Just in Time Quick Check

Standard of Learning 7.PFA.1

Strand: Patterns, Functions, and Algebra

Standard of Learning 7.PFA.1

The student will investigate and analyze proportional relationships between two quantities using verbal descriptions, tables, equations in *y = mx* form, and graphs, including problems in context.

Students will demonstrate the following Knowledge and Skills:

a) Determine the slope, *m*, as the rate of change in a proportional relationship between two quantities given a table of values, graph, or contextual situation and write an equation in the form *y = mx* to represent the direct variation relationship. Slope may include positive or negative values (slope will be limited to positive values in a contextual situation).

b) Identify and describe a line with a slope that is positive, negative, or zero (0), given a graph.

c) Graph a line representing a proportional relationship, between two quantities given an ordered pair on the line and the slope, *m*, as rate of change. Slope may include positive or negative values.

d) Graph a line representing a proportional relationship between two quantities given the equation of the line in the form *y = mx*, where *m* represents the slope as rate of change. Slope may include positive or negative values.

e) Make connections between and among representations of a proportional relationship between two quantities using problems in context, tables, equations, and graphs. Slope may include positive or negative values (slope will be limited to positive values in a contextual situation).

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting and Prerequisite SOL: 6.PFA.1, 6.PFA.2

Just in Time Quick Check 7.PFA.1

1. The table of values represents a proportional relationship between x and y.

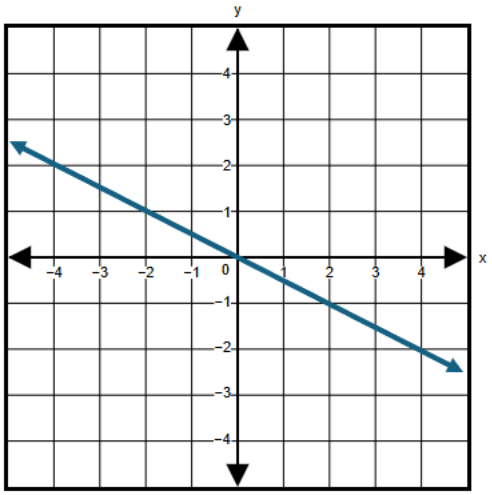
x	y
2	1
5	$2\frac{1}{2}$
6	3

a) What is the slope of the line that best represents this relationship?

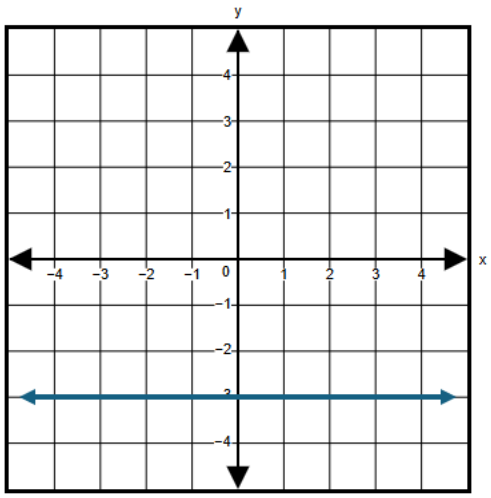
b) Write an equation in the form $y = mx$ to represent the relationship shown in the table.

2. Determine if the slope of each graph is positive, negative, or zero.

a)



b)



3. Miguel makes bags. He can make 8 bags with 2 yards of fabric. Write an equation to represent the yards of fabric, x, needed to make a specific number of bags, y.

4. The table of values represents a relationship between the number of cupcakes, *x*, and the total cost in dollars, *y*.

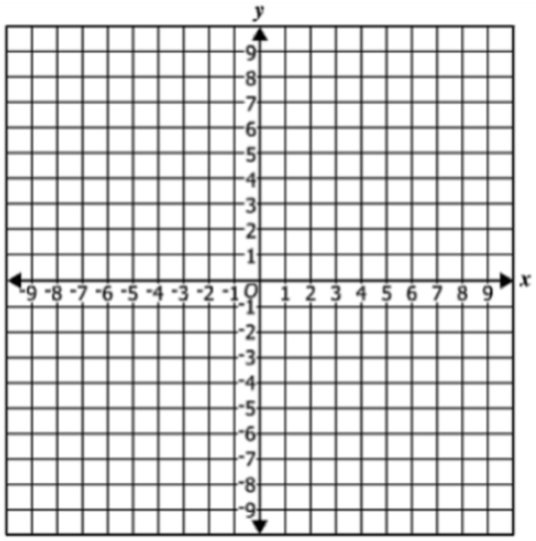
Number of Cupcakes (x)	**Total Cost (dollars)** (y)
0	0
1	3
2	6
3	9

a) What is the slope of the line that best represents this relationship?

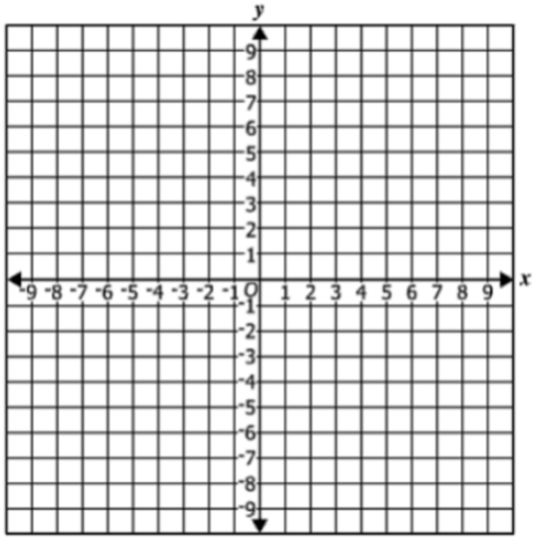
b) Write an equation that represents the proportional relationship shown in the table.

5. Sid is creating a model volcano for his science project using papier mâché. To create the papier mâché glue that holds the paper strips together, he must mix $\frac{3}{4}$ cups of water with $\frac{1}{4}$ cup of flour. Write an equation to represent the proportional relationship between the number of cups of flour, *y*, and the number of cups of water, *x*, needed to make the glue mixture.

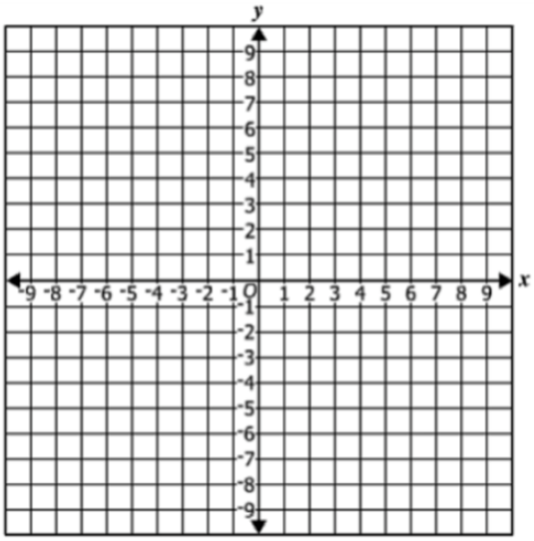
6. Graph the line that passes through (-6, -4) and has a slope of $\frac{2}{3}$. Plot at least two additional points that lie on the line.



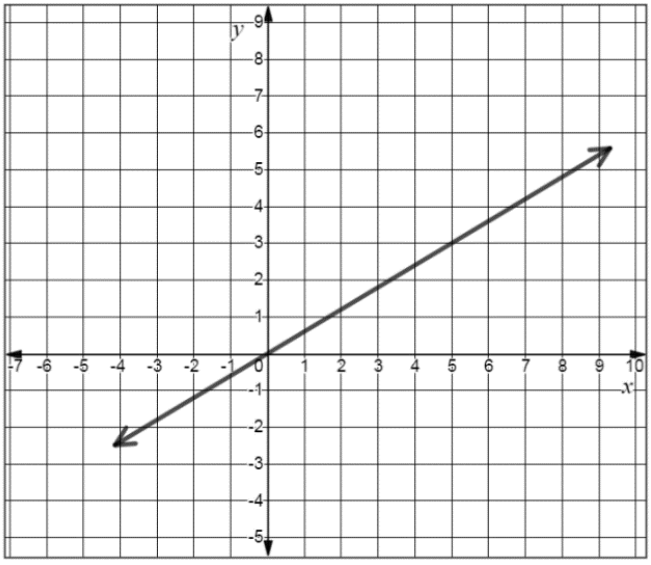
7. Graph the line that represents $y = 2x$. Plot at least 3 points on this line.



8. Graph the line that represents $y = \frac{5}{4}x$. Plot at least 3 points on this line.



9. Erica is designing a new town park. Every 5 yards of bike path will require 3 hours of clearing and paving. Erica graphed this relationship between the number of yards of bike path, x, and the number of hours of clearing and paving, y.



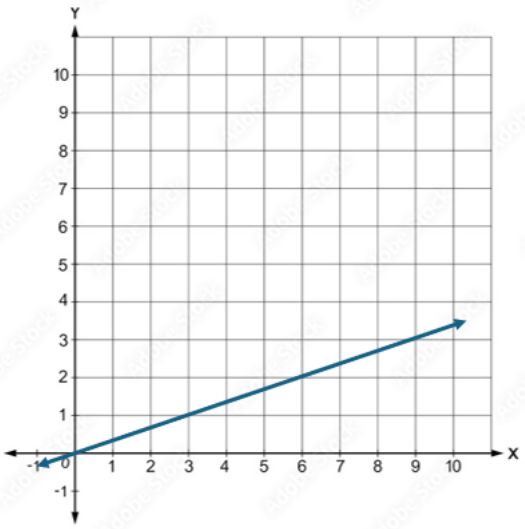
Did Erica graph the relationship correctly? Justify your reasoning.

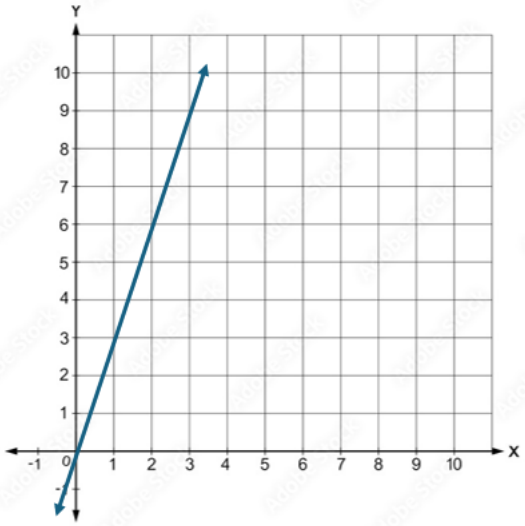
10. Select each representation that could represent the contextual situation:

    Mary and her friends set out to sea on their annual fishing trip. Their distance from the shore in miles, *y*, increases by 3 miles each hour, *x*.

x	*y*
0	0
1	3
2	6
3	9

x	*y*
0	3
1	4
2	5
3	7





7.PFA.1 Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

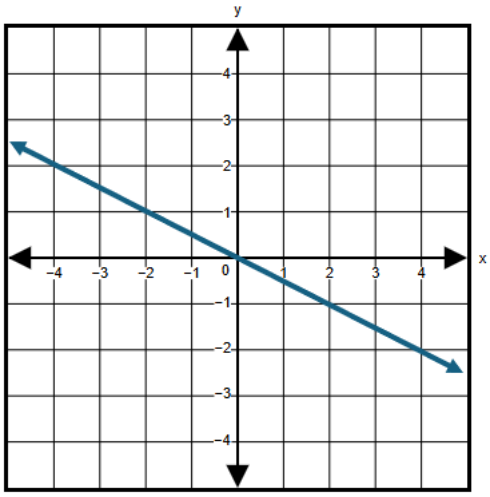
1. The table of values represents a proportional relationship between x and y.

x	y
2	1
5	$2\frac{1}{2}$
6	3

a) What is the slope of the line that best represents this relationship?
One common error is determining what the y-value is multiplied by to get the x-value and stating the slope is two. This indicates that students may not have a strong understanding of how to determine slope from a table. Students may benefit from additional practice with finding unit rate or slope from ratio tables.

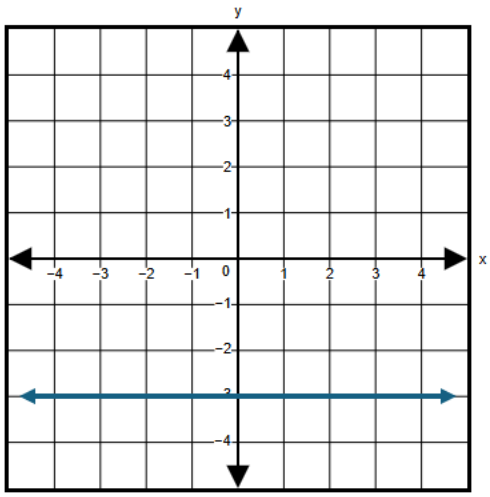
b) Write an equation in the form $y = mx$ to represent the relationship shown in the table.
A common error would be to use the reciprocal slope, producing an incorrect answer of $y = 2x$. This may indicate that students lack a conceptual understanding of slope as the change in y over the change in x or the constant ratio of y to x. Students may benefit from a review of vocabulary related to proportional relationships, slope and unit rate. Students may also benefit from practice finding the unit rate and rate of change from a table.

2. Determine if the slope of each graph is positive, negative, or zero.



a)

A common error students may make is identifying the slope as positive and describing a rise from the right side of the graph to the left side of the graph. Students making this error may not recognize that the line must be described from left to right. These students may benefit from activities that address slope in terms of a ratio.



b)

A common error students may make is stating that the slope of this line is undefined. Students making this error would benefit from activities that address slope as a ratio as well as reinforcing vocabulary of horizontal and vertical lines.

3. Miguel makes bags. He can make 8 bags with 2 yards of fabric. Write an equation to represent the yards of fabric, x, needed to make a specific number of bags, y.

A common error would be to write $x = 4y$. Students may also incorrectly use the difference between the x-value and y-value, resulting in an answer of $y = 6x$. These errors indicate that students may not have a strong understanding of how to determine slope. Students may benefit from additional practice determining slope when given a practical situation. These errors also may indicate a learning gap regarding proportional relationships. Students may benefit from practice identifying and representing proportional relationships.

4. The table of values represents a relationship between the number of cupcakes, *x*, and the total cost in dollars, *y*.

Number of Cupcakes (x)	**Total Cost (dollars)** (y)
0	0
1	3
2	6
3	9

a) What is the slope of the line that best represents this relationship?

Students may incorrectly use the reciprocal slope resulting in a slope of $\frac{1}{3}$. This indicates that students believe the slope represents the change in x over the change in y. Another common error students may make is to use the first non-zero ordered pair and think the slope is two, since $2 + 1 = 3$. This may indicate that students think the slope is found using an additive relationship. The student may benefit from additional practice determining slope from a table.

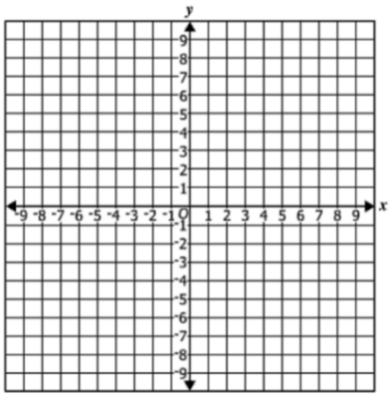
b) Write an equation that represents the proportional relationship shown in the table.

A common error would be to write $y = x + 3$ because every y-value increases by three. This indicates a student may lack a conceptual understanding of slope as the rate of change.

5. Sid is creating a model volcano for his science project using papier mâché. To create the papier mâché glue that holds the paper strips together, he must mix $\frac{3}{4}$ cups of water with $\frac{1}{4}$ cup of flour. Write an equation to represent the proportional relationship between the number of cups of flour, *y*, and the number of cups of water, *x*, needed to make the glue mixture.

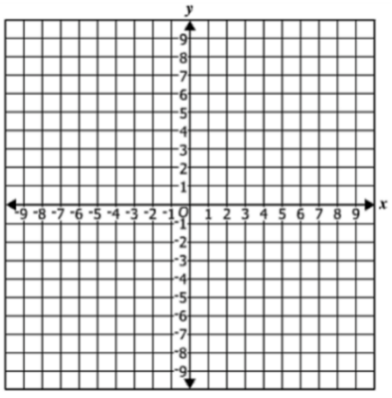
   A common error would be to subtract the two values and use the difference as the slope resulting in $y = \frac{1}{2}x$. This error indicates that students determined the relationship is additive rather than proportional. The student would benefit from a review of key vocabulary including proportional and additive relationships.

6. Graph the line that passes through (-6, -4) and has a slope of $\frac{2}{3}$. List two points that lie on the line.



   A common error students may make is to plot the reciprocal slope, $m = \frac{3}{2}$. This indicates that there may be confusion with regards to the meaning of slope as the $\frac{change\ in\ y-values}{change\ in\ x-values}$. Students may benefit from practice finding slope from two points on a graph or graphing from a table of values.

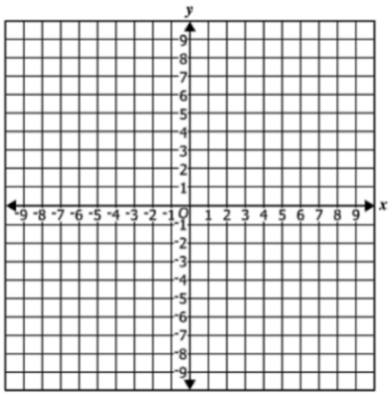
7. Graph the line that represents $y = 2x$. Plot at least 3 points on this line.



Students may incorrectly use the slope value of two as the x- and y-intercept values, plotting (0, 2) and (2, 0). This indicates that students may not understand slope as $\frac{change\ in\ y-values}{change\ in\ x-values}$. *Students may benefit from practicing how to derive slope from the graph of a line in the form of* $y = mx$.

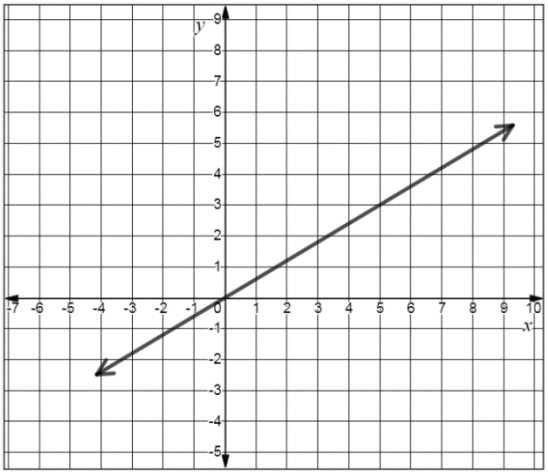
Another common example is students may not include (0, 0) in the graph of the line. This indicates that students do not understand all proportional relationships go through the origin. Students may benefit from a review of the vocabulary associated with proportional relationships, specifically slope and proportional relationship. They may also benefit from graphing various proportional relationships, which will allow them to see that that all proportional relationships go through the origin.

8. Graph the line that represents $y = \frac{5}{4}x$. Plot at least 3 points on this line.



A common mistake students may make is to use the numerator and denominator to plot the point (5, 4). This indicates students may be think slope is a point on a line instead of $\frac{change\ in\ y-values}{change\ in\ x-values}$. *Students may benefit from additional practice writing and graphing equations in the form* $y = mx$.

9. Erica is designing a new town park. Every 5 yards of bike path, will require 3 hours of clearing and paving. Erica graphed this relationship between the number of yards of bike path, x, and the number of hours of clearing and paving, y.



Did Erica graph the relationship correctly? Explain your answer.

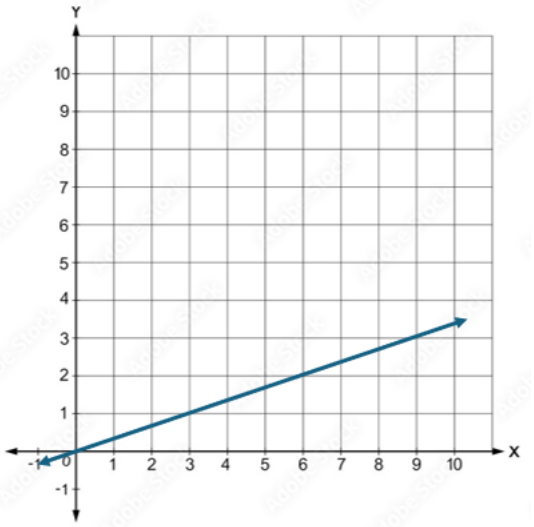
Students may state that Erica's graph is incorrect because the line shown should have a slope of $\frac{5}{3}$. This error indicates that students may be struggling with interpreting the slope of the real-world scenario and using the ratio of y to x. Students may benefit from additional practice with connecting proportional relationships to practical applications where the slope must be interpreted.

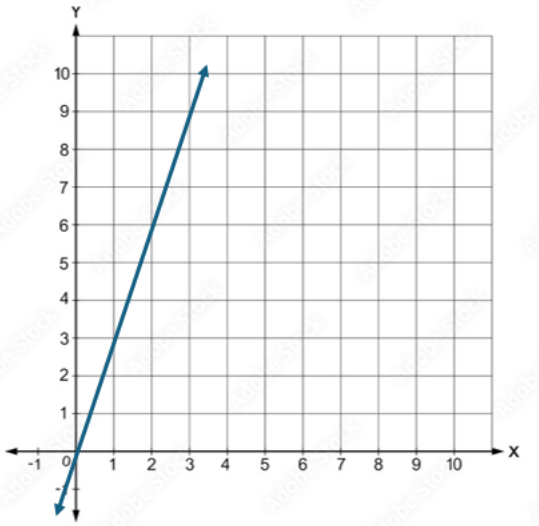
10. Select each representation that could represent the contextual situation:

Mary and her friends set out to sea on their annual fishing trip. Their distance from the shore in miles, *y*, increases by 3 miles each hour, *x*.

x	*y*
0	0
1	3
2	6
3	9

x	*y*
0	3
1	4
2	5
3	7





A common error students may make is to incorrectly interpret the meaning of a contextual situation in relation to additive or proportional relationships. This type of error may indicate that students are having difficulty with translating a verbal description into a tabular, symbolic, or graphical representation that is equivalent. For example, a student may interpret the distance increasing by 3 miles each hour as an additive relationship. The student may benefit from additional practice writing linear equations from verbal representations.