled balloons for *n* party guests.
		C=58+1.45n

12 CLAIM 4	**Example Item 4D.1a (Grade 8)** Primary Target 4D (Content Domain F), Secondary Target 1F (CCSS 8.F.B), Tertiary Target 4C This graph shows the average number of words a child can say from birth to 36 months. **Number of Words a Child Can Say** Number of Words (vertical axis): 200, 400, 600, 800, 1000, 1200 Age in Months (horizontal axis): 6, 12, 18, 24, 30, 36 Which statement is the **most accurate** description of the growth in the number of words a child speaks based on the graph shown? A. Children learn to say new words at a steady rate starting about 12 months of age. B. Children are constantly learning to say new words from the moment they are born. C. Children learn to say new words more slowly during their second year than during their third year. D. Children begin learning to say words around 24 months and stop learning to say new words at 36 months.	C
13 CLAIM 4	**Example Item 4E.1b (Grade 8)** Primary Target 4E (Content Domain F), Secondary Target 1F (CCSS 8.F.B), Tertiary Target 4F, Quaternary Target 4D Cory is buying copper for a construction project. He pays \$1.85 per pound of copper for the first 100 pounds. He pays \$1.75 per pound of copper for every pound over 100 pounds. Cory calculated that it would cost \$228.75 to purchase 125 pounds of copper. He wrote an equation that allows him to determine the cost of copper for any number of pounds of copper over 100 pounds. His equation is in the form $y = n(x - 100) + p$ where *y* is the amount of money, in dollars, Cory pays for *x* total pounds of copper when *x* is greater than 100. What are his values for n and p? Enter the value of n in the first response box. Enter the value of p in the second response box.	n = 1.75 p = 185

F: Modeling A

Name _____ Period _____ Date _____

14

CLAIM 4

Example Item 4E.2a (Grade 8)
Primary Target 4E (Content Domain F), Secondary Target 1F (CCSS 8.F.B), Tertiary Target 4F, Quaternary Target 4D
(Source: Adapted from Illustrative Mathematics 8-F Modeling with a Linear Function)

Select **all** situations that can be modeled by the linear equation $y = 2x + 5$.

A. There are initially 5 rabbits on a farm. Each month thereafter the number of rabbits is 2 times the number in the mo before. How many rabbits are there after x months?

B. Joe earns $2 for each magazine sale. He also earns $5 for each hour he spends trying to sell magazines. How much money will he earn after selling magazines for x hours?

C. Sandy charges $2 an hour for babysitting. Parents are charged $5 if they arrive home later than scheduled. Assumin the parents arrived home late, how much money does she earn for x hours?

D. The Reader's Club is a members-only audio book rental store. There is a $2 sign-up fee and a $5 per audio book rer fee. How much would Laney owe on her first visit if she becomes a member and rents x audio books?

E. Andre is saving money for a new CD player. He began saving with a $5 gift and will continue to save $2 each week. How much money will he have saved at the end of x weeks?

C and E

15

CLAIM 4

Example Item 4E.2b (Grade 8)
Primary Target 4E (Content Domain F), Secondary Target 1F (CCSS 8.F.B), Tertiary Target 4D

The table shows the relationship between the average number of hours students studied for a mathematics test and their average grade.

Hours Studied	Average Grade
0	62
1	78
2	85
5	74

Which type of function is most likely to model these data?

A. linear function with positive rate of change
B. linear function with negative rate of change
C. non-linear function that decreases then increases
D. non-linear function that increases then decreases

D

16

CLAIM 4

Example Item 4F.1c (Grade 8)
Primary Target 4F (Content Domain F), Secondary Target 1F (CCSS 8.F.B), Tertiary Target 4D

The relationship between Jack's distance from home and the time since he left home is linear, as shown in the table.

Time (hrs)	Distance (mi)
0	7.5
2	17.5
4	27.5

Based on the values in the table, determine whether each statement is true. Select True or False for each statement.

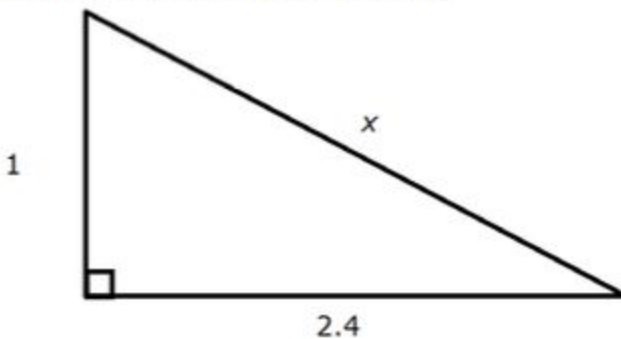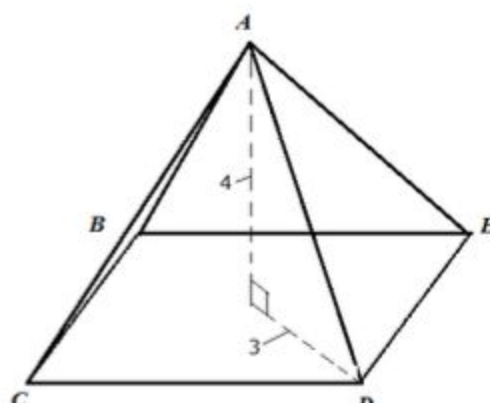| Statement	True	False
Jack's initial distance from home is 7.5 miles.		
Jack's distance increases by 5 miles every 1 hour.		
Jack's distance from home at 3 hours is 23.5 miles.		

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T
F

F: Modeling A

Name _____ Period _____ Date _____

F: Modeling A
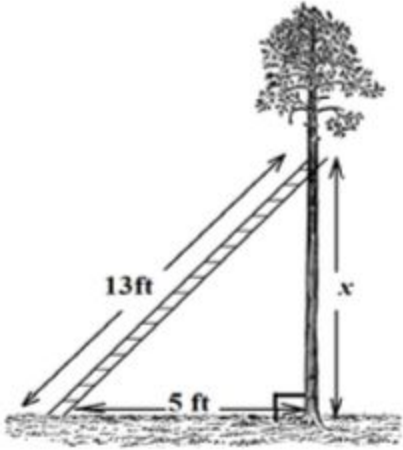
Name _____   Period _____   Date _____

GEOMETRY:PYTHAGOREAN THEOREM A

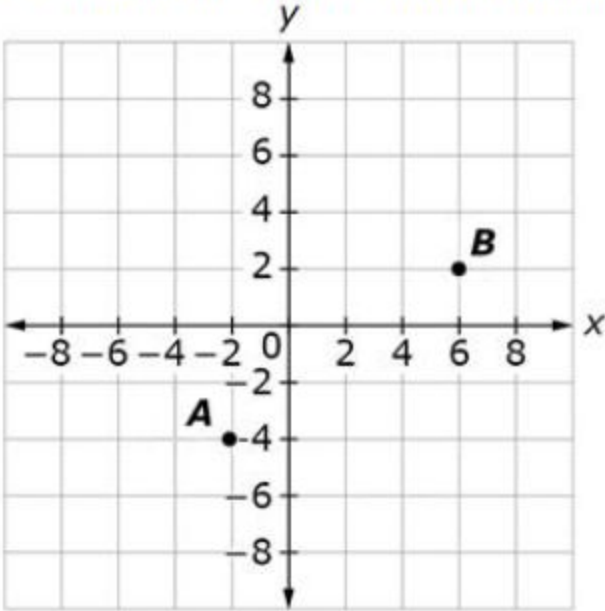| 1	**Example Stem 1:** A right triangle is shown.	2.6
	Enter the value of x.	
2	**Example Stem 2:** A right square pyramid is shown. The height of the pyramid is 4 units. The distance from the center of the base of the pyramid to vertex D is 3 units, as shown. Enter the length of segment *AD*, in units.	5

G: Pythagorean Theorem A

Name _____ Period _____ Date _____

3	**Example Stem 3:** A 13-foot ladder is leaning on a tree. The bottom of the ladder is on the ground at a distance of 5 feet from the base of the tree. The base of the tree and the ground form a right angle as shown. 13ft x 5 ft Enter the distance between the ground and the top of the ladder, x, in feet.	12
4	**Example Stem:** The table shows the side lengths for some triangles. Determine whether the side lengths define a right triangle. Select Yes if it is a right triangle. Select No if it cannot be a right triangle. <table><tr><th>Triangle Side Lengths</th><th>Yes</th><th>No</th></tr><tr><td>4 cm, 5 cm, 8 cm</td><td></td><td></td></tr><tr><td>8 ft, 10 ft, 16 ft</td><td></td><td></td></tr><tr><td>21 in, 28 in, 35 in</td><td></td><td></td></tr></table>	N N Y

G: Pythagorean Theorem A

Name _____   Period _____   Date _____

5	**Example Stem 1:** A coordinate plane is shown with labeled points.	C

What is the distance between point *A* and point *B* on the coordinate plane?

A. 5
B. 6
C. 10
D. 14

6	**Example Stem 2:** What is the distance between points (5, 2) and (−3, −4) on the coordinate plane?	C

A. 5
B. 6
C. 10
D. 14

G: Pythagorean Theorem A

Name _____   Period _____   Date _____

7	**Example Stem:** The points show different locations in Joe's town. Each unit represents 1 mile. **Places in Joe's Town** What is the distance, in miles, between Joe's Home and the Park? Round your answer to the nearest tenth.	3.6
8 CLAIM 3	**Example Item 3F.1c (Grade 8)** Primary Target 3F (Content Domain G), Secondary Target 1H (CCSS 8.G.B), Tertiary Target 3B The Pythagorean Theorem states that if a right triangle has legs of length a and b and hypotenuse of length c, then $a^2 + b^2 = c^2$. Figures 1 and 2 represent the key ideas in a proof of the Pythagorean Theorem. **Figure 1** **Figure 2** Create an outline a proof for the Pythagorean Theorem based on Figures 1 and 2, by dragging the seven statements shown into a logical sequence. A right triangle has legs of length a and b and hypotenuse of length c. 1. 2. 3. 4. 5. 6. 7. Thus, $a^2 + b^2 = c^2$ Subdivide the large square in Figure 1 into a square with side-length a, a square with side-length b, and two rectangles with side-lengths a and b. Subdivide the large square in Figure 2 into four right triangles with legs a and b and a square with side-length c. The total area of the large square in Figure 1 is $a^2 + b^2 + ab + ab$. The total area of the large square in Figure 2 is $c^2 + 4(\frac{1}{2}ab)$. Start with two large squares with sides of length $a + b$. $a^2 + b^2 + ab + ab = c^2 + 4(\frac{1}{2}ab)$ The two large squares have the same area because they are congruent.	Proof
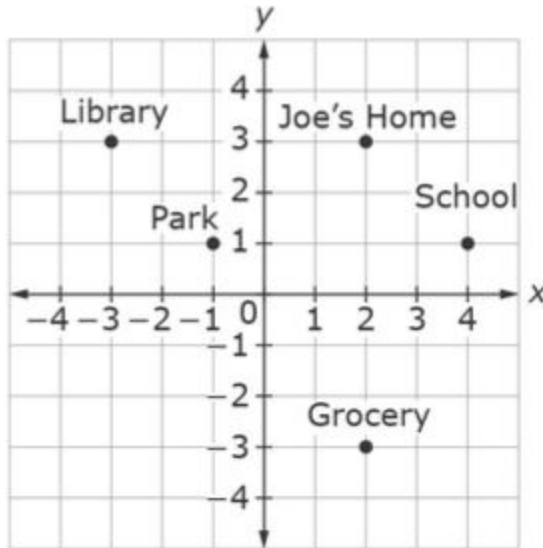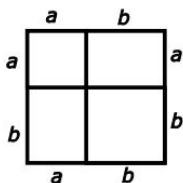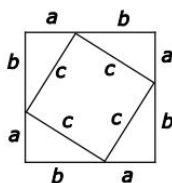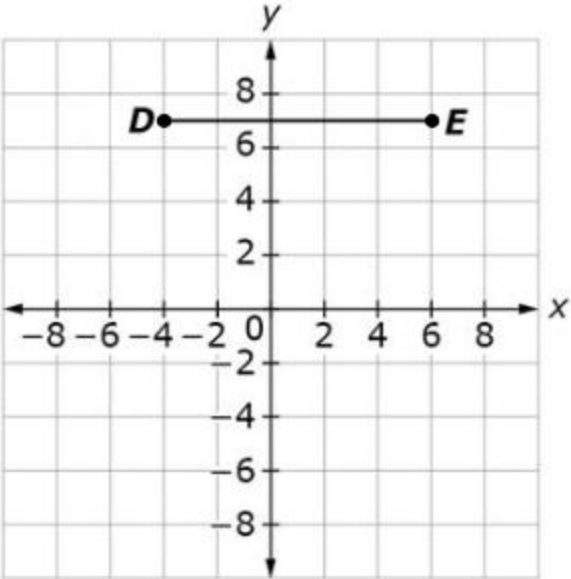
G: Pythagorean Theorem A

Name _____   Period _____   Date _____

9 CLAIM 2	**Example Item 2A.4a (Grade 8):** Primary Target 2A (Content Domain G), Secondary Target 1H (CCSS 8.G.B), Tertiary Target 2D Two sides of a right triangle have lengths $\sqrt{10}$ centimeters and $\sqrt{6}$ centimeters. There are two possible lengths for the third side. Enter the **longest** possible side length, in centimeters, for the third side of this triangle.	4

G: Pythagorean Theorem A

Name _____ Period _____ Date _____

Geometry: transformations A

1	**Example Stem 1:** Line segment *DE* is translated left 3 units and down 2 units to form line segment *D'E'*.	10
	Enter the distance, in units, between point *D'* and point *E'*.	
2	**Example Stem 2:** Line segment *FG* begins at (−2, 4) and ends at (−2, −3). The segment is translated left 3 units and up 2 units to form line segment *F'G'*. Enter the length, in units, of line segment *F'G'*.	7

G: Transformations A

Name _____ Period _____ Date _____

3

Example Stem: Triangle *ABC* is reflected across the *x*-axis and then translated right 12 units to form triangle *A'B'C'*.

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F
T
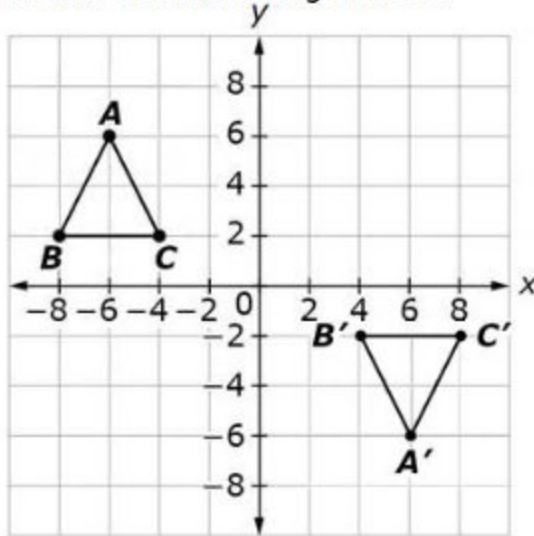
Select True or False for each statement.

Statement	True	False
Angle *B* has the same measure as angle *B'*.		
Side *AC* is longer than side *A'C'*.		
Side *BC* is the same length as side *B'C'*.		

G: Transformations A

Name _____ Period _____ Date _____

4 | **Example Stem:** Triangle *ABC* was created by joining points *A*(3, 2), *B*(4, 5), and *C*(7, 3) with line segments.

Triangle *ABC* is reflected over the *x*-axis and then reflected over the *y*-axis to form a triangle with side lengths *x*, *y*, and *z*.
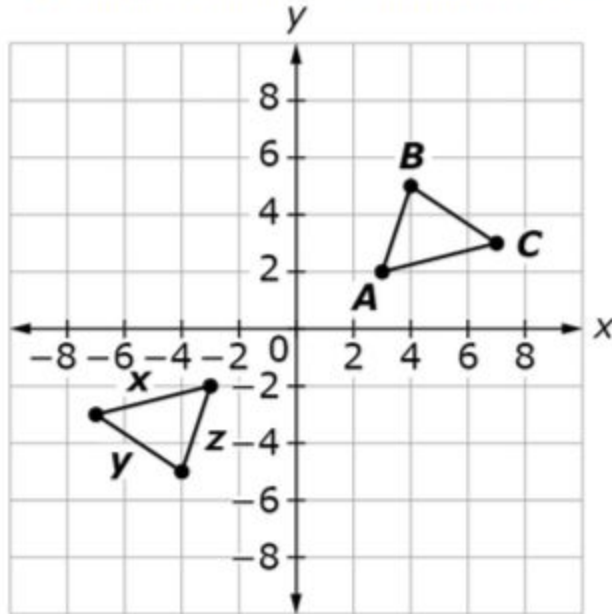
Click in the table to show which side lengths are equal.

	x	y	z
AB			
AC			
BC			

AB = z
AC = x
BC = y

Name _____ Period _____ Date _____

5

Example Stem: Consider this figure.
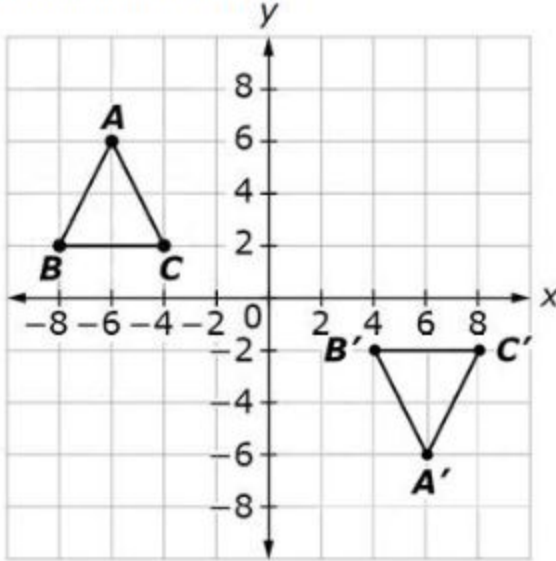
Consider the statements in the table shown. Select True or False for each statement about the sequences of transformations that can verify that triangle ABC is congruent to triangle A′B′C′.

Statement	True	False
Triangle ABC is translated 12 units to the right, followed by a reflection across the x–axis.		
Triangle ABC is a reflected across the y–axis, followed by a translation 12 units down.		
Triangle ABC is reflected across the x–axis, followed by a translation 12 units to the right.		

T
F
T

G: Transformations A

Name _____   Period _____   Date _____

| 6 | **Example Stem:** The figure on the coordinate plane is reflected across the *y*-axis. | Graph |
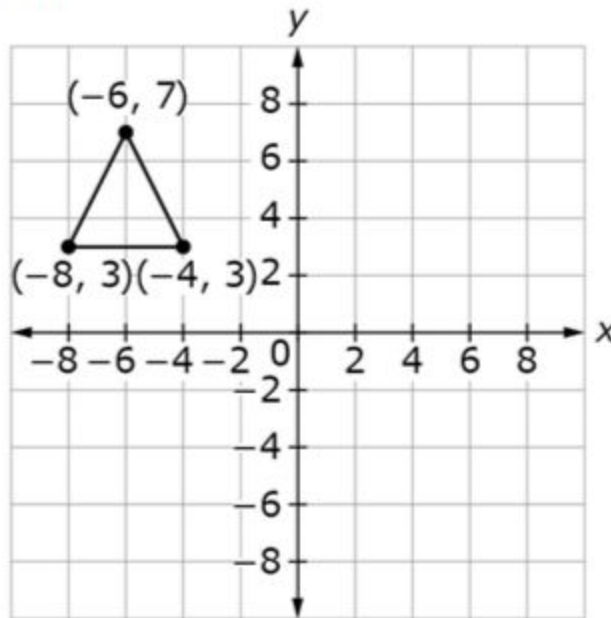
Use the Connect Line tool to draw the resulting image of the figure.

G: Transformations A

Name _____ Period _____ Date _____

7

Example Stem: Triangle *ABC* is reflected across the *x*-axis, and dilated by a scale factor of 2, with the origin as the center of the dilation.

A'=(-12,-12)

B'=(-16,-4)

C'=(-8,-4)
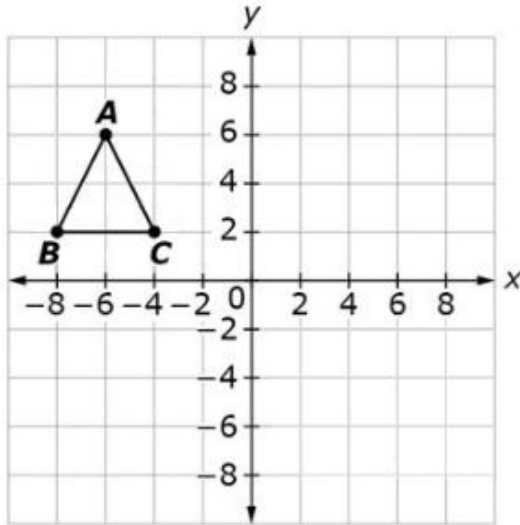
Click the numbers to give the coordinates of vertices *A'B'C'*.

Interaction: The student will click on numbers and positive/negative signs to give coordinates.

A'=(,   )   B'=(,   )

C'=(,   )

G: Transformations A

Name _____   Period _____   Date _____

| 9

CLAIM 3 | **Example Item 3D.1b (Grade 8)**
Primary Target 3D (Content Domain G), Secondary Target 1G (CCSS 8.G.A), Tertiary Target 3G

Select **all** of the following situations that show that Figure P is congruent to Figure Q.

A. There is a translation that takes Figure P to Figure Q.
B. There is a rotation that takes Figure P to Figure Q.
C. There is a reflection that takes Figure P to Figure Q.
D. There is a dilation that takes Figure P to Figure Q. | A, B and C |

G: Transformations A

Name _____   Period _____   Date _____

G: Transformations A

Name _____   Period _____   Date _____

Geometry: Volume A

1	**Example Stem 1:** This figure shows the dimensions of a tanker truck. The tank forms a cylinder with a length of 32 feet and radius of 4 feet. *r* = 4 ft. 32 ft. What is the volume, in cubic feet, of the tank? Round your answer to the nearest hundredth.	1608.50
2	**Example Stem 2:** A spherical baseball has a radius of 2 inches, as shown in the diagram. *r* = 2 in. What is the volume, in cubic inches, of the baseball? Round your answer to the nearest hundredth.	33.51

G: Volume A

Name _____ Period _____ Date _____

3	**Example Stem 3:** An ice cream cone has a height of 6 inches and a radius of 2 inches as shown. The ice cream completely fills the cone, as well as the half-sphere above the cone. $r = 2$ in. $h = 6$ in. Which is closest to the total volume, in cubic inches, of the ice cream? A. $\frac{16}{3}\pi$ B. 8π C. $\frac{40}{3}\pi$ D. 20π	C
4	**Example Stem 1:** A cone with radius 4 feet and height 10 feet is shown. 10 ft 4 ft Enter the volume of the cone, in cubic feet. Round your answer to the nearest hundredth.	167.47
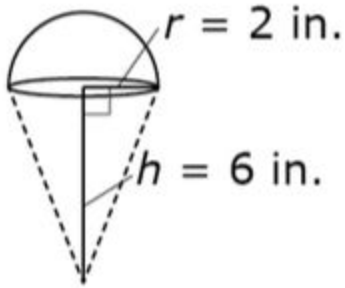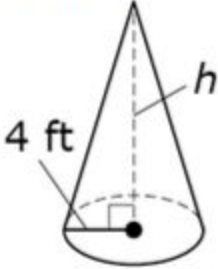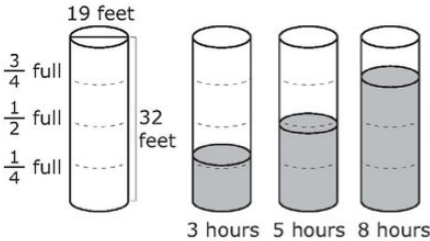
G: Volume A

Name _____ Period _____ Date _____

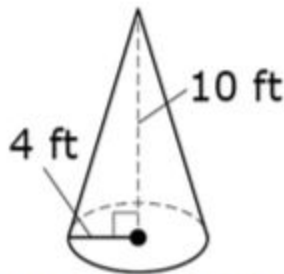| 5	**Example Stem 2:** A cone with radius 4 feet is shown. Its approximate volume is 165 cubic feet. Enter the height of the cone, in feet. Round your answer to the nearest hundredth.	9.85
6 CLAIM 4	**Example Item 4A.2b (Grade 8)** Primary Target 4A (Content Domain G), Secondary Target 1I (CCSS 8.G.C), Tertiary Target 1A (CCSS 7.RP.A), Quaternary Target 4B An empty tank in the shape of a cylinder is being filled with water. The tank is filled at a constant rate for a total of 10 hours. The figure shows the height of water in the tank at the given number of hours after filling started. Enter the **percent** of the tank that is filled with water at 10 hours.	94% Height after 10 hours 30 Volume 8500
7 CLAIM 2	Grades 6-8, Claim 2 **Balanced** Assessment Consortium **Example Item 2A.4b (Grade 8):** Primary Target 2A (Content Domain G), Secondary Target 1I (CCSS 8.G.C), Tertiary Target 2D A sphere and the base of a cone have a radius of 3 inches. The volume of the sphere equals the volume of the cone. What is the height of the cone, in inches? Enter the height, in inches.	12
8 CLAIM 2	**Example Item 2A.4c (Grade 8):** Primary Target 2B (Content Domain G), Secondary Target 1F (CCSS 8.G.C), Tertiary Target 2D A right cylindrical tank has a height of 10 feet and a radius of 4 feet. Jane fills this tank with water at a rate of 8 cubic feet per minute. Using this rate, determine the number of minutes it will take Jane to completely fill the tank. Enter your answer, rounded to the nearest minute, in the response box.	63

G: Volume A

Name _____ Period _____   Date _____

G: Volume A

Name _____   Period _____   Date _____

Number Systems: Rational & Irrational Numbers A

1	**Example Stem:** Determine for each number whether it is a rational or irrational number.	R I R I R

Number	Rational	Irrational
$\frac{4}{7}$		
$\sqrt{30}$		
$\frac{21}{\sqrt{4}}$		
π		
-27		

2	**Example Stem:** Enter a fraction equivalent to $0.\overline{2}$. Use only whole numbers for numerators and denominators.	2/9

3	**Example Stem:** Which number is the closest approximation to $\sqrt{167}$? A. 12 B. 13 C. 83 D. 84	B

4	**Example Stem:** Enter the approximate value of $2\sqrt{47}$ to the nearest tenth.	13.6

NS: Rational & Irrational Numbers A

Name _____ Period _____ Date _____

5	**Example Stem:** Which range contains the value of $\sqrt{(16 + 9 + 20)}$? A. between 6.6 and 6.8 B. between 7.5 and 7.7 C. between 16.8 and 17.0 D. between 22.4 and 22.6	A

6
 	
CLAIM 4
	Example Stem: Select **all** expressions that have a value greater than 5.
	
	    A. 2π
	    B. $\frac{10}{\sqrt{3}}$
	    C. $3 + \sqrt{2}$
	    D. $5.7 - \frac{6}{\sqrt{20}}$
		A
		B

7	**Example Stem:** Select True or False to indicate whether each comparison is true. <table><tr><th></th><th>True</th><th>False</th></tr><tr><td>$\frac{4}{7} > \sqrt{19}$</td><td></td><td></td></tr><tr><td>$\sqrt{40} > 7$</td><td></td><td></td></tr><tr><td>$\frac{20}{\sqrt{30}} > \frac{2}{3}$</td><td></td><td></td></tr></table>	F F T
8	**Example Stem:** Use the Add Point tool to approximate the value of $\sqrt{78}$ to the nearest tenth on the number line. 	8.8

NS: Rational & Irrational Numbers A

Name _____ Period _____ Date _____

9

Example Stem: Drag each expression to the number line to show the approximate value.

$2\sqrt{14}$ 2π $3\sqrt{10}$

Box 1
2π

Box 2
$2\sqrt{14}$

Box 3
$3\sqrt{10}$

10

CLAIM 3

Example Item 3A.2b (Grade 8)
Primary Target 3A (Content Domain NS), Secondary Target 1B (CCSS 7.NS.A), Tertiary Target 3G

Franco said that for any values a, b, and c the equation $a^2 + b^2 = c^2$ is always true. Mary disagrees.

Which of the following values for a, b, and c support Mary's claim? Select **all** that apply.

A.   a = 6, b = 8, c = 10
B.   a = 2, b = 4, c = 6
C.   a = b = c = 0
D.   a = −2, b = 2, c = 0

B
D

11

CLAIM 3

Example Item 3B.1b (Grade 8)
Primary Target 3B (Content Domain NS), Secondary Target 1B (CCSS 7.NS.A), Tertiary Target 3C

The numbers a, b, and c are **not** zero and $a \cdot b = c$.

Part A
Click on the equation below that **must** also be true.

A. $-a \cdot b = c$
B. $a \cdot -b = c$
C. $-a \cdot -b = c$
D. $-a \cdot -b = -c$

Part B
Choose **four** statements that support your claim.

A. $-a = (-1) \cdot a$
B. $-b = (-1) \cdot b$
C. $-c = (-1) \cdot c$
D. $(-1) \cdot (-1) = 1$
E. $(-1) \cdot (1) = -1$
F.   You can multiply numbers in any order.

A
B
D
F

Name _____ Period _____ Date _____

Name _____ Period _____ Date _____

Statistics & Probability: Bivariate Data A

1

Example Stem: This scatter plot shows the relationship between the average weight and average heart rate for 11 different animals.

Animal Weight vs. Heart Rate

Average Heart Rate (Beats Per Minute)

Average Animal Weight (lbs)
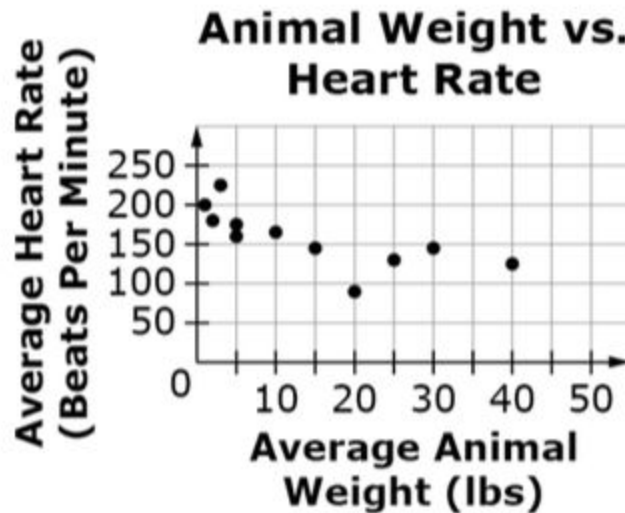
Select True or False for each statement based on the scatter plot.

Statement	True	False
There is a positive association between average weight and average heart rate for animals.		
Animals with higher body weights tend to have lower heart rates than animals with lower body weights.		
For animals weighing 20 lbs or less, there is a linear association between average weight and average heart rate.		

F
T
T

SP: Bivariate Data A

Name _____ Period _____ Date _____

2

Example Stem: This scatter plot shows the relationship between the average weight and average heart rate for 11 different animals. The line of best fit is shown on the graph.

Animal Weight vs. Heart Rate

Average Heart Rate (Beats Per Minute)

300 250 200 150 100 50 0

A B C D

10 20 30 40 50

Average Animal Weight (lbs)
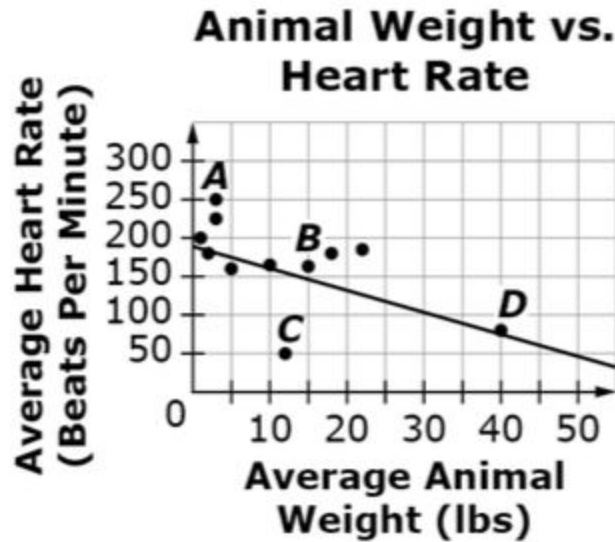
Select True or False for each statement based on the graph.

Statement	True	False
The line of best fit provides a good estimate of an animal's average heart rate based on its weight for all animals.		
The *y*-intercept is at approximately (0, 185).		
Point *D* is one outlier because it is far away from the other data points.		

F
T
F

SP: Bivariate Data A

Name _____ Period _____ Date _____

| 3 | **Example Stem 1:** Every boxer puppy in a litter is weighed each day. The scatter plot shows the age and mass recorded at each weighing. | B |

Age and Mass of Boxer Puppies
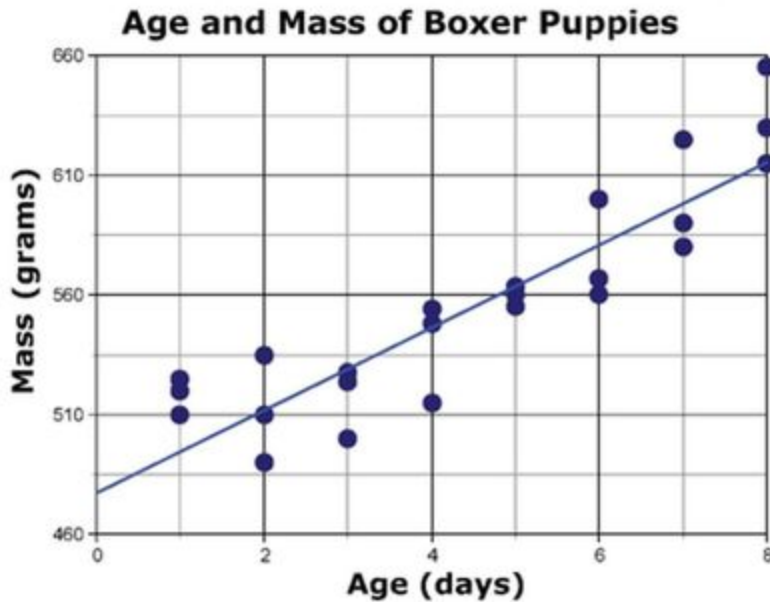
The line of best fit has equation $y = a + bx$, where a and b are constants. What does the y-intercept tell you about the puppies in the litter?

    A. The predicted change in mass of a puppy each day.
    B. The predicted mass of a puppy at birth.
    C. The number of puppies born on day 0.
    D. The mass of the entire litter of puppies.

Name _____ Period _____ Date _____

4

Example Stem 2: Each puppy in a litter is weighed each day. The scatter plot shows the age and mass recorded at each weighing.

Age and Mass of Boxer Puppies
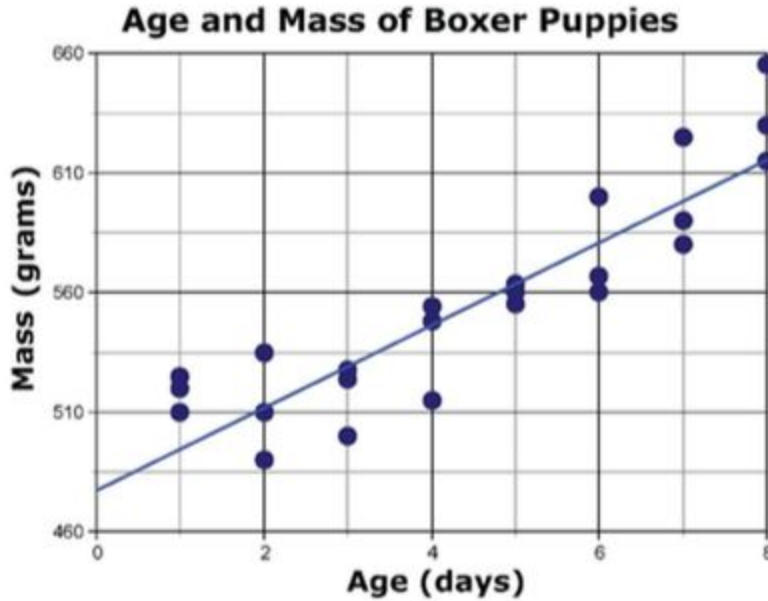
The line of best fit is shown on the scatter plot. What does the slope of the line tell you about the puppies in the litter?

A. The predicted change in mass of a puppy each day.
B. The predicted mass of a puppy at birth.
C. The number of puppies born on day 0.
D. The mass of the entire litter of puppies.

A

Name _____ Period _____ Date _____

| 5 | **Example Stem 1:** All 8th-grade students at a school answered Yes or No to the two survey questions shown. | A |

- Do you have a cell phone?   Yes   No
- Do you have an MP3 player?   Yes   No

The results of the survey are shown in the table.

	MP3 Player	No MP3 Player	Total
Cell Phone	58	122	180
No Cell Phone	30	65	95
Total	88	187	275

What percentage of the students have both a cell phone and an MP3 player?

- A. 21%
- B. 32%
- C. 66%
- D. 68%

| 6 | **Example Stem 2:** A company surveyed both adults and children about whether or not they liked a particular game. The survey results are shown in the table. | B |

	Liked the game	Did not like the game	Total
Adults	28	20	48
Children	54	98	152
Total	82	118	200

Which of the following correctly compares the proportion of adults who liked the game with the proportion of children who liked the game?

- A. They are approximately the same.
- B. The proportion of adults who liked the game is <u>greater than</u> the proportion of children who liked the game.
- C. The proportion of adults who liked the game is <u>less than</u> the proportion of children who liked the game.
- D. It is not possible to compare these proportions with the information given.

Name _____ Period _____ Date _____

1		D
	Example Stem: All 8th-grade students at a school answered Yes or No to the two survey questions shown.	

- Do you have a cell phone?   Yes   No
- Do you have an MP3 player?   Yes   No

The results of the survey are shown in the table.

	MP3 Player	No MP3 Player	Total
Cell Phone	58	122	180
No Cell Phone	30	65	95
Total	88	187	275

Is there an association between owning a cell phone and owning an MP3 Player for the students at this school?

A. Yes, because more than half of the students own a cell phone but less than half own an MP3 player.
B. Yes, because the proportion of students who own an MP3 player is almost the same for students who own a cell phone and for students who do not.
C. No, because more than half of the students own a cell phone but less than half own an MP3 player.
D. No, because the proportion of students who own an MP3 player is almost the same for students who own a cell phone and for students who do not.

Name _____ Period _____ Date _____

8	**Example Stem:** A coach of a cross country team asked all 200 of the runners who ran at a meet two questions:	A

Did you get less than 8 hours of sleep last night?   Yes   No
Did you achieve a personal record in this meet?   Yes   No

A summary of the data is shown in the table.

	8 or more hours of sleep	Less than 8 hours of sleep	Total
Personal Record	28	20	48
No Personal Record	54	98	152
Total	82	118	200

The coach saw an association between the amount of sleep and achieving a personal record for the runners. Which statement provides evidence for this association?

A. About 34% of the runners who got more than 8 hours of sleep achieved a personal record, but only 17% of those who got less than 8 hours of sleep did.
B. More than 50% of the runners who achieved a personal record got 8 or more hours of sleep.
C. Only 25% of the runners achieved a personal record at the meet.
D. There is no evidence for an association.

9 CLAIM 3	**Example Item 3B.3c (Grade 8)**	answer

Primary Target 3B (Content Domain RP), Secondary Target 1A (CCSS 7.RP.A), Tertiary Target 4F

A car is traveling at a constant speed and drove 75 miles in 1.5 hours. One mile is approximately 1.6 kilometers. Approximately how fast is the car traveling in kilometers per hour?

Explain or show clear steps for how you determined your answer.

SP: Bivariate Data A

Name _____ Period _____ Date _____
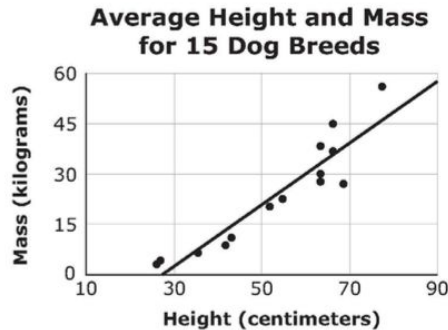
| 10
CLAIM 4 | **Example Item 4D.1b (Grade 8)**
Primary Target 4D (Content Domain SP), Secondary Target 1J (CCSS 8.SP.A), Tertiary Target 4E

This scatter plot and line of best fit show the relationship between the height and mass of 15 different dog breeds.

The mass of the Afghan Hound is less than would be predicted by the line of best fit, and the difference between the predicted mass and the actual mass is greater than for any other breed.

Click on the point in the scatterplot that corresponds to the Afghan Hound.

Average Height and Mass for 15 Dog Breeds
Mass (kilograms) vs Height (centimeters) | [answer](#) |

| 11
CLAIM 4 | **Example Item 4E.1a (Grade 8)**
Primary Target 4E (Content Domain SP), Secondary Target 1J (CCSS 8.SP.A), Tertiary Target 4D, Quaternary 4B

This scatter plot shows the lengths and the widths (in millimetres) of the eggs of some American birds.

Sizes of Bird's Eggs
Width (mm) vs Length (mm)
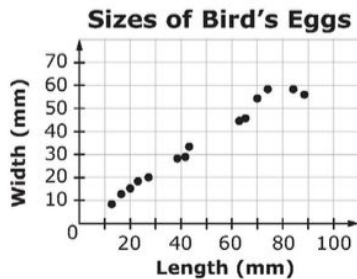
Use the information in the scatter plot to support each answer.

Part A
The scatter plot shows an association between the length of a bird egg and its width. Describe that association.

Part B
Fossils show that dinosaur eggs closely resemble the shape of bird eggs. One type of dinosaur (sauropods) grew from egg[s] were 180 millimeters in length.

Assume that sauropod eggs were the same shape as bird eggs. What is the approximate width, in millimeters, of sauropo[d] eggs? Explain how you determined your answer. | [answer](#) |

SP: Bivariate Data A