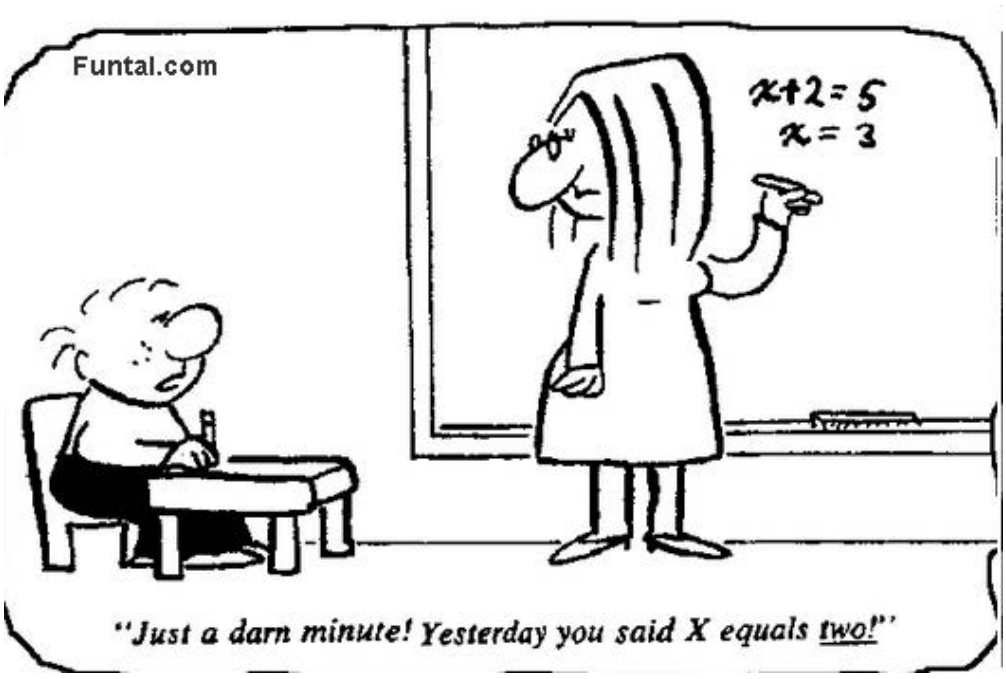
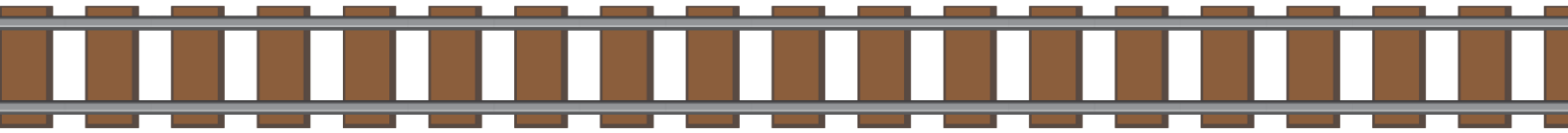
STAY ON TRACK PACK

8TH GRADE

NUMBER SYSTEMS
EXPRESSIONS AND EQUATIONS FUNCTIONS
GEOMETRY
STATISTICS AND PROBABILITY



Note Page:



Name: _____

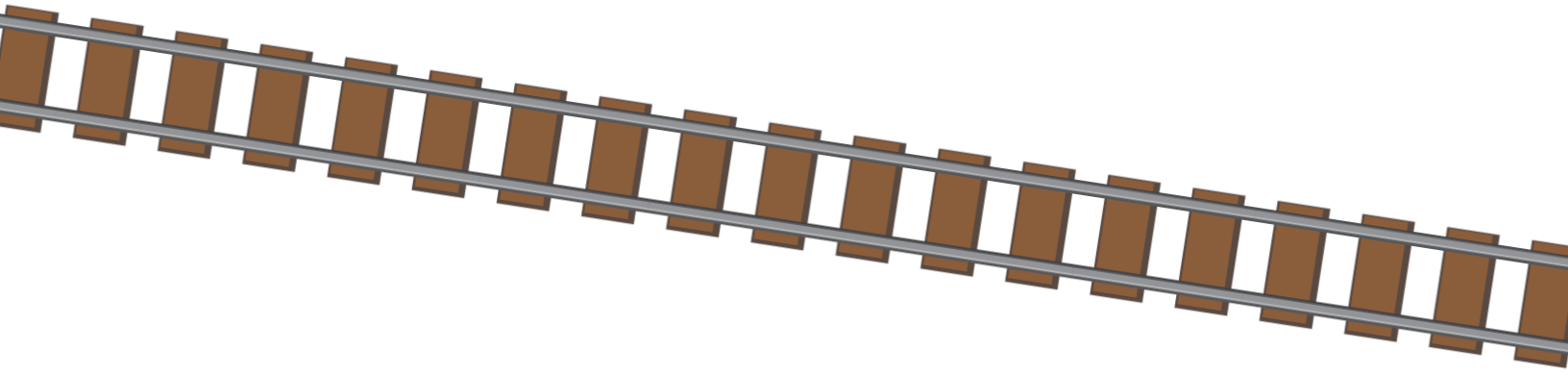
STUDENT INSTRUCTIONS

You will be completing a variety of problems and tasks within this math packet. The packet is broken down into the following topics:

- Number Systems
- Expressions and Equations
- Functions
- Geometry
- Statistics and Probability

Do your best within each section, and when finished, please fill out each section of the student reflection form.

STAY ON TRACK IN MATH!



NUMBER SYSTEMS

8.NS.1

1. Is the number $\frac{2}{3}$ rational or irrational? _____

Why? _____

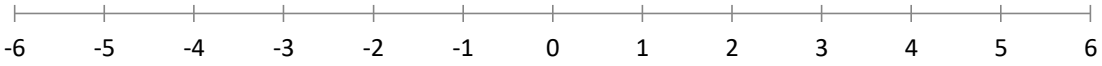
2. Is the number $\sqrt{22}$ rational or irrational? _____

Why?_____

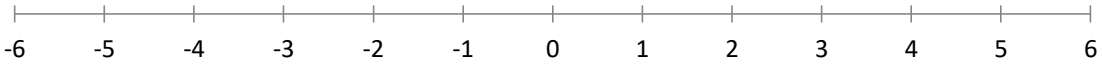
8.NS.2

3. Plot the following numbers on the number line below. Be sure to label each point with its letter:

(a) π (b) 2.666666666… (c) $-\sqrt{16}$ (d) $\sqrt{36}$ (e) $\frac{1}{4}$ (f) $-\frac{2}{3}$



4. Plot the number $\sqrt{17}$ on the number line below. Explain below how you are able to approximate the number to the tenths place without using a calculator.



Explain:

8.NS.1

5. What is the difference between a rational and irrational number?
Explain below:

6. State whether each number is either rational or irrational:

(a) −23 _____ (b) $\sqrt{18}$ _____

(c) $\frac{4}{5}$ _____ (d) 8.6753 _____

Now that you are finished with this section, fill out the **NUMBER SYSTEM** section of the **REFLECTION FORM**.

EXPRESSIONS AND EQUATIONS

8.EE.1

1. Simplify each expression. Be sure your answers have positive exponents:

(a) $3a^6 \bullet 6a^4$ = ☐ (b) $\frac{20b^{12}}{5b^3}$ = ☐ (c) $(x^4)^6$ = ☐

(d) Write 2 possible answers for this problem: $4^3 \bullet 4^{-6}$ = ☐ or ☐

8.EE.2

2. Solve each problem involving square or cube roots:

(a) What is the cube root of 27? _____ (b) What is the square root of 121? _____

(c) Solve the equation: $x^2 + 3 = 67$

Solution(s): _____

(d) A square has an area of 324 m^2. What is the measure of one side? _____ meters

8.EE.3, 4

3. Solve each problem involving scientific notation:

(a) Write .0000306 in scientific notation: _____

(b) Write 7,900,000,000 in scientific notation: _____

(c) A CEO's salary is $5,000,000 per year. A first-year teacher's salary is $25,000. *How many times larger* is the CEO's salary? Keep your numbers in scientific notation as you set up and work out the problem. Show steps below:

The CEO's salary is _____ times larger.

(d) Is this number in scientific notation? 13 x 10^8. (Yes or No.) _____

How do you know? _____

If you answered "no," make the corrections: _____

(d) Multiply: (4.6 x 10^8) • (3.8 x 10^6) = _____

EXPRESSIONS AND EQUATIONS

8.EE.5

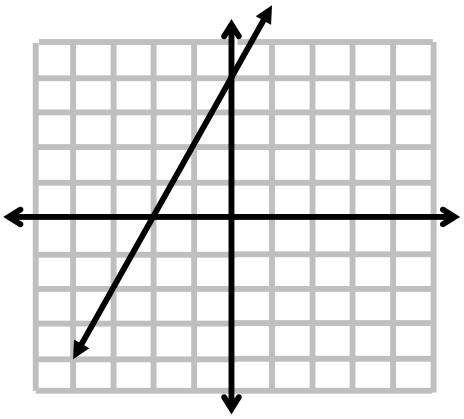
4. The table shows the change in altitude of a hiker. What is the hiker's rate of change?

Minutes	Altitude (ft)
0	0
3	150
4	200
5	250
6	300

The hiker's rate of change is _____ .

8.EE.6

5. Draw a "slope triangle" on the graph to find the slope of the line. (Remember…slope is $\frac{rise}{run}$.)



Slope of the line = ☐

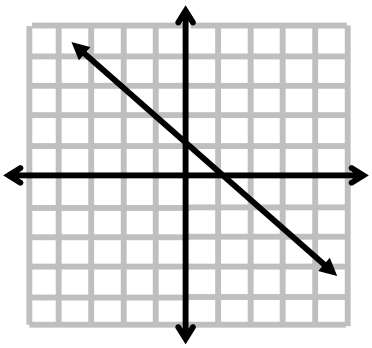
Now, try it again, but create a new slope triangle that is a different size. Do you get the same answer for the slope? _____

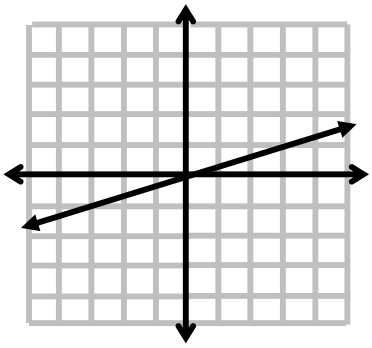
Why did that happen? *Explain:*

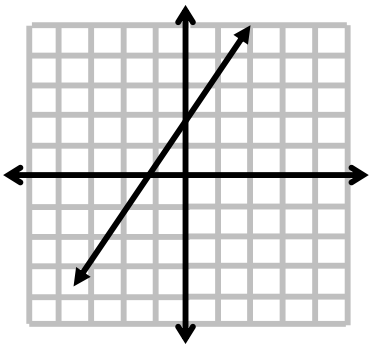
_____

_____

6. Write an equation for each line. Be sure your equation is in the form *y = mx + b.*

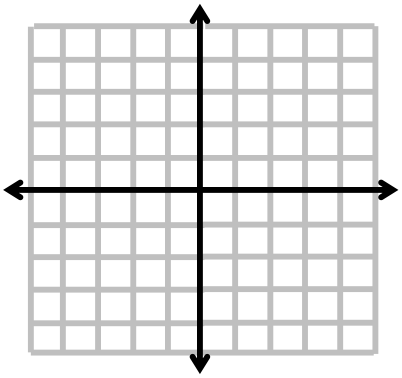






(a) Equation: _____ (b) Equation: _____ (c) Equation: _____

7. Graph the equation. Use the coordinate grid at the right: **y = −2x − 1**



EXPRESSIONS AND EQUATIONS

8.EE.7

8. Solve each equation. Show your steps:

(a) $2(-4x - 13) = 37 + 13x$ (b) $8x - 2(x + 5) = 2(x - 1)$ (c) $17 - 5x = 50 + 6x$

x = _____ x = _____ x = _____

(d) $6(x - 11) = 2(3x + 8)$ (e) $12x + 4x + 8 = 2(8x + 4)$ (f) $\frac{1}{2}(8x + 16) = \frac{1}{3}(24x - 12)$

x = _____ x = _____ x = _____

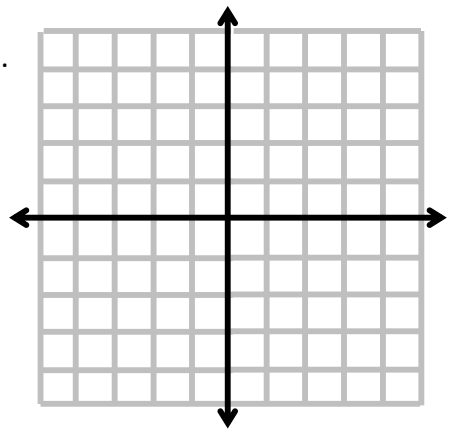
8.EE.8

9. Solve the system of equations by graphing. Use the coordinate grid at the right.

y = −3x + 5

y = x + 1

Solution: _____



10. Inspect this system of equations:

4x + 2y = 8

4x + 2y = 6

Why does this system of equations have no solution?

_____

_____

11. Determine if (−4, 6) is a solution for this system of equations:

y = x + 10

2x + y = −2

Is the ordered pair a solution? _____

Explain how you know:

_____

_____

Now that you are finished with this section, fill out the **EXPRESSIONS AND EQUATIONS** section of the **REFLECTION FORM.**

FUNCTIONS

8.F.1

1. Tell whether or not each situation represents a **function.**

(a) **Ordered Pair:** (3, 5), (6, 8), (7, 5), (8, 10) Function? (Yes or no.) _____

Explain: _____

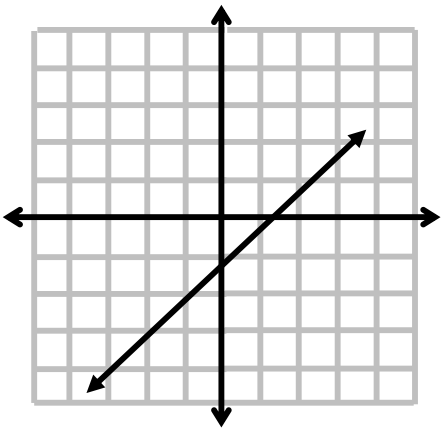
(b) **Table:**

x	y
5	8
10	7
6	4
5	3
4	10

Function? (Yes or no.) _____

Explain: _____

(c) **Graph:**

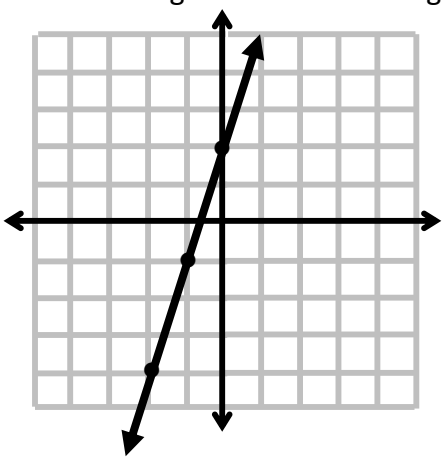


Function? (Yes or no.) _____

Explain: _____

8.F.2

2. Tell which function has a greater rate of change…the graph or the table:



x	y
8	76
4	60
0	44
−4	28
−8	12

Which has the greater rate of change?

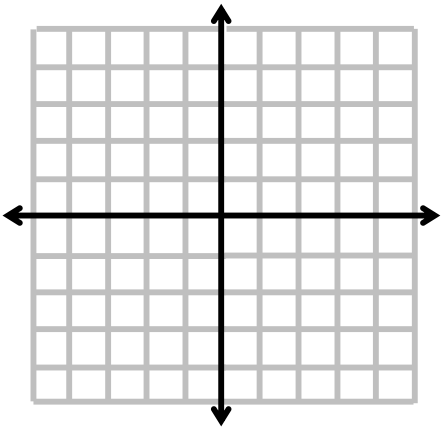
_____

Rate of change: _____ Rate of change: _____

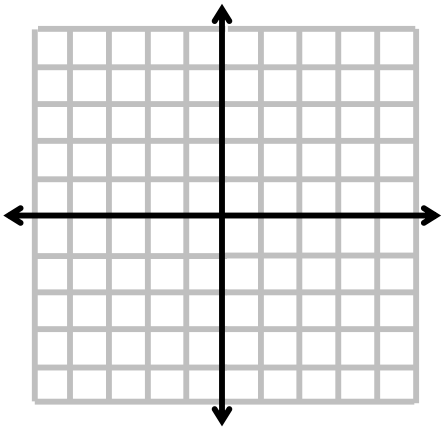
FUNCTIONS

8.F.3

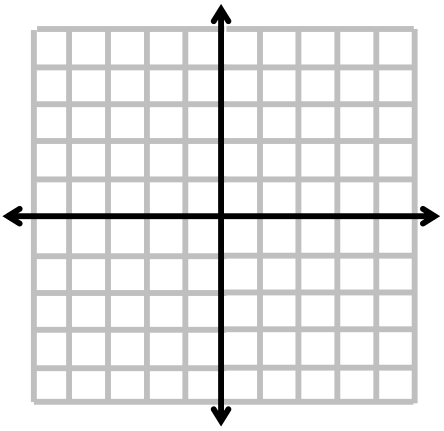
3. Graph each equation. Then tell whether or not your graph represents a function.



(a) $y = 2x + 1$
Function? Yes or No: _____



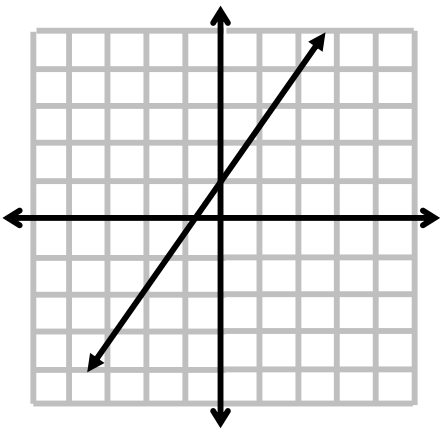
(b) $x = 4$
Function? Yes or No: _____



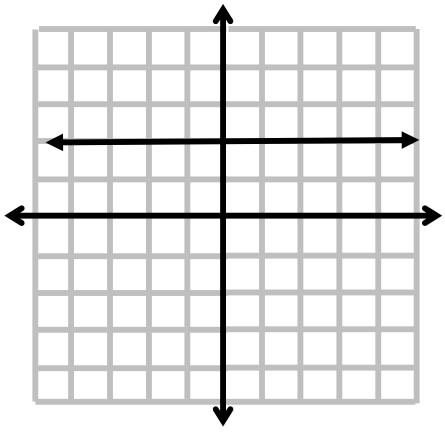
(c) $-2x + 4y = -8$
Function? Yes or No: _____

8.F.4

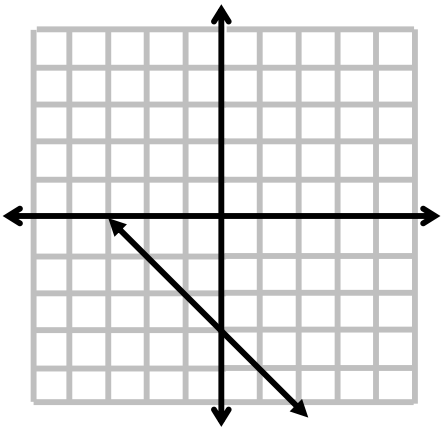
4. Write an equation in function form for each linear relationship below:



(a) Equation: _____



(b) Equation: _____



(c) Equation: _____

8.F.5

5. The graph at the right tells a story. In your own words, describe what is happening to the y-values as the x-values are increasing from 0 to 10. Be sure to use words like increase, decrease, constant, linear, or nonlinear.

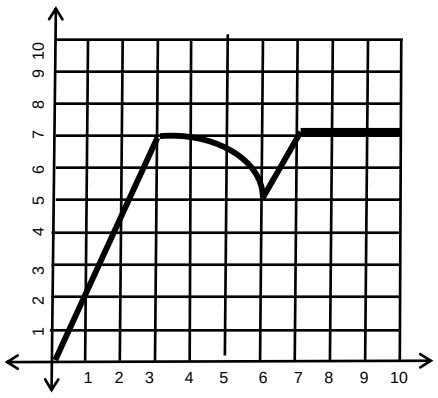
_____

_____

_____

_____

_____

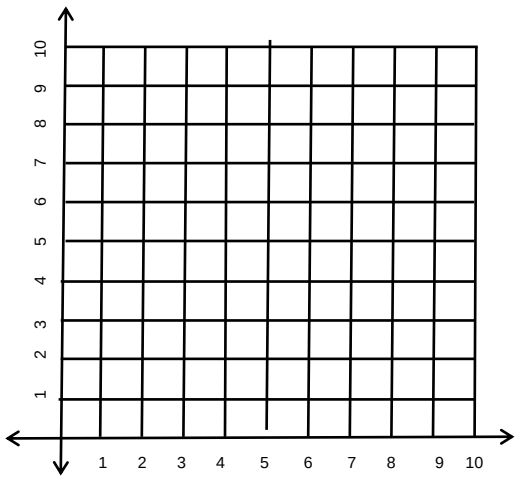


FUNCTIONS

8.F.5

6. Sketch a graph that could exhibit the qualities in the description below:

Between the x values of 0 and 4, the y values increase in a nonlinear pattern. Then, the y values stay constant between the x values of 4 and 6. Then, from x values of 6 to 10, the y values decrease in a linear pattern.

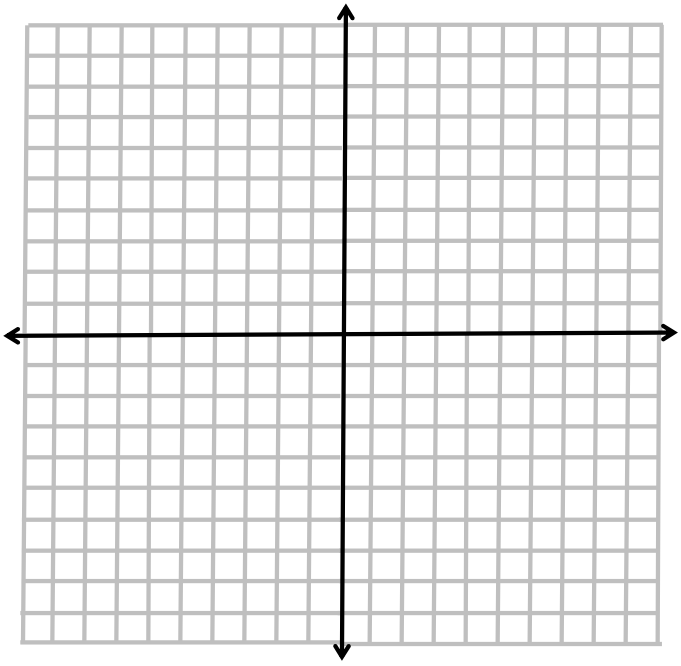


Now that you are finished with this section, fill out the **FUNCTIONS** section of the **REFLECTION FORM**.

GEOMETRY

8.G.1

1. Triangle ABC has coordinates A(−8, 6), B(−4, 5), C(−6, 3). Complete the series of transformations below. Graph each new image and give the new image coordinates:



Step 1: Reflect the image over the y-axis.
Coordinates of the image: A'_____ B'_____ C'_____

Step 2: Rotate the image 180° about the origin.
Coordinates of the new image: A''_____ B''_____ C''_____

Step 3: Translate the image using the rule (x, y) → (x + 4, y −1).
Coordinates of the final image: A'''_____ B'''_____ C'''_____

8.G.2

Question to Consider: Is the final image congruent to your preimage? Yes or No: _____
Why?
_____
_____

8.G.2

2. A line segment is moved 5 units to the left and 4 units down in the coordinate plane. Give a coordinate rule for the translation:

_____

Are both line segments congruent? Yes or No: _____

Why? _____

GEOMETRY

8.G.3

3. Give the rule in coordinate notation for a reflection over the x-axis: _____

4. Give the coordinate rule for a reflection over the y-axis: _____

5. Give the coordinate rule for a 180° rotation about the origin: _____

6. Give the coordinate rule for a 90° clockwise rotation about the origin: _____

7. Give the coordinate rule for a 90° counterclockwise rotation about the origin: _____

8. Give the coordinate rule for a dilation of a figure using a scale factor of 3: _____

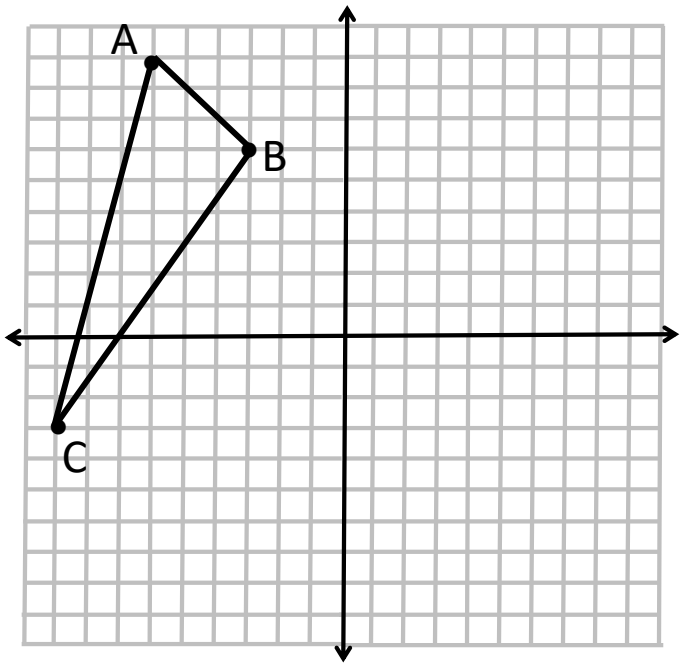
Which type of dilation does your rule represent? (Enlargement or Reduction): _____

9. A triangle is translated 8 units to the left and 2 units up in the coordinate plane. Describe the rule in coordinate notation:

_____

8.G.4

10. Dilate triangle ABC using the rule $(x, y) \rightarrow (\frac{1}{3}x, \frac{1}{3}y)$. Be sure to label the vertices of your image.



Are ΔABC and ΔA'B'C' similar?
(Yes or No): _____

Why or why not?

_____
_____
_____

Are ΔABC and ΔA'B'C' congruent?
(Yes or No): _____

Why or why not?

_____
_____
_____

11. Which type of transformations will result in a congruent image?

_____

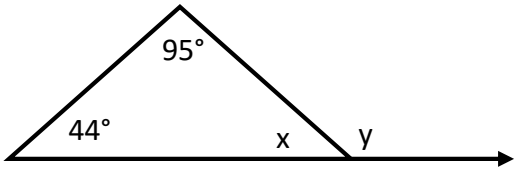
12. Explain what it means for 2 figures to be congruent:

_____

8.G.5

GEOMETRY

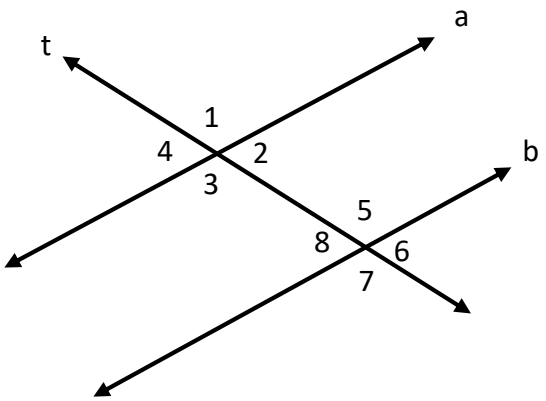
13. Use the diagram below to find the missing angle measures.



x = _____

y = _____

14. Use the diagram below to answer the fill in the blanks. *Lines a and b are parallel:*



(a) ∠7 and _____ are corresponding angles.

(b) ∠2 and _____ are alternate interior angles.

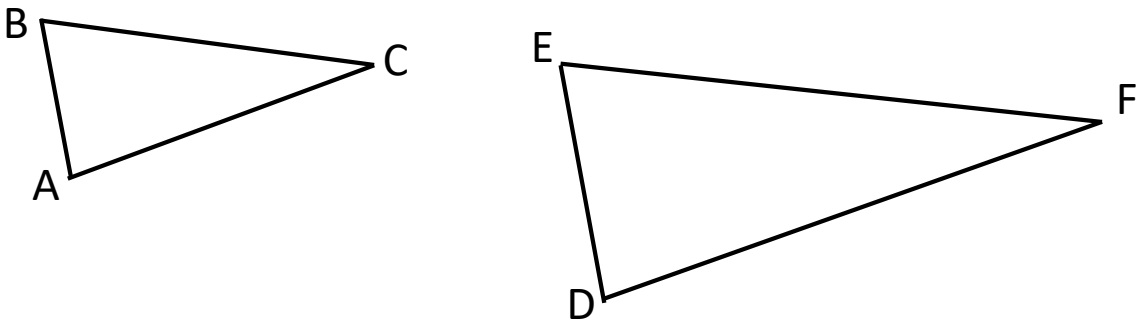
(c) ∠4 and _____ are alternate exterior angles.

(d) ∠6 and _____ are vertical angles.

(e) ∠3 and _____ are consecutive interior angles.

(f) If m∠1= 132˚, then m∠7 = _____ .

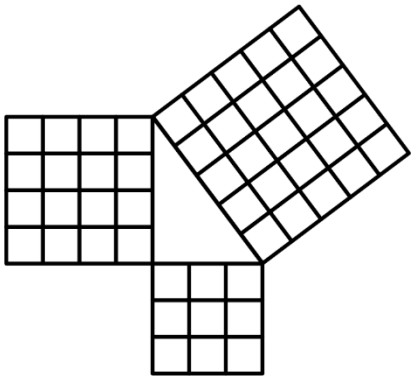
15. ΔABC and ΔDEF are similar. If m∠B = 62˚, then m∠E = _____



8.G.6

16. In your own words, explain why this diagram shows how the Pythagorean Theorem works:

_____
_____
_____
_____
_____
_____

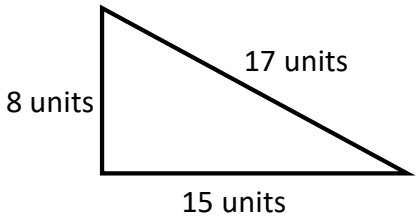


GEOMETRY

8.G.6

17. Explain how you know this is a right triangle:

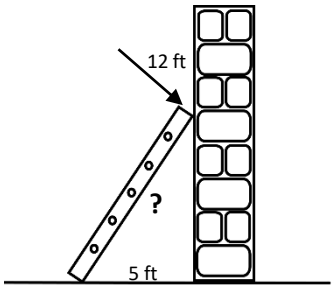
_____
_____
_____
_____
_____



8.G.7

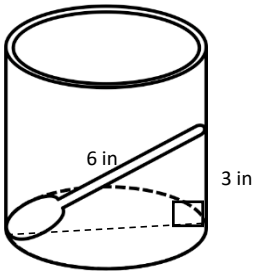
18. A ladder is leaning against a brick wall. The bottom of the ladder is 5 feet from the wall. The top of the ladder reaches the wall 12 feet up from the ground. **How long is the ladder?**

Steps and Solution:



19. A 6 inch spoon is placed inside a cylinder. It is angled such that the end of the spoon handle rests 3 inches from the bottom of the cylinder. What is the diameter of the cylinder? Round your answer to the nearest hundredths place.

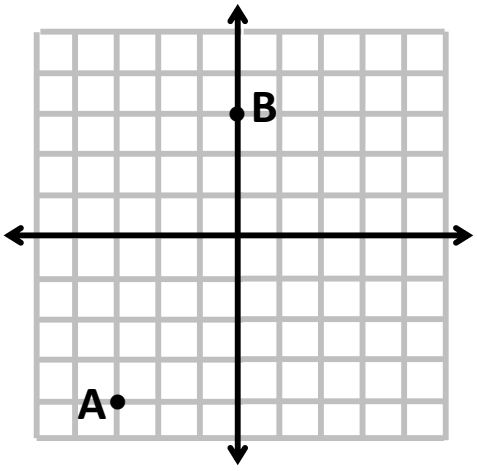
Steps and Solution:



8.G.8

20. Use the Pythagorean Theorem to find the distance between points A and B in the coordinate plane. Round your answer to the nearest hundredths place.

Steps and Solution:

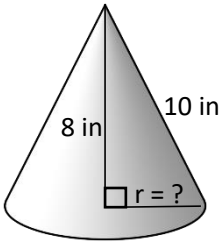


GEOMETRY

8.G.9

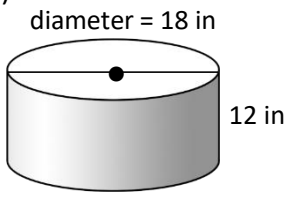
21. Find the volume of the cone, cylinder and sphere below. Use 3.14 for π. Round all answers to the nearest whole number:

(a)



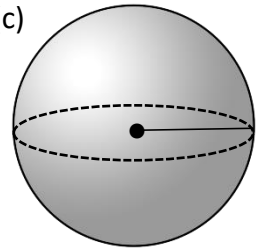
Steps and Solution:

(b)



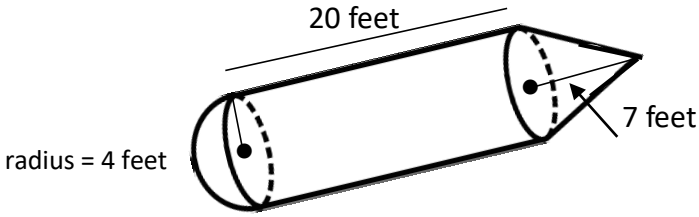
Steps and Solution:

(c)



Steps and Solution:

22. For the back-to-school open house, the middle school put a huge blow-up pencil in the front of the building! Find the volume of the pencil. Use 3.14 for π and round your final answer to the whole number.



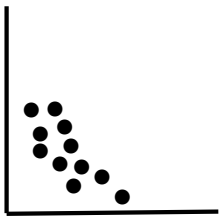
Show Steps and Solution:

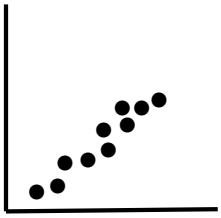
Now that you are finished with this section, fill out the **GEOMETRY** section of the **REFLECTION FORM.**

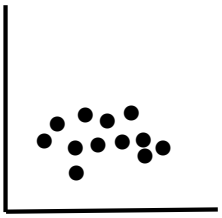
STATISTICS AND PROBABILITY

8.SP.1

1. Which scatterplot below *best* illustrates the relationship between hours studying and test scores earned? ***Circle your choice:***







Explain how you decided:

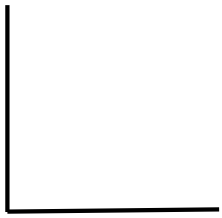
_____

_____

_____

2. Create a scatterplot below that shows these characteristics:

Negative Correlation
One outlier



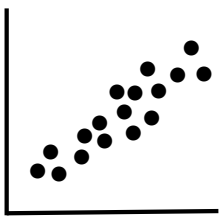
What might your scatterplot depict? Give a real-world example of a situation your graph could represent:

_____

_____

8.SP.2

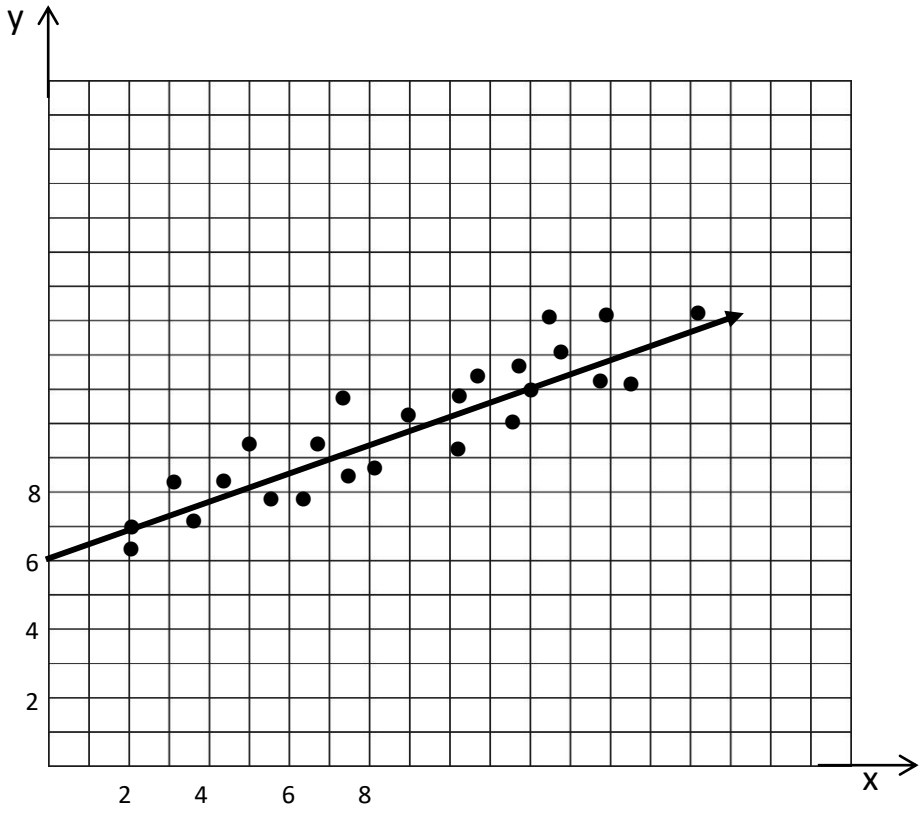
3. Draw a line of fit for the scatterplot below:



STATISTICS AND PROBABILITY

8.SP.3

4. Use the step-by-step approach at the right to write an equation for the line of fit.



Step 1: Find the y-intercept: _____ (b value)

Step 2: Find and label two points on the line of fit:

(_____, _____) and

(_____, _____)

Step 3: Use the slope formula $\frac{y_2 - y_1}{x_2 - x_1}$ to find the slope of the line through your points (m value).

Step 4: Write the equation of the line in y = mx + b form:

_____

8.SP.4

5. Find 8 friends or family members and measure their height, foot length, and hair length. Fill in each table below with the data. Afterward, answer the questions at the right:

Height (cm)	Foot Length (cm)

Height (cm)	Hair Length (cm)

(a) What association(s), if any, do you see for the Height/Foot Length table?

_____
_____
_____
_____

(b) What association(s), if any, do you see for the Height/Hair Length table?

_____
_____
_____
_____

Now that you are finished with this section, fill out the **STATISTICS AND PROBABILITY** section of the **REFLECTION FORM**.

Name: _____

STUDENT REFLECTION FORM

Directions: After completing each section of the packet, fill out this sheet in the corresponding section. Please be honest! This will let your math teacher know how you have progressed. Maybe you've mastered certain topics, or perhaps you need additional help in others. Your teacher is there to provide help if needed!

NUMBER SYSTEMS:

What was the easiest problem for you in this section? _____

What was the most difficult problem for you in this section? _____

Which types of problems do you feel you've mastered in this section?

_____

_____

Which types of problems do you need to "watch out" for in this section?

_____

_____

EXPRESSIONS AND EQUATIONS:

What was the easiest problem for you in this section? _____

What was the most difficult problem for you in this section? _____

Which types of problems do you feel you've mastered in this section?

_____

_____

Which types of problems do you need to "watch out" for in this section?

_____

_____

STUDENT REFLECTION FORM (CONTINUED)

FUNCTIONS:

What was the easiest problem for you in this section? _____

What was the most difficult problem for you in this section? _____

Which types of problems do you feel you've mastered in this section?

_____

_____

Which types of problems do you need to "watch out" for in this section?

_____

_____

GEOMETRY:

What was the easiest problem for you in this section? _____

What was the most difficult problem for you in this section? _____

Which types of problems do you feel you've mastered in this section?

_____

_____

Which types of problems do you need to "watch out" for in this section?

_____

_____

STATISTICS AND PROBABILITY:

What was the easiest problem for you in this section? _____

What was the most difficult problem for you in this section? _____

Which types of problems do you feel you've mastered in this section?

_____

_____

Which types of problems do you need to "watch out" for in this section?

_____

_____

NUMBER SYSTEMS

ANSWER KEY

8.NS.1

1. Is the number $\frac{2}{3}$ rational or irrational? **Rational**

Why? **It is written as a quotient of two integers.**

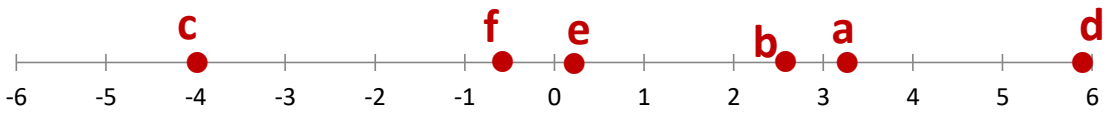
2. Is the number $\sqrt{22}$ rational or irrational? **Irrational**

Why? **The decimal form of this number neither terminates nor repeats.**

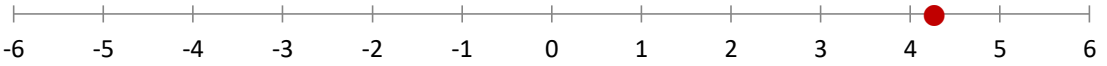
8.NS.2

3. Plot the following numbers on the number line below. Be sure to label each point with its letter:

(a) π (b) 2.666666666… (c) $-\sqrt{16}$ (d) $\sqrt{36}$ (e) $\frac{1}{4}$ (f) $-\frac{2}{3}$



4. Plot the number $\sqrt{17}$ on the number line below. Explain below how you are able to approximate the number to the tenths place without using a calculator.



Explain: **$\sqrt{17}$ is between two perfect squares, 16 and 25. Their square roots are each 4 and 5. So that means the value of $\sqrt{17}$ falls between 4 and 5, but is much closer to 4, because 17 is much closer to 16.**

8.NS.1

5. What is the difference between a rational and irrational number?

Explain below:

A rational number can be written as a quotient of two integers. If a number is rational, its decimal form will either terminate or have a repeating pattern.

6. State whether each number is either rational or irrational:

(a) −23 **Rational** (b) $\sqrt{18}$ **Irrational**

(c) $\frac{4}{5}$ **Rational** (d) 8.6753 **Rational**

Now that you are finished with this section, fill out the **NUMBER SYSTEM** section of the **REFLECTION FORM.**

EXPRESSIONS AND EQUATIONS

ANSWER KEY

8.EE.1

1. Simplify each expression. Be sure your answers have positive exponents:

(a) $3a^6 \bullet 6a^4$ = **$18a^{10}$** (b) $\frac{20b^{12}}{5b^3}$ = **$4b^9$** (c) $(x^4)^6$ = **x^{24}**

(d) Write 2 possible answers for this problem: $4^3 \bullet 4^{-6}$ = **$\frac{1}{4^3}$** or **$\frac{1}{64}$**

8.EE.2

2. Solve each problem involving square or cube roots:

(a) What is the cube root of 27? **3**

(b) What is the square root of 121? **11**

(c) Solve the equation: $x^2 + 3 = 67$
Solution(s): **8 and −8**

(d) A square has an area of 324 m^2. What is the measure of one side? **18 meters**

8.EE.3, 4

3. Solve each problem involving scientific notation:

(a) Write .0000306 in scientific notation: **3.06×10^{-5}**

(b) Write 7,900,000,000 in scientific notation: **7.9×10^9**

(c) A CEO's salary is $5,000,000 per year. A first-year teacher's salary is $25,000. *How many times larger* is the CEO's salary? Keep your numbers in scientific notation as you set up and work out the problem. Show steps below:

$\frac{5 \times 10^6}{2.5 \times 10^4} = 2 \times 10^2$

The CEO's salary is **200** times larger.

(d) Is this number in scientific notation? 13×10^8. (Yes or No.) **No**

How do you know? **13 is not a number falling in this range: 1≤ x < 10**

If you answered "no," make the corrections: **1.3×10^9**

(d) Multiply: $(4.6 \times 10^8) \bullet (3.8 \times 10^6)$ = **1.748×10^{15}**

EXPRESSIONS AND EQUATIONS ANSWER KEY

8.EE.5

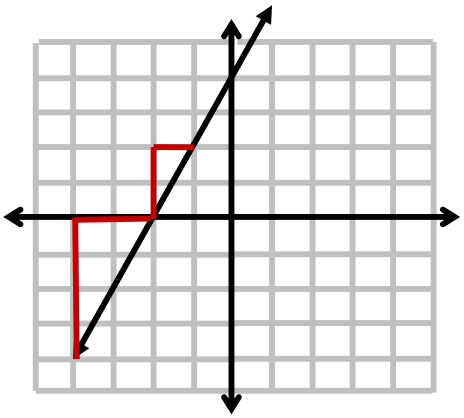
4. The table shows the change in altitude of a hiker. What is the hiker's rate of change?

Minutes	Altitude (ft)
0	0
3	150
4	200
5	250
6	300

The hiker's rate of change is **50 ft./min .**

8.EE.6

5. Draw a "slope triangle" on the graph to find the slope of the line. (Remember…slope is $\frac{rise}{run}$.)



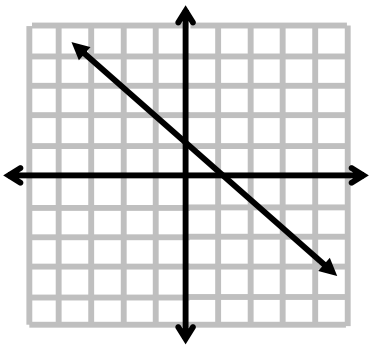
Slope of the line = **2 or $\frac{2}{1}$**

Now, try it again, but create a new slope triangle that is a different size. Do you get the same answer for the slope? **Yes**

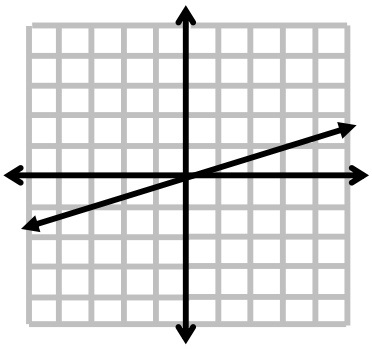
Why did that happen? *Explain:*

Yes. The two slope triangles are similar. One was $\frac{2}{1}$ and the other was $\frac{4}{2}$. Their corresponding side lengths are proportional.

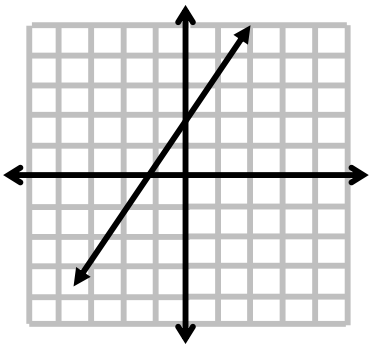
6. Write an equation for each line. Be sure your equation is in the form *y = mx + b.*



(a) Equation: **y = −1x + 1**

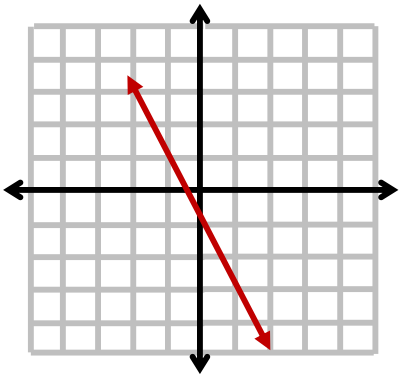


(b) Equation: **$y = \frac{1}{3}x$**



(c) Equation: **y = 2x + 2**

7. Graph the equation. Use the coordinate grid at the right: **y = −2x − 1**



EXPRESSIONS AND EQUATIONS

ANSWER KEY

8.EE.7

8. Solve each equation. Show your steps:

(a) $2(-4x - 13) = 37 + 13x$

$-8x - 26 = 37 + 13x$
$+8x \qquad +8x$
$-26 = 37 + 21x$
$-37 = -37$
$-63 = 21x$

$x = -3$

(b) $8x - 2(x + 5) = 2(x - 1)$

$8x - 2x - 10 = 2x - 2$
$6x - 10 = 2x - 2$
$-2x \qquad -2x$
$4x - 10 = -2$
$+10 \quad +10$
$4x = 8$
$x = 2$

(c) $17 - 5x = 50 + 6x$

$+5x \qquad +5x$
$17 = 50 + 11x$
$-50 \quad -50$
$-33 = 11x$

$x = -3$

(d) $6(x - 11) = 2(3x + 8)$

$6x - 66 = 6x + 16$
$-66 \neq 16$
No Solution

(e) $12x + 4x + 8 = 2(8x + 4)$

$16x + 8 = 16x + 8$
$8 = 8$
Infinitely Many Solutions

(f) $\frac{1}{2}(8x + 16) = \frac{1}{3}(24x - 12)$

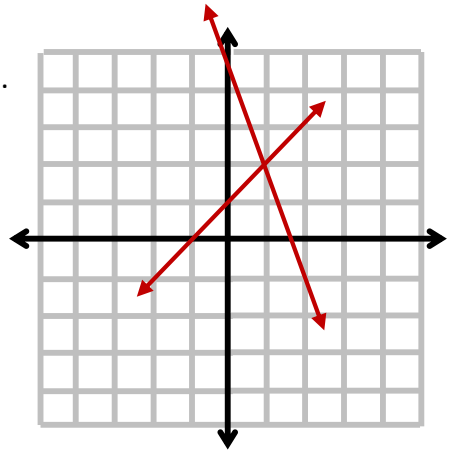
$4x + 8 = 8x - 4$
$-4x \qquad -4x$
$8 = 4x - 4$
$+4 \qquad +4$
$12 = 4x$
$3 = x$

8.EE.8

9. Solve the system of equations by graphing. Use the coordinate grid at the right.

$y = -3x + 5$
$y = x + 1$

Solution: (1, 2)



10. Inspect this system of equations:

$4x + 2y = 8$
$4x + 2y = 6$

Why does this system of equations have no solution?

4x + 2y cannot simultaneously be 8 and 6.

11. Determine if (−4, 6) is a solution for this system of equations:

$y = x + 10$
$2x + y = -2$

Is the ordered pair a solution? **Yes.**

Explain how you know:

When the x and values are each replaced with values from the ordered pair (x-values are replaced with −4 and y-values are replaced with 6), both equations are true statements.

Now that you are finished with this section, fill out the **EXPRESSIONS AND EQUATIONS** section of the **REFLECTION FORM.**

FUNCTIONS

ANSWER KEY

8.F.1

1. Tell whether or not each situation represents a **function.**

(a) **Ordered Pair:** (3, 5), (6, 8), (7, 5), (8, 10) Function? (Yes or no.) **Yes.**

Explain: **Each input value has exactly one output value.**

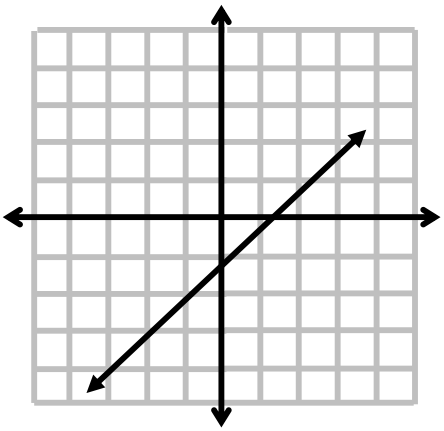
(b) **Table:**

x	y
5	8
10	7
6	4
5	3
4	10

Function? (Yes or no.) **No.**

Explain: **5 has two output values.**

(c) **Graph:**

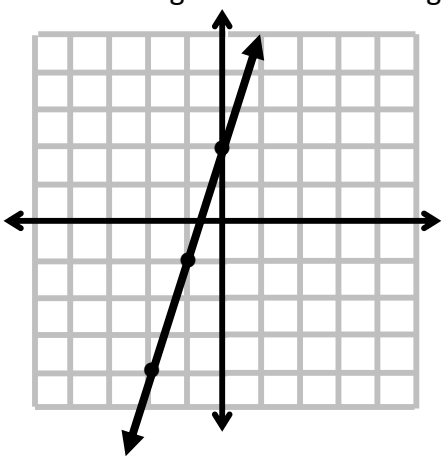


Function? (Yes or no.) **Yes.**

Explain: **The graph passes the vertical line test.**

8.F.2

2. Tell which function has a greater rate of change…the graph or the table:



Rate of change: **3**

x	y
8	76
4	60
0	44
−4	28
−8	12

Rate of change: **4**

Which has the greater rate of change?

The table

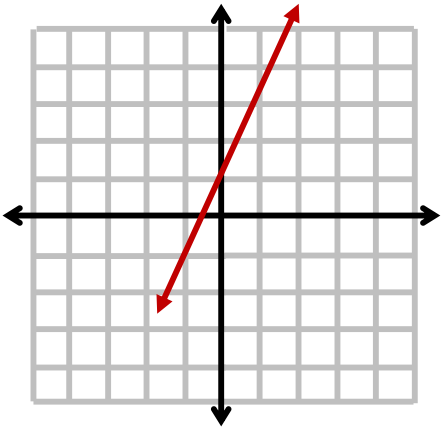
© Anna Taylor

FUNCTIONS

ANSWER KEY

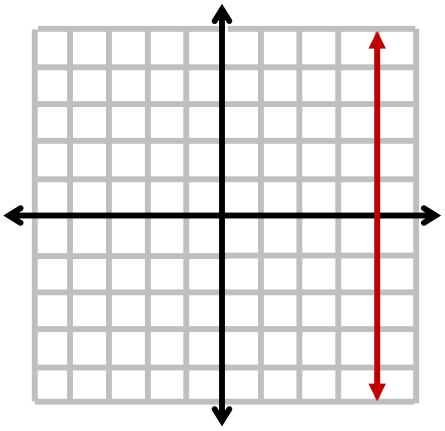
8.F.3

3. Graph each equation. Then tell whether or not your graph represents a function.



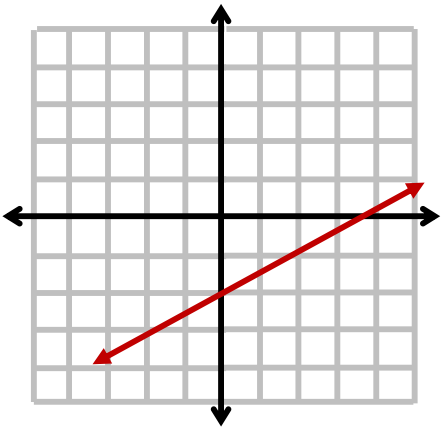
(a) y = 2x + 1

Function? Yes or No: **Yes**



(b) x = 4

Function? Yes or No: **No**



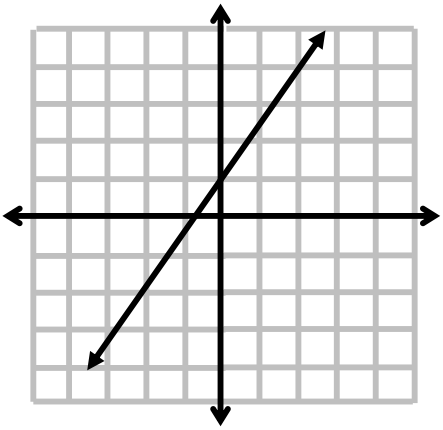
(c) −2x + 4y = −8

Equation in Function Form: $y = \frac{1}{2}x - 2$

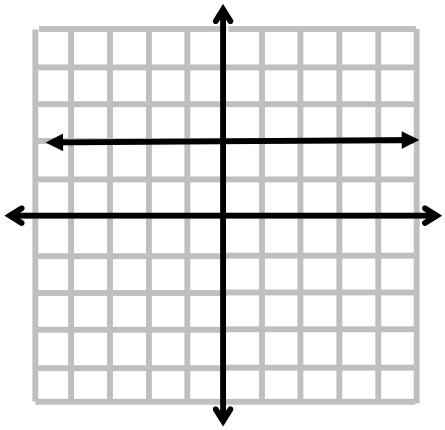
Function? Yes or No: **Yes**

8.F.4

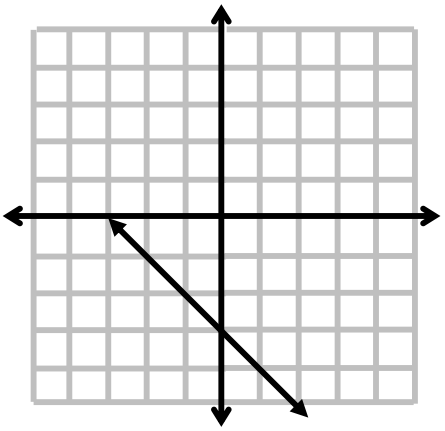
4. Write an equation in function form for each linear relationship below:



(a) Equation: **$y = \frac{3}{2}x + 1$**



(b) Equation: **y = 2**

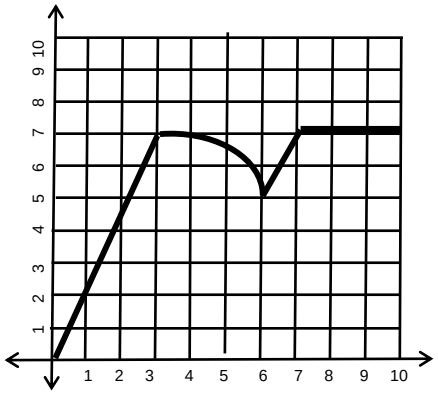


(c) Equation: **y = −1x − 3**

8.F.5

5. The graph at the right tells a story. In your own words, describe what is happening to the y-values as the x-values are increasing from 0 to 10. Be sure to use words like increase, decrease, constant, linear, or nonlinear.

When the x-values are between 0 and 3, the y-values show a linear increase from 0 to 7. When the x-values are between 3 and 6, the y-values show a nonlinear decrease from 7 to 5. When the x-values are between 6 and 7, the y-values show a linear increase from 5 to 7. When the x-values are between 7 and 10, the y-values stay constant at 7.



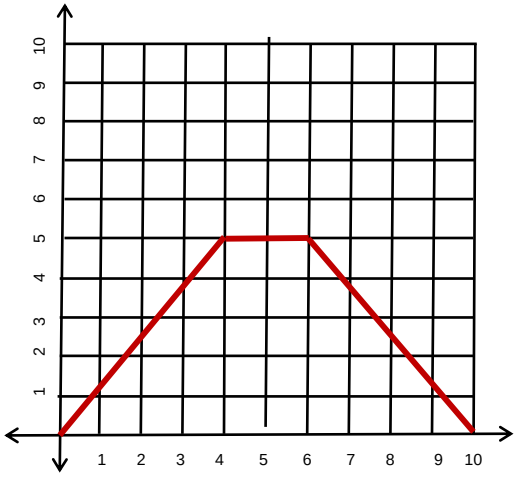
FUNCTIONS

ANSWER KEY

8.F.5

6. Sketch a graph that could exhibit the qualities in the description below:

Between the x values of 0 and 4, the y values increase in a nonlinear pattern. Then, the y values stay constant between the x values of 4 and 6. Then, from x values of 6 to 10, the y values decrease in a linear pattern.



Remember, you are giving a sketch of what *could* exhibit the qualities. Answers may vary, but this general shape should be evident.

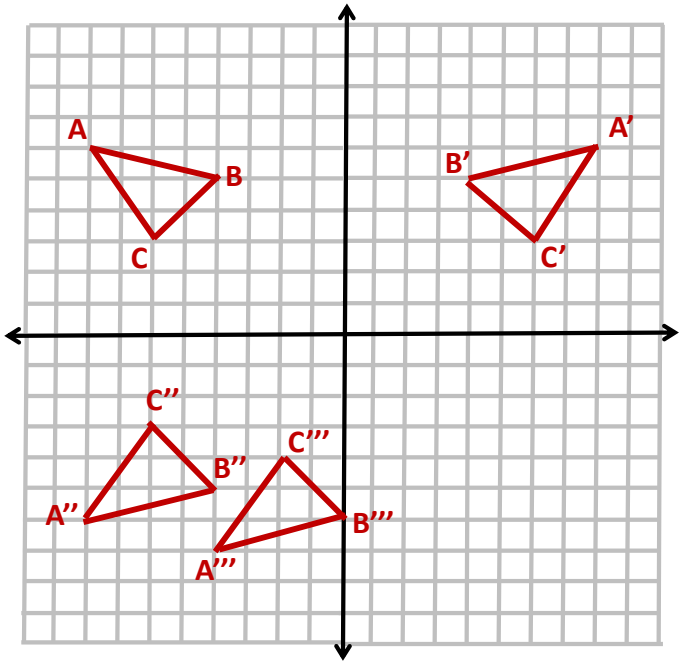
Now that you are finished with this section, fill out the **FUNCTIONS** section of the **REFLECTION FORM**.

GEOMETRY

ANSWER KEY

8.G.1

1. Triangle ABC has coordinates A(−8, 6), B(−4, 5), C(−6, 3). Complete the series of transformations below. Graph each new image and give the new image coordinates:



Step 1: Reflect the image over the y-axis.
Coordinates of the image: **A'(8, 6) B'(4, 5) C'(6, 3)**

Step 2: Rotate the image 180° about the origin.
Coordinates of the new image: **A''(−8, −6) B''(−4, −5) C''(−6, −3)**

Step 3: Translate the image using the rule (x, y) → (x + 4, y −1).
Coordinates of the final image: **A'''(−4, −7) B'''(0, −6) C'''(−2, −4)**

8.G.2

Question to Consider: Is the final image congruent to your preimage? Yes or No: **Yes.**
Why?
The final image is the exact same size and shape of triangle ABC. The figure was moved; it did not change size/shape.

8.G.2

2. A line segment is moved 5 units to the left and 4 units down in the coordinate plane. Give a coordinate rule for the translation:

(x, y) → (x – 5, y – 4)

Are both line segments congruent? Yes or No: **Yes.**
Why? **The image is the exact same size and shape of the preimage. The segment was moved; it did not change size/shape.**

GEOMETRY
ANSWER KEY

8.G.3

3. Give the rule in coordinate notation for a reflection over the x-axis: **(x, y) → (x, −y)**

4. Give the coordinate rule for a reflection over the y-axis: **(x, y) → (−x, y)**

5. Give the coordinate rule for a 180° rotation about the origin: **(x, y) → (−x, −y)**

6. Give the coordinate rule for a 90° clockwise rotation about the origin: **(x, y) → (y, −x)**

7. Give the coordinate rule for a 90° counterclockwise rotation about the origin: **(x, y) → (−y, x)**

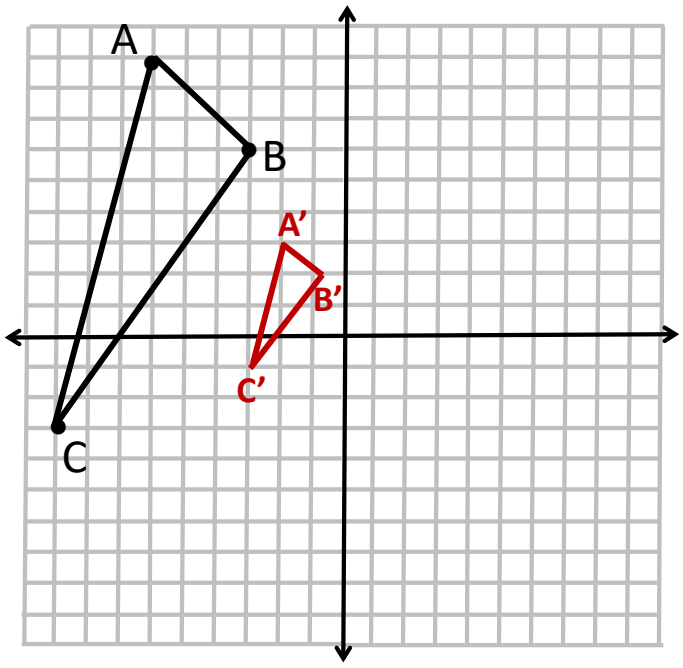
8. Give the coordinate rule for a dilation of a figure using a scale factor of 3: **(x, y) → (3x, 3y)**

Which type of dilation does your rule represent? (Enlargement or Reduction): **Enlargement**

9. A triangle is translated 8 units to the left and 2 units up in the coordinate plane. Describe the rule in coordinate notation:
(x, y) → (x – 8, y + 2)

8.G.4

10. Dilate triangle ABC using the rule $(x, y) \rightarrow (\frac{1}{3}x, \frac{1}{3}y)$. Be sure to label the vertices of your image.



Are ΔABC and ΔA'B'C' similar?
(Yes or No): **Yes.**

Why or why not?
They are both the same shape, but not the same size. Each side of the image is $\frac{1}{3}$ as long as each corresponding side of the preimage.

Are ΔABC and ΔA'B'C' congruent?
(Yes or No): **No.**

Why or why not? **They are not the same size.**

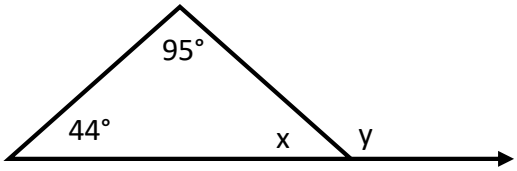
11. Which type of transformations will result in a congruent image?
Reflections, Rotations, Translations

12. Explain what it means for 2 figures to be congruent:
They are the same exact size and shape.

8.G.5

GEOMETRY ANSWER KEY

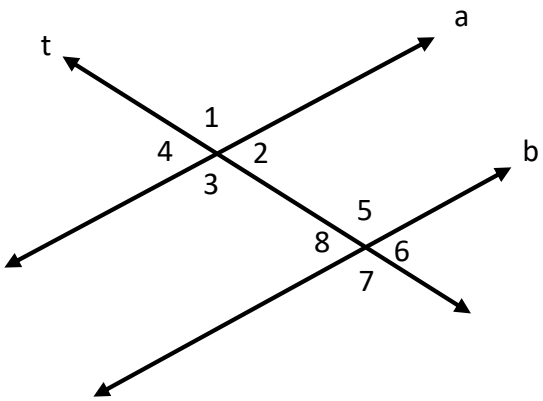
13. Use the diagram below to find the missing angle measures.



x = 41°

y = 139°

14. Use the diagram below to answer the fill in the blanks. *Lines a and b are parallel:*



(a) ∠7 and ∠3 are corresponding angles.

(b) ∠2 and ∠8 are alternate interior angles.

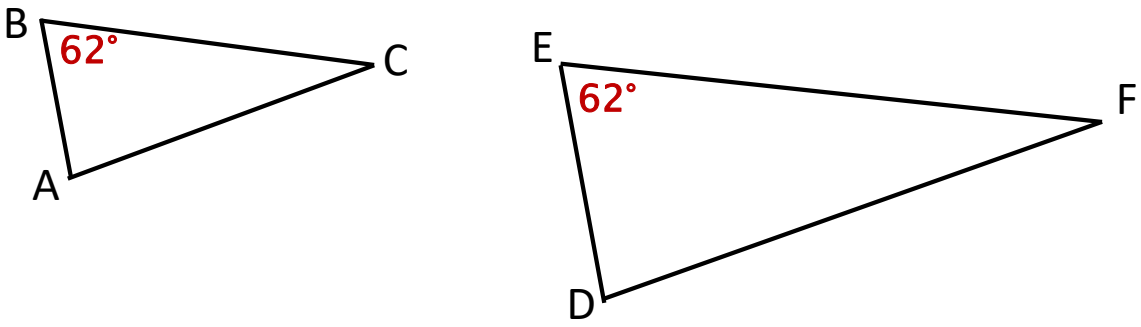
(c) ∠4 and ∠6 are alternate exterior angles.

(d) ∠6 and ∠8 are vertical angles.

(e) ∠3 and ∠8 are consecutive interior angles.

(f) If m∠1= 132˚, then m∠7 = 132° .

15. ΔABC and ΔDEF are similar. If m∠B = 62˚, then m∠E = 62°



8.G.6

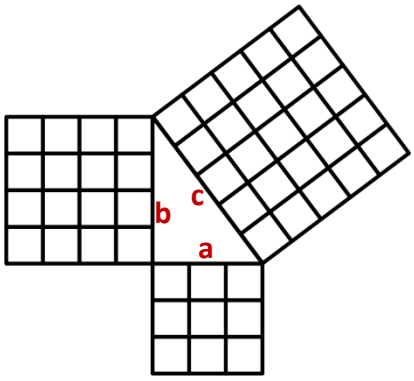
16. In your own words, explain why this diagram shows how the Pythagorean Theorem works:

The square of the length of the hypotenuse (side c) is equal to the sum of the squares of the lengths of the legs, sides a and b.

$a^2 + b^2 = c^2$

$3^2 + 4^2 = 5^2$

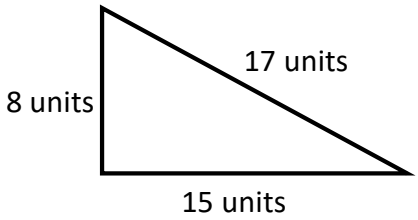
9 + 16 = 25



GEOMETRY ANSWER KEY

8.G.6

17. Explain how you know this is a right triangle:

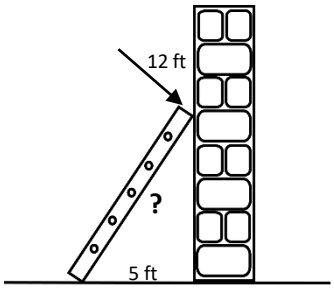


If $a^2 + b^2 = c^2$, then the triangle is a right triangle.

$8^2 + 15^2 = 17^2$
64 + 225 = 289

8.G.7

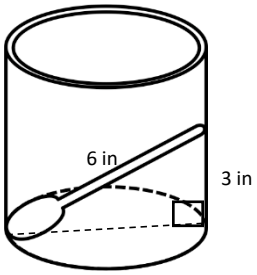
18. A ladder is leaning against a brick wall. The bottom of the ladder is 5 feet from the wall. The top of the ladder reaches the wall 12 feet up from the ground. **How long is the ladder?**



Steps and Solution:

$5^2 + 12^2 = c^2$
25 +144 = c^2
***169* = c^2** **c = 13 ft**

19. A 6 inch spoon is placed inside a cylinder. It is angled such that the end of the spoon handle rests 3 inches from the bottom of the cylinder. What is the diameter of the cylinder? Round your answer to the nearest hundredths place.

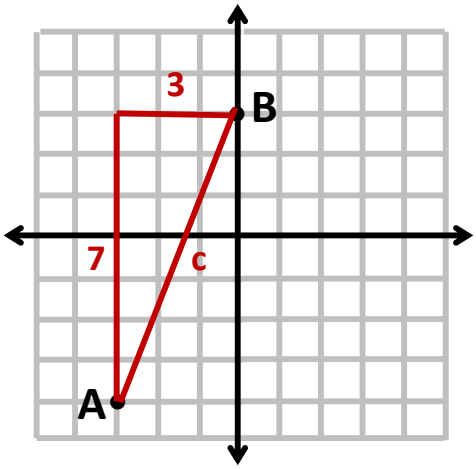


Steps and Solution:

$a^2 + b^2 = c^2$
$3^2 + b^2 = 6^2$
$9 + b^2 = 36$
b^2 = 27 **b ≈ 5.20 inches**

8.G.8

20. Use the Pythagorean Theorem to find the distance between points A and B in the coordinate plane. Round your answer to the nearest hundredths place.



Steps and Solution:

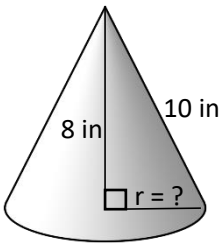
$3^2 + 7^2 = c^2$
$9 + 49 = c^2$
***58* = c^2** **c ≈ 7.62 units**

GEOMETRY ANSWER KEY

8.G.9

21. Find the volume of the cone, cylinder and sphere below. Use 3.14 for π. Round all answers to the nearest whole number:

(a)



Steps and Solution:

$V = \frac{1}{3}\pi r^2 h$

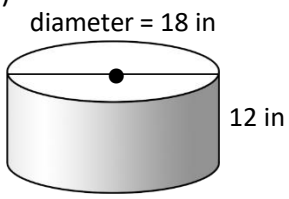
Step 1: Find radius using the Pythagorean Theorem.
Radius = 6 in

Step 2: Use volume formula:

$V = \frac{1}{3}(3.14)(6)^2(8)$

$V \approx 301\ in^3$

(b)



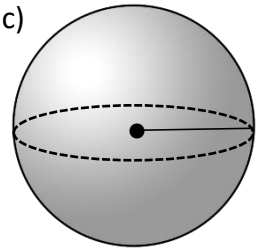
Steps and Solution:

$V = \pi r^2 h$

$V = (3.14)(9)^2(12)$

$V \approx 3{,}052\ in^3$

(c)



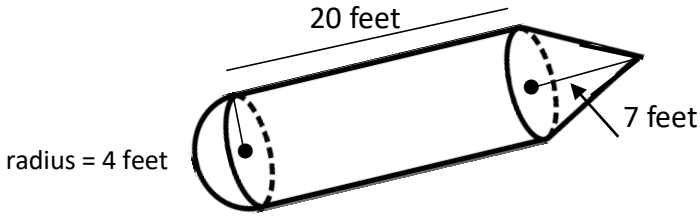
Steps and Solution:

$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}(3.14)\ (7)^3$

$V \approx 1{,}436\ in^3$

22. For the back-to-school open house, the middle school put a huge blow-up pencil in the front of the building! Find the volume of the pencil. Use 3.14 for π and round your final answer to the whole number.



Show Steps and Solution:

Volume of hemisphere (eraser):

$V = \frac{1}{2} \bullet \frac{4}{3}\pi r^3$

$V = \frac{1}{2} \bullet \frac{4}{3}(3.14)(4)^3$

$V \approx 134\ ft^3$

Volume of the cylinder:

$V = \pi r^2 h$

$V = (3.14)(4)^2(20)$

$V \approx 1{,}005\ ft^3$

Volume of the cone (pencil tip):

$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}(3.14)\ (4)^2(7)$

$V \approx 117\ ft^3$

Now, add all 3 sections together: 134 + 1,005 + 117 ≈ $1{,}256\ ft^3$

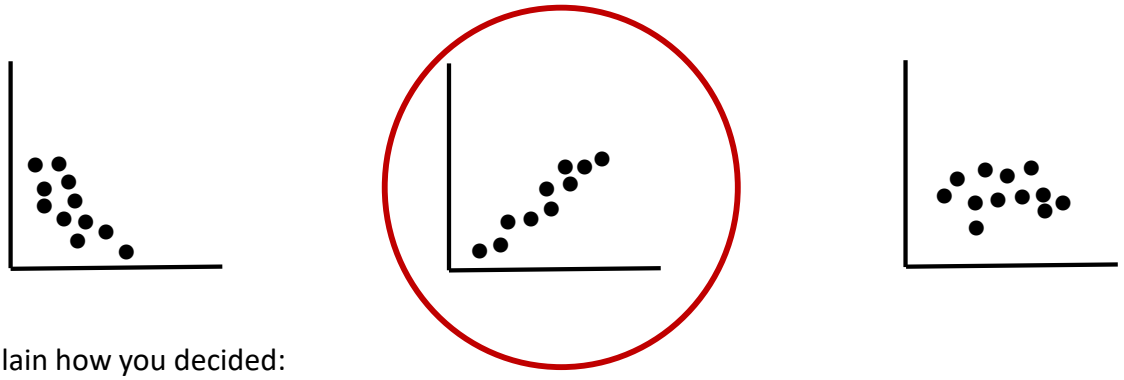
Now that you are finished with this section, fill out the **GEOMETRY** section of the **REFLECTION FORM.**

STATISTICS AND PROBABILITY

ANSWER KEY

8.SP.1

1. Which scatterplot below *best* illustrates the relationship between hours studying and test scores earned? ***Circle your choice:***



Explain how you decided:

The more hours spent studying, the higher the test scores.

2. Create a scatterplot below that shows these characteristics:

Negative Correlation
One outlier

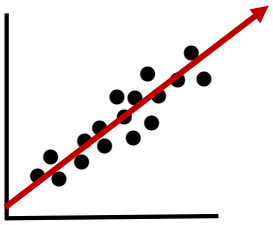
Answers will vary, but the graph should show a trend in this direction.

What might your scatterplot depict? Give a real-world example of a situation your graph could represent:

The more hours spent exercising, the more your weight will decrease. The outlier could represent someone who has a higher muscle mass, or he/she could be increasing their food intake while exercising!

8.SP.2

3. Draw a line of fit for the scatterplot below:

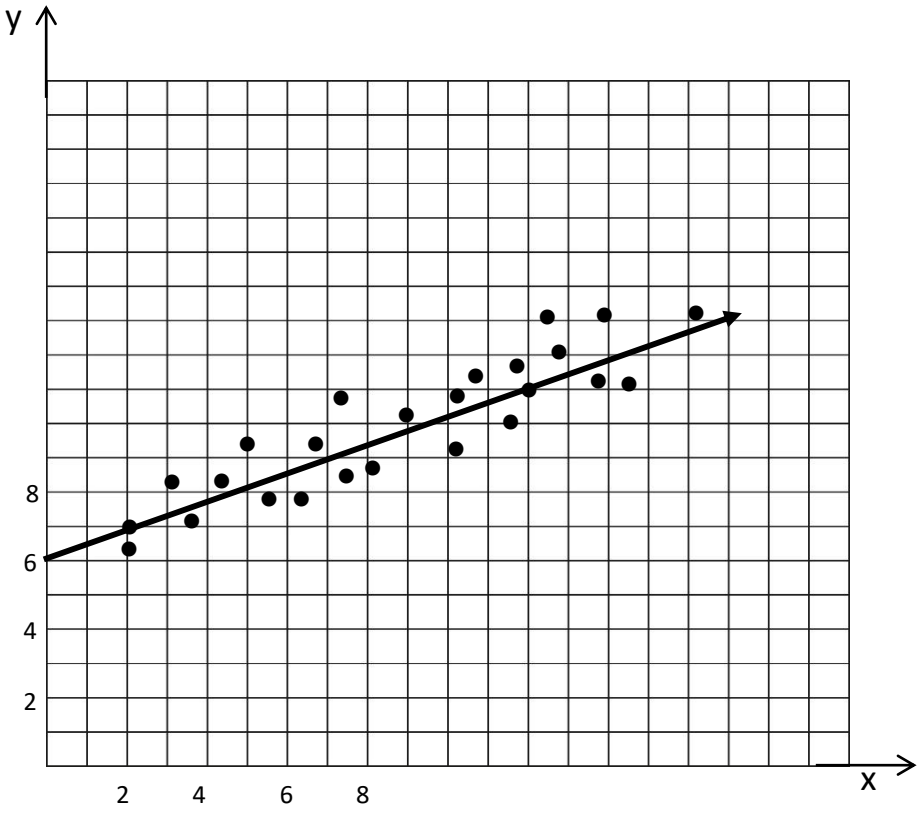


STATISTICS AND PROBABILITY

ANSWER KEY

8.SP.3

4. Use the step-by-step approach at the right to write an equation for the line of fit.



Step 1: Find the y-intercept:
____6____ (b value)

Step 2: Find and label two points on the line of fit:

(____2____, ____7____) and

(____12____, ____11____)

Step 3: Use the slope formula $\frac{y_2 - y_1}{x_2 - x_1}$ to find the slope of the line through your points (m value).

$\frac{11-7}{12-2} = \frac{4}{10} = \frac{2}{5}$

Step 4: Write the equation of the line in y = mx + b form:

$y = \frac{2}{5}x + 6$

8.SP.4

5. Find 8 friends or family members and measure their height, foot length, and hair length. Fill in each table below with the data. Afterward, answer the questions at the right:

Height (cm)	Foot Length (cm)

Height (cm)	Hair Length (cm)

(a) What association(s), if any, do you see for the Height/Foot Length table?

Data will vary, but most students will notice that the taller the height, the longer the foot length (a positive correlation.)

(b) What association(s), if any, do you see for the Height/Hair Length table?

Data will vary, but most students will see no correlation between hair length and height.

Now that you are finished with this section, fill out the **STATISTICS AND PROBABILITY** section of the **REFLECTION FORM.**

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