Unit: Linear Relationships
Student Handout 1

Name _____

Date _____Pd_____

IDENTIFYING FUNCTIONS

A donut shop has a small vending machine with the items shown.

a. If Nate inputs B2, what will he receive?
b. If Mia inputs A2, what will she receive?
c. If 5 people in a row input B1, what should they each receive?

	A	B
1	MILK	CHOC. MILK
2	ORANGE JUICE	APPLE JUICE
3	FRUIT PUNCH	WATER

FUNCTIONS

- A function is a relation or rule that assigns each _____ exactly one _____. Each _____-value is paired with exactly one _____-value.
- A graph that is a function will pass the _____ line test where any _____ line drawn on the graph will pass through only _____ point.

- Would a vending machine like the one shown represent a function? Explain.

- A customer chose A3 and received fruit punch. If the next customer chooses A3 and receives milk, would the vending machine represent a function? Explain.

Determine if each representation shows y as a function of x. Explain your choice.

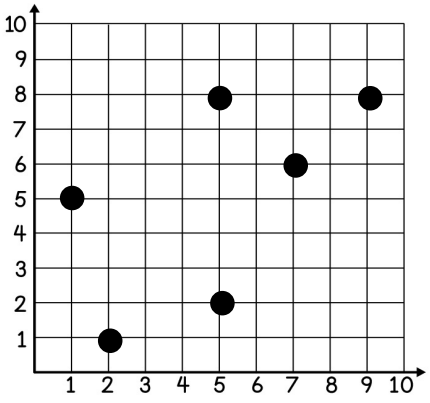
1.

x	-2	-1	0	1	2
y	7	1	-1	1	7

2.

{(-2, 1), (3, 11), (-4, -3), (-2, 8), (0, 5)}

3.



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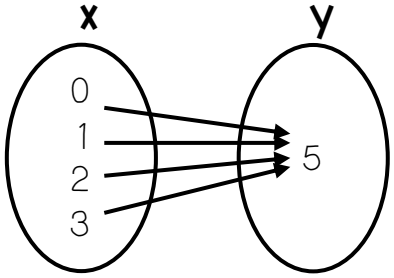


Determine if each representation is a function by writing "yes" or "no." Justify your answers.

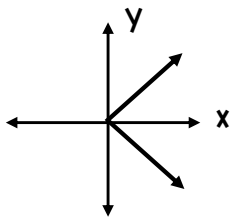
5.

{(3, 7), (4, 7), (5, 7), (6, 7)}

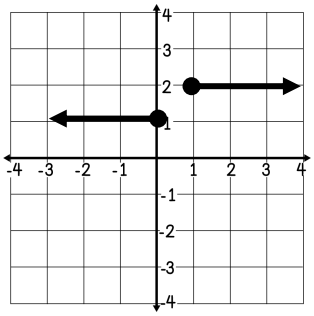
6.

x	-7	-5	-7	5
y	1	3	-1	13

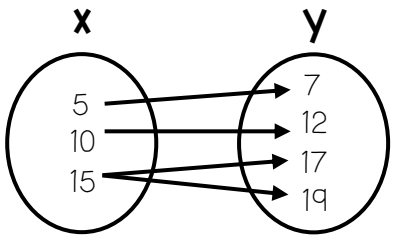
7.



8.



9.

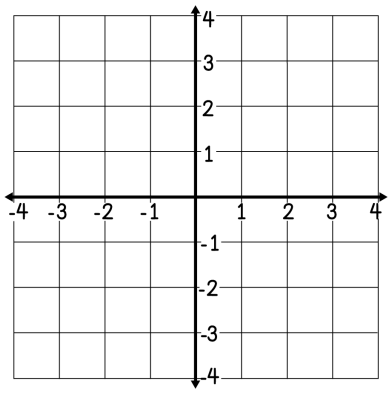
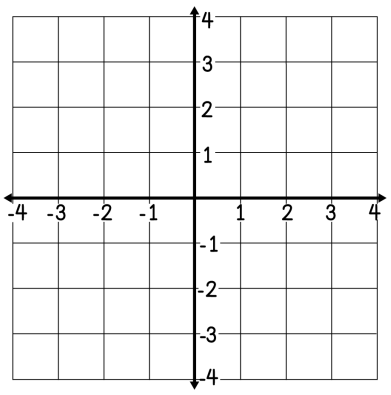


10. The set of ordered pairs shown is missing an x-value.

{(9, -15), (0, 0), (4, 0), (___, 2)}

a. Give an example of an x-value that would result in y as a function of x.
b. Give an example of an x-value that would not result in y as a function of x.

Create your own examples and non-examples of functions for each representation below.

EXAMPLES	NON-EXAMPLES
{(___ , ___) (___ , ___) (___ , ___)}	{(___ , ___) (___ , ___) (___ , ___)}
x | | | | | | y | | | | | |	x | | | | | | y | | | | | |
	

Summarize today's lesson:

Unit: Linear Relationships
Homework 1

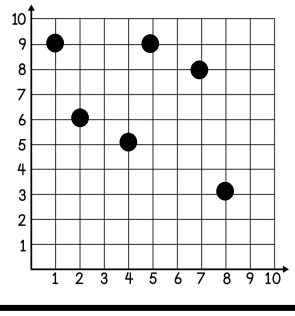
Name _____

Date _____Pd_____

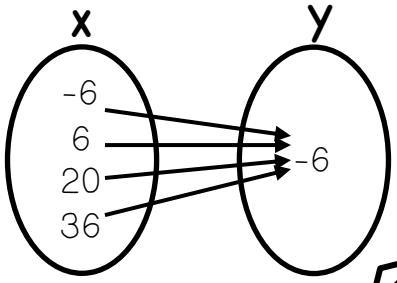
IDENTIFYING FUNCTIONS

Students were asked to create a representation of y as a function of x. Circle the names of the students who correctly completed the task. Then, unscramble the underlined letters of the circled names to answer the question at the bottom.

CHARLOTTE



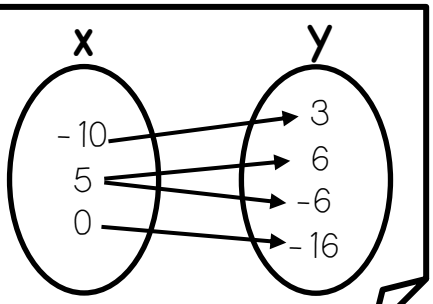
SOFIA



DESHAUN

{(-6, 7), (-1, 4), (2, 9), (-6, 11)}

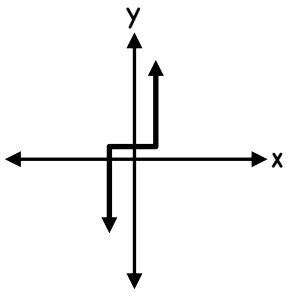
JACE



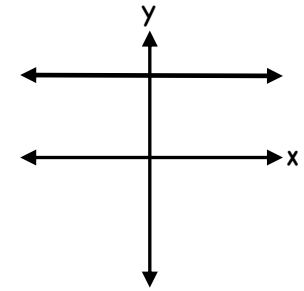
NATHAN

x	-4	0	5	11
y	-8	-13	-4	14

COLBY



ABBY



ORLANDO

{(9,-2), (7, 5), (4,-3), (-9, 6)}

STEPHANIE

x	-4	0	7	-4
y	6	0	-2	-6

WHAT IS THE ONLY NUMBER WHOSE LETTERS ARE IN ALPHABETICAL ORDER?

_____

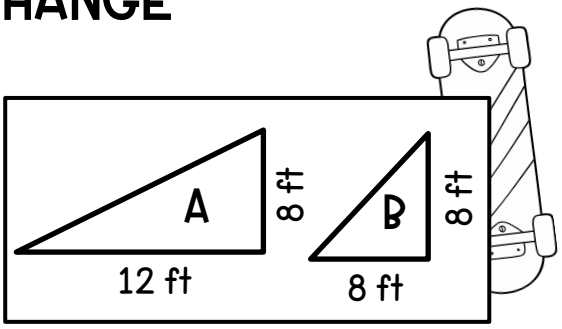
Unit: Linear Relationships
Student Handout 2

Name _____

Date _____Pd_____

SLOPE AND RATE OF CHANGE

The side view of two ramps at a local skate park are shown.



a. What measurement do the ramps have in common?

b. What measurement is different between the ramps?

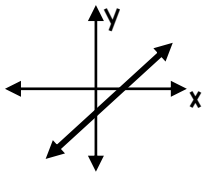
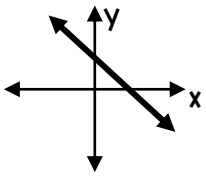
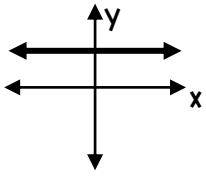
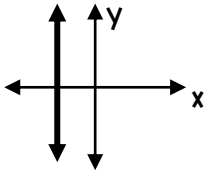
c. Which ramp appears steeper? Justify your answer using a and b.

SLOPE

- When a linear relationship is graphed, the slope is a value used to describe the _____ of the line.
- Slope is the ratio of the _____ change compared to the _____ change, or $\frac{\text{RISE}}{\text{RUN}}$. Slope is equal to the _____ of _____ of the graph and the linear relationship.

There are four types of slope as described and shown in the table below.

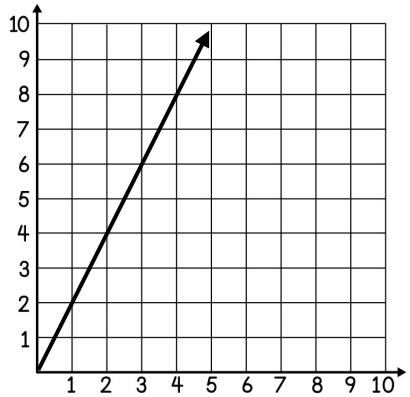
TYPES OF SLOPE

A _____ slope increases from left to right.	A _____ slope decreases from left to right.	A _____ slope is a horizontal line.	An _____ slope is a vertical line.
			

Follow the steps described below to find the slope of the graphed line.

FINDING SLOPE FROM A GRAPH

- Choose two _____ on the graphed line.
- Draw a right triangle to count the _____ and the _____ between the points.
- Set up a _____ of $\frac{\text{RISE}}{\text{RUN}}$ and simplify.
- Double check if the graph is _____ or _____.



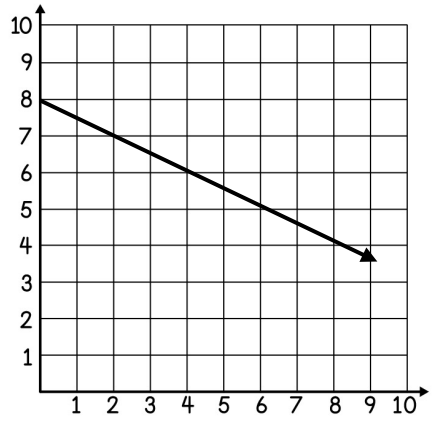
RISE:

RUN:

SLOPE:

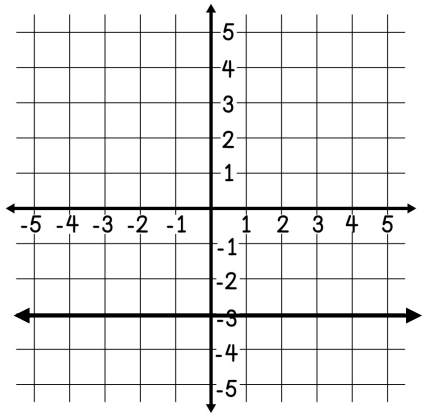
In 1-6, find the slope of each graphed line.

1.



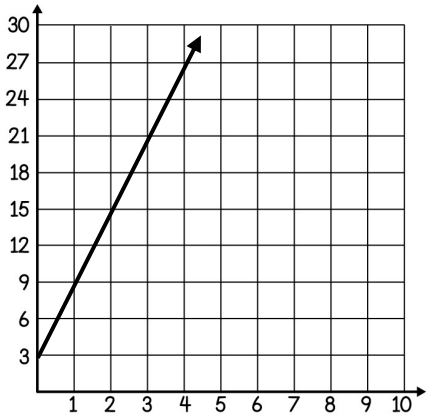
Slope: _____

2.



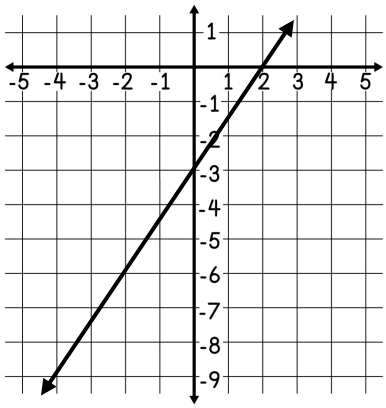
Slope: _____

3.



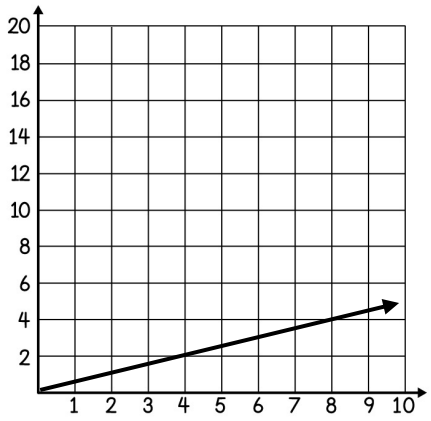
Slope: _____

4.



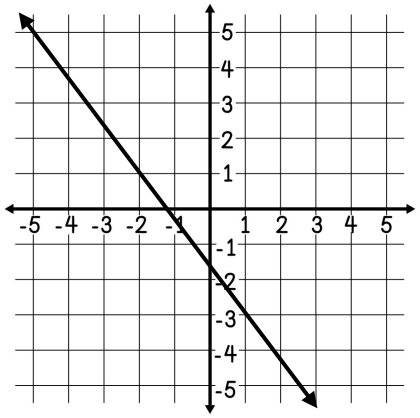
Slope: _____

5.



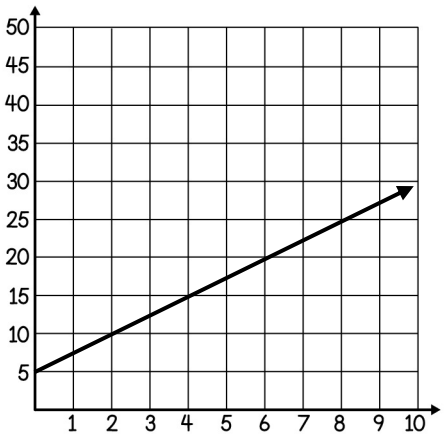
Slope: _____

6.



Slope: _____

7. Luis thinks the slope is $\frac{1}{2}$. Explain his mistake and give the correct slope.



8. The graph shows the linear relationship between number of bagels a bagel shop has remaining, and the number of customers served so far that day. Find the rate of change of bagels remaining with respect to the number of customers served.

Unit: Linear Relationships
Homework 2

Name _____

Date _____Pd_____

SLOPE AND RATE OF CHANGE

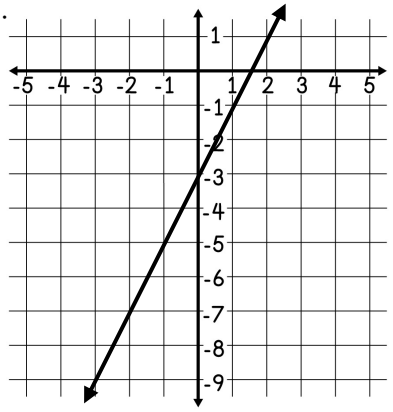
In 1-6, complete each blank with the letter of the correct vocabulary term from the right.

1. The slope of a vertical line will always be _____.	A. Positive
2. A graph with a _____ slope decreases from left to right.	B. Undefined
3. The vertical change on a graph is described as the _____.	C. Run
4. The horizontal change on a graph is described as the _____.	D. Zero
5. The slope of a horizontal line will always be _____.	E. Negative
6. A graph with a _____ slope increases from left to right.	F. Rise

In 7-12, find the slope of each line. Use the bank of answer choices below to check your work. Not all choices will be used.

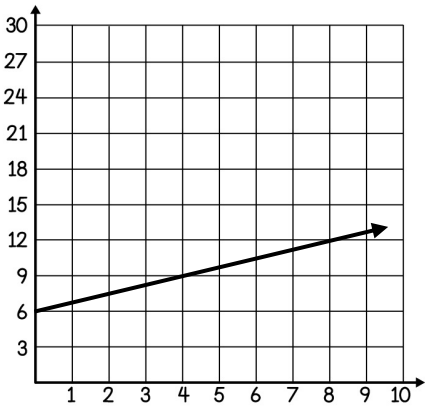
$\frac{2}{3}$	-25	UNDEFINED	$-\frac{1}{2}$	$\frac{3}{2}$	2	$\frac{1}{4}$	0	-3	$\frac{3}{4}$

7.



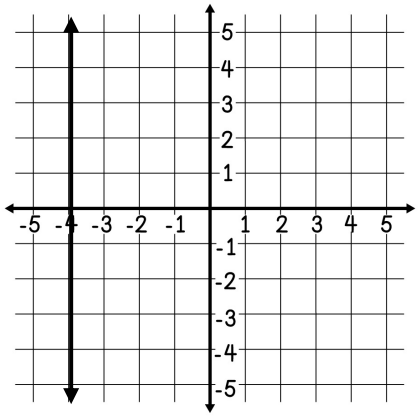
Slope: _____

8.



Slope: _____

9

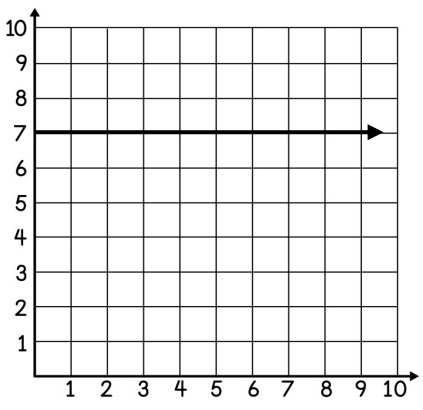


Slope: _____

10.

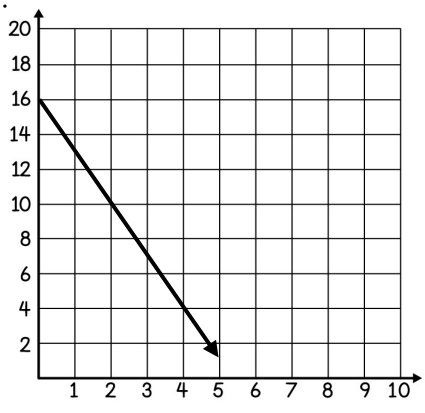
Slope: _____

11.



Slope: _____

12.



Slope: _____

Unit: Linear Relationships
Student Handout 3

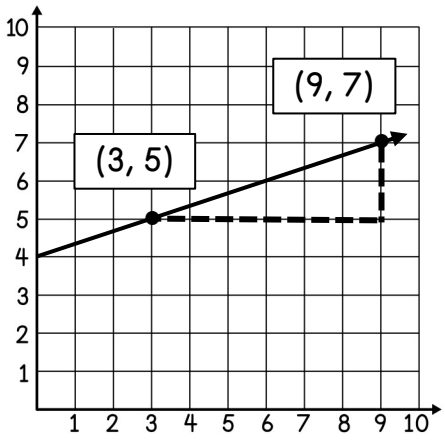
Name _____

Date _____Pd_____

THE SLOPE FORMULA

To find the slope of the graph, Aiden chose the two points shown and counted the rise to be 2 and the run to be 6. He used these values to set up the ratio $\frac{2}{6}$ and simplified the slope to $\frac{1}{3}$.

- Using the values in the ordered pairs, how else could Aiden have found the rise to be 2?
- Using the values in the ordered pairs, how else could Aiden have found the run to be 6?

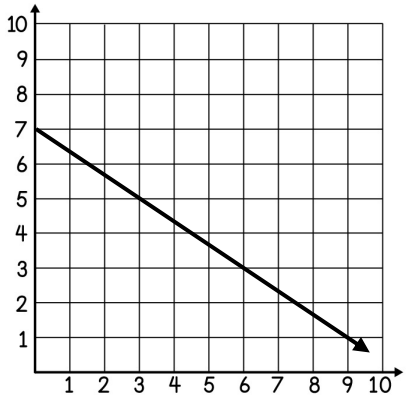


THE SLOPE FORMULA

If a linear relationship contains two ordered pairs (x_1, y_1) and (x_2, y_2), the slope can be found using the formula below:

$$\frac{y_2 - y_1}{x_2 - x_1}$$

Ex. Use the formula to find the slope of the graphed line.



1. A graphed line passes through each of the following pairs of points. Use the slope formula to find the slope of each line. Show all work.

POINTS	FORMULA AND WORK	SLOPE
A (2, 4) and (1, 7)		
B (-1, 3) and (5, -5)		
C (8, 11) and (10, 22)		
D (-1, 9) and (-1, 6)		

In 2-3, each table represents a linear relationship. Choose two ordered pairs from the table and use the slope formula to find the rate of change.

2.

X	0	1	2	3
Y	5	5.5	6	6.5

Formula: _____ Slope: _____

3.

X	3	8	11	14
Y	15	15	15	15

Formula: _____ Slope: _____

4. A web designer charges customers an initial consultation fee plus an hourly rate. The table shows the linear relationship between x, the number of hours and y, the total cost of hiring the designer.

# HOURS	TOTAL COST
2	$205
5	$400
8	$595
10	$725

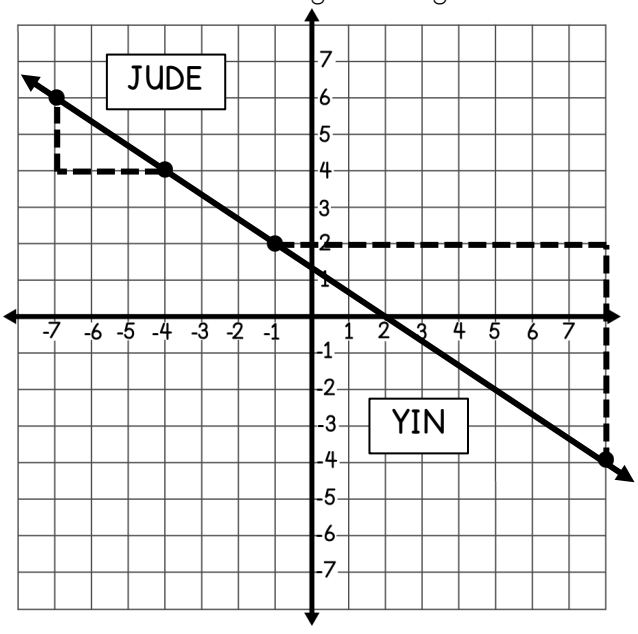
a. Find the rate of change.

b. What does the rate of change represent in the context of the situation?

5. The post office calculates shipping costs based on the weight of the item in addition to a fee. The cost to ship a 2-pound item is $6.09, while the cost to ship a 7-pound item is $8.84. Find the rate of change of the cost with respect to the weight of the item.

_____

6. Jude and Yin each chose two points on the graphed line below and drew right triangles to find the slope of the line. Use their triangles to answer a-d.



a. Use Jude's points to set up and simplify the slope formula below.

b. Use Yin's points to set up and simplify the slope formula below.

c. How are the two triangles related to one another?

d. What can we assume about the slope between any two points on the same line? Explain.

Unit: Linear Relationships
Homework 3

Name _____

Date _____Pd_____

THE SLOPE FORMULA

In 1-3, find the slope of the graphed line that contains the given ordered pairs. Show all work.

1. (8, 7) and (2, 12)

slope:_____

2. (12, -10) and (15, -8)

slope:_____

3. (1, 4) and (0, 11)

slope:_____

4. Madeline needs to find the slope of the line that passes through the points (9, 12) and (7, 4). She sets up the following work:

$$\frac{12-4}{7-9}$$

Has she set up her work correctly? Why or why not?

5. A graphed line has a slope of $\frac{5}{3}$. Which of the following points could the line contain?

A. (15, 13) and (0, 4)

B. (3, 9) and (6, 14)

C. (0, 4) and (19, 9)

D. (5, 7) and (10, 10)

In 6-8, each table represents a linear relationship. Use the slope formula to find the slope or rate of change shown in each table.

6.

x	2	6	10	14
y	8	28	48	68

_____

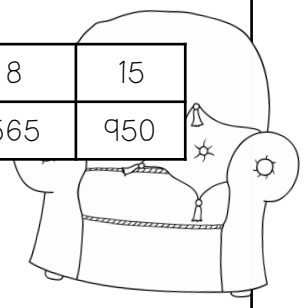
7.

x	-6	4	9	20
y	5	10	12.5	18

_____

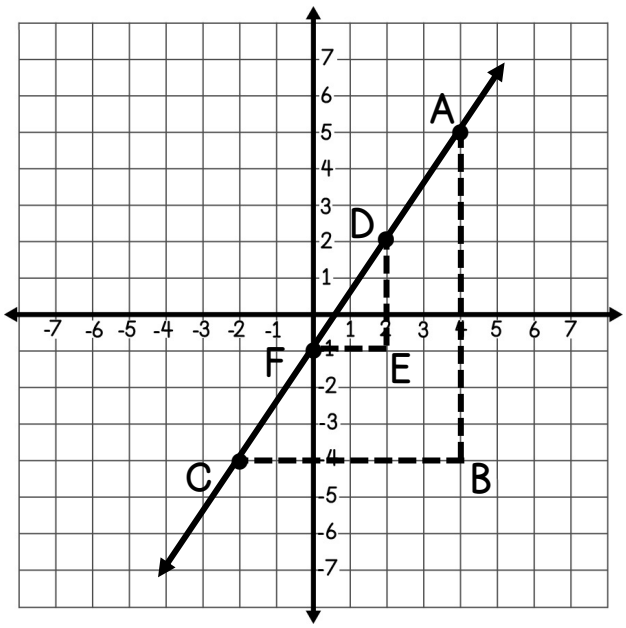
8. An interior designer charges customers an initial consultation fee plus an hourly rate. The table shows the linear relationship between x, the number of hours, and y, the total cost of hiring the designer.

HOURS	0	2	8	15
TOTAL COST ($)	125	235	565	950



a. Find the rate of change.
b. What does the rate of change represent in the context of the situation?

Use the graphed line and triangles ABC and DEF below to answer 9-10.



9. Find the slope of $\overline{AC}$.

10. Which is a true statement about the slope of $\overline{AC}$ compared to the slope of $\overline{DF}$?

a. The slope of $\overline{AC}$ is greater than the slope of $\overline{DF}$.

b. The slope of $\overline{AC}$ is less than the slope of $\overline{DF}$.

c. The slopes are equal because $\frac{5-(-4)}{4-(-2)} = \frac{2-(-1)}{2-0}$.

d. The slopes are equal because $\frac{4-(-2)}{5-(-4)} = \frac{2-0}{2-(-1)}$.

Unit: Linear Relationships
Mini-Quiz 1

Name _____

Date _____ Pd_____

FUNCTIONS AND SLOPE MINI-QUIZ

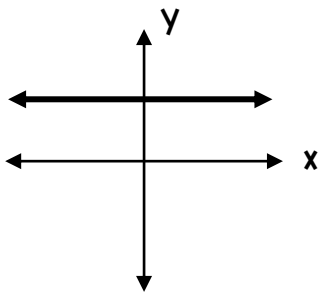
1. Determine if each representation shows y as a function of x by writing "yes" or "no."

a.

{(-2, 9), (0, -4), (3, 12), (1, 1)}

_____

b.



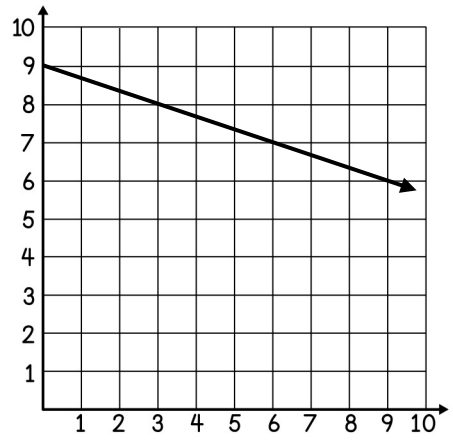
_____

c.

x	y
-1	1
-1	2
-1	3
-1	4

_____

2. Find the slope of the line graphed below.



_____

3. Find the rate of change represented in the table.

x	-2	0	2	4
y	-39	-11	17	45

_____

4. Find the slope of the line that passes through the following pairs of points:

a. (7, -51) and (10, -75) _____

b. (5, 10.5) and (25, 12.5) _____

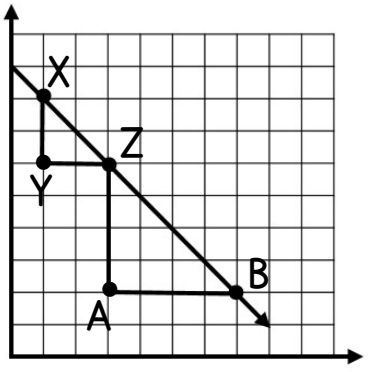
5. Which is NOT a true statement about the triangles shown on the graph at the right?

A. The slope of $\overline{XZ}$ is equal to the slope of $\overline{ZB}$.

B. The triangles are similar triangles.

C. The ratio of $\frac{y_2 - y_1}{x_2 - x_1}$ is greater for $\overline{ZB}$ than $\overline{XZ}$.

D. The length of $\overline{XY}$ is less than the length of $\overline{ZA}$.



Unit: Linear Relationships
Student Handout 4

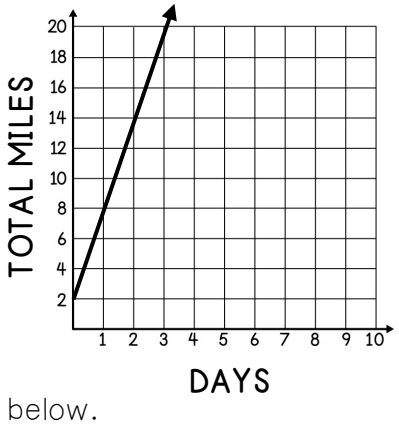
Name _____

Date _____Pd_____

SLOPE-INTERCEPT FORM: PART I

Xander has biked 2 miles so far this week and plans to bike an average of 6 miles each day over the next several days. Xander wrote the equation and created the graph to represent x, the number of days and y, the total number of miles traveled on his bike.

y = 6x + 2



a. Find the slope of the graph. Where do you see this value in Xander's equation?

b. What value does the graph touch on the y-axis? Where do you see this value in Xander's equation?

Xander's equation is written in slope-intercept form which is described below.

SLOPE-INTERCEPT FORM

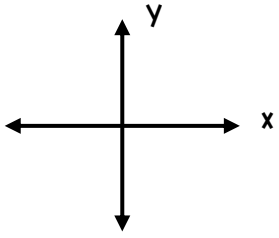
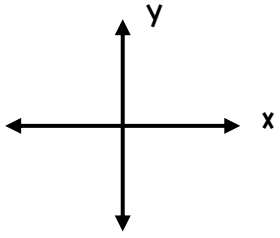
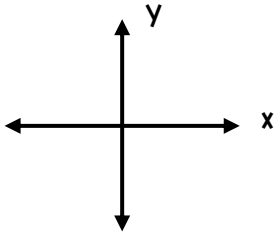
- Slope-intercept form, or y = ____x + ____, is one way to write the equation of a _____ relationship.
- The y-intercept of a graph is the value of y where the line _____ the y-axis, or when x = _____.

y = mx + b

In 1-3, use the given information to write an equation of the line in slope-intercept form.

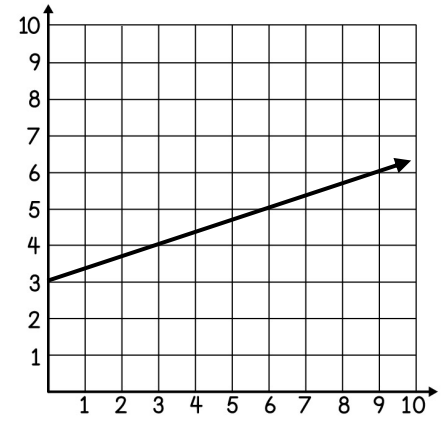
1. slope = -9, y-intercept = 2	2. m = 4.5, b = -10	3. A line has a slope of -5 and passes through the origin.
y = ____ x + _____	_____	_____

4. Complete the table below by recording the slope, the y-intercept and a sketch of each linear equation's graph.

	y = x – 5	y = 3x	y = -5x + 7
SLOPE (m)			
Y-INT (b)			
GRAPH			

For each graph below, record the slope, y-intercept, and equation in slope-intercept form.

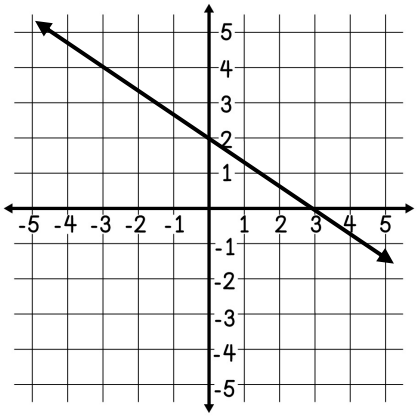
5.



m: _____ b: _____

equation: _____

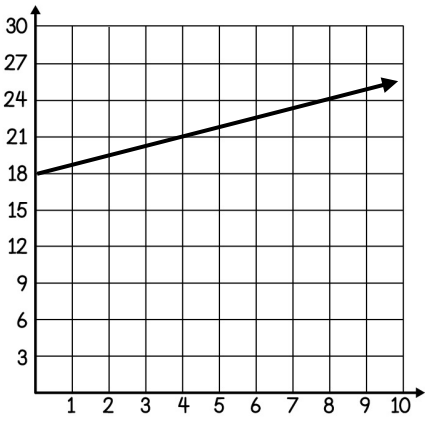
6.



m: _____ b: _____

equation: _____

7.



m: _____ b: _____

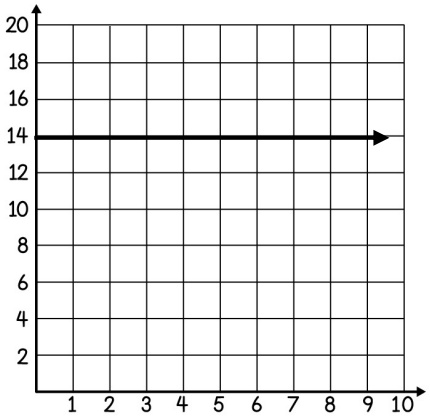
equation: _____

8.

m: _____ b: _____

equation: _____

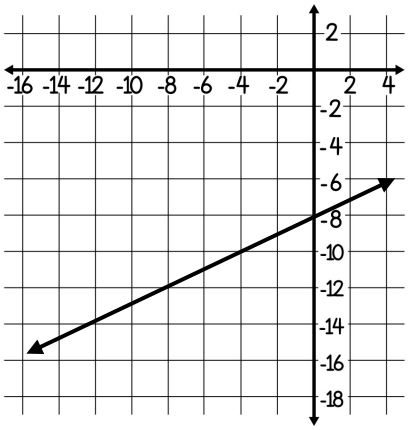
9.



m: _____ b: _____

equation: _____

10.



m: _____ b: _____

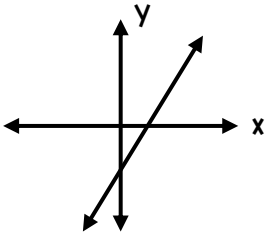
equation: _____

11. Matt is going to create a graph of the equation $y = \frac{4}{5}x - 7$. Mark each statement as true or false and correct any false statements.

_____ a. Matt's graph will cross the y-axis at (-7, 0).

_____ b. Matt's graph will increase from left to right.

12. Circle the name of any student who wrote an equation that could possibly represent the graphed line shown at the right.



JAVIER	KARISSA	LIAM
$y = -3x - 2$	$y = 2x - 3$	$y = 2x + 3$

Summarize today's lesson:

Unit: Linear Relationships
Homework 4

Name _____

Date _____Pd_____

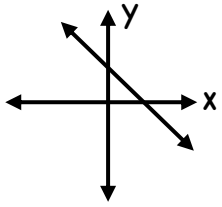
SLOPE-INTERCEPT FORM: PART I

Apply your knowledge of slope-intercept form to answer the questions below.

1. Harper is going to create a graph of the equation $y = -0.5x + 12$. Which of the following will be true about the graph?

a. The graph will contain the origin.
b. The graph will increase from left to right.
c. The graph will cross the x-axis at (12, 0).
d. The graph will have a slope of -0.5.

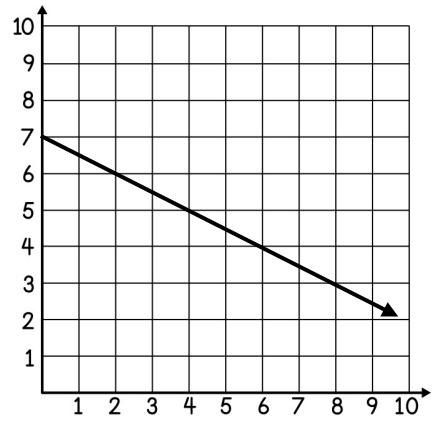
2. Khari graphed the line below. Which equation could represent Khari's graph?



a. $y = -2x - 3$
b. $y = 3x + 4$
c. $y = -4x + 3$
d. $y = -2x - 5$

For each graph below, record the slope, y-intercept, and equation in slope-intercept form.

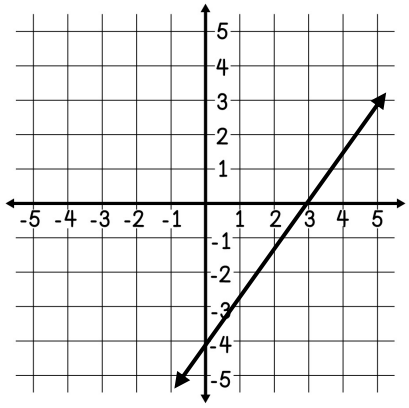
3.



m: _____ b: _____

equation: _____

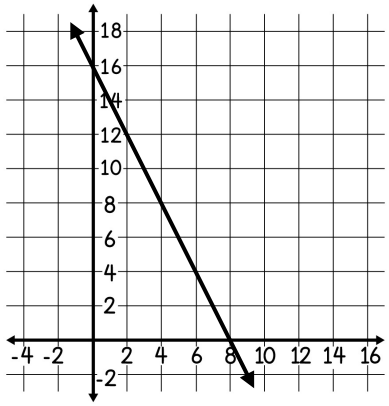
4.



m: _____ b: _____

equation: _____

5.

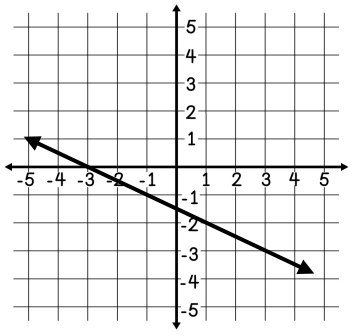


m: _____ b: _____

equation: _____

6. Li wrote the equation below to represent the graph shown. Explain her errors and correct the equation.

$$y = \frac{1}{2}x - 3$$



7. For a and b, write an equation in slope-intercept form that meets the given criteria.

a. A negative slope and passes through the origin

b. Slopes upward from left to right and has a y-intercept below the x-axis.

8. Mr. Brown asked his students to write an equation that represents a line with a positive slope and a negative y-intercept. Circle the name of any student who correctly completed the task.

EZRA	AALIYAH	JACOBY	PENNY
$y = -5x + 2.5$	$y = 4x - 7$	$y = -3x - 11$	$y = \frac{4}{5}x - 20$

Unit: Linear Relationships
Student Handout 5

Name _____

Date _____Pd_____

SLOPE-INTERCEPT FORM: PART II

Manny needs to write an equation in slope-intercept form to represent the linear relationship between x and y in the table shown at the right.

x	0	1	4	11	18
y	6	2	-10	-38	-66

a. Describe how Manny can find m, the slope.

b. Describe how Manny can find b, the y-intercept.

c. Write an equation to represent the relationship.

In 1-4, write an equation in slope-intercept form to represent each linear relationship.

1.

x	-5	0	5	10
y	-0.25	6	12.25	18.5

m: _____ b: _____

equation: _____

2.

x	2	4	6	8
y	50	90	130	170

m: _____ b: _____

equation: _____

3.

x	3	6	9	12
y	-6	-12	-18	-24

m: _____ b: _____

equation: _____

4.

x	0	1	2	3
y	1	$1\frac{1}{5}$	$1\frac{2}{5}$	$1\frac{3}{5}$

m: _____ b: _____

equation: _____

5. Luke's family goes to the movies and purchases a large popcorn. They are debating whether to purchase any drinks. The table shows the total cost based on the number of drinks they decide to purchase.

DRINKS	TOTAL COST
0	$6.25
1	$10.00
2	$13.75
3	$17.50
4	$21.25

a. Find the slope and explain what it represents.

b. Find the y-intercept and explain what it represents.

c. Write an equation in slope-intercept form: _____

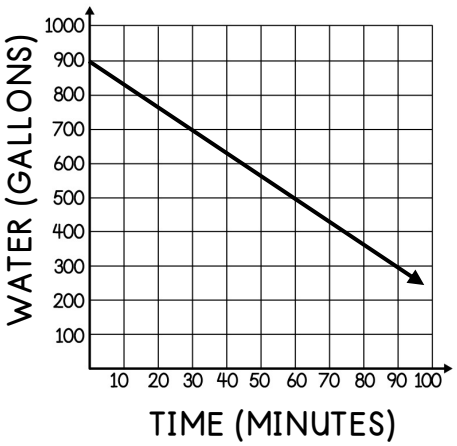
In 6-9, write an equation in slope-intercept form to represent the given situation.

6. At the end of the day, a pizzeria turns off its pizza oven. The table shows the linear relationship between the temperature of the oven and the first five minutes after it was turned off.

MINUTES	TEMPERATURE (°F)
1	425
2	400
3	375
4	350
5	325

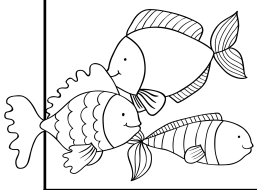
m: _____ b: _____ equation: _____

7. The graph shows the relationship between the number of gallons of water remaining in a storage tank and the number of minutes it has been draining.



m: _____ b: _____ equation: _____

8. Carly wants to buy some fish to keep in her room. At a local pet store, customers can pay $12.50 for a fish tank and $0.20 for each fish they purchase. Write an equation to represent the relationship between t, the total cost and n, the number of fish purchased.



m: _____ b: _____

equation: _____

9. Danny is diving for rings at the bottom of the pool and is 8.7 feet below the surface of the water. He grabs a ring and ascends 1.3 feet per second. Write an equation to represent the relationship between s, the number of seconds and f, Danny's depth in feet relative to the surface of the water.

m: _____ b: _____

equation: _____

10. A karate academy charges a monthly membership fee plus an additional fee per karate class. The table shows the linear relationship between the number of karate classes taken and the total cost including the membership fee. Find the error in each statement and rewrite them to make them true.

# OF CLASSES	1	5	8	14	20
TOTAL COST	36	60	78	114	150

a. The cost of each class is $8.

b. The monthly membership fee is $36.

c. A student who attended 30 classes would pay $220.

Unit: Linear Relationships
Homework 5

Name _____

Date _____Pd_____

SLOPE-INTERCEPT FORM: PART II

In 1-2, write an equation in slope-intercept form to represent each linear relationship.

1.

x	0	5	10	15
y	-2	40.5	83	125.5

m: _____ b: _____

equation: _____

2.

x	3	6	9	12
y	5	-1	-7	-13

m: _____ b: _____

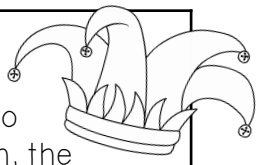
equation: _____

Apply your knowledge of slope-intercept form to answer each of the following questions.

3. Mia has $50 on a gift card to her favorite coffee shop. Each time she visits the coffee shop she spends $3.75 on her favorite drink. Write an equation to represent the relationship between n, the number of times she visits the coffee shop, and b, the total balance on her gift card.

_____

4. A magician charges a $30 fee to cover travel and expenses, plus $19.99 per hour. Write an equation to represent the relationship between h, the number of hours, and t, the total charge for the magician.



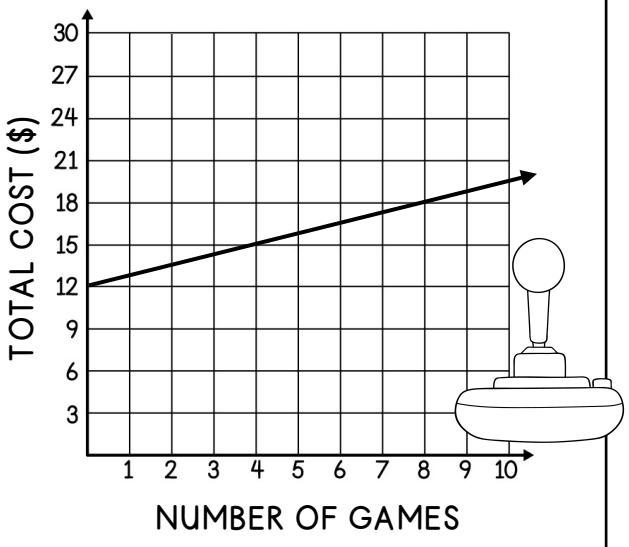
_____

Robert pays for his family to go to the arcade. He pays an entrance fee for his group and an additional amount per game that his family plays as shown in the graph. Use the graph to answer 5-7.

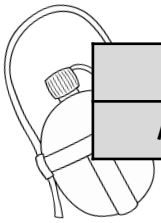
5. Find the slope and interpret its meaning.

6. Find the y-intercept and interpret its meaning.

7. Write an equation to represent the relationship between x, the number of games and y, the total cost.



8. A hiker hikes at a steady rate throughout the day on a mountain. Which student wrote a correct equation to represent the linear relationship shown on the table between x, the number of hours hiked and y, the current altitude of the climber?



# HOURS HIKED	1	2	3	5	8
ALTITUDE (FEET)	5,650	5,525	5,400	5,150	4,775

MATEO

$y = 125x + 5{,}775$

JULIE

$y = -125x + 5{,}775$

OLIVER

$y = -125x + 5{,}650$

The table shows the linear relationship between the number of pages left to read in a novel and the number of hours a student has already spent reading the novel. Mark each statement as true or false. If false, rewrite the statement correctly.

_____ 9. The student reads at a rate of 48 pages per hour.

_____ 10. The number of pages in the novel is 644.

_____ 11. The situation can be represented by the equation $y = -48x + 692$.

HOURS READ	PAGES REMAINING
1	644
4	500
8	308
12	116
14	20

Unit: Linear Relationships
Student Handout 6

Name _____

Date _____Pd_____

MULTIPLE REPRESENTATIONS

Practice representing linear relationships in multiple ways with the following examples. Use the representation given to help you fill in the others.

[VERBAL DESCRIPTION]

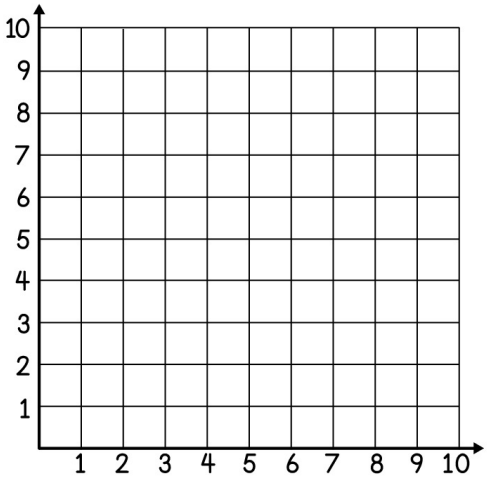
A baby giraffe measures 6 feet tall when it is born and grows an average of $\frac{1}{2}$ foot each month. What is the relationship between x, the number of months and y, the height of the giraffe?

[EQUATION]

[TABLE]

MONTHS	PROCESS	HEIGHT (FT)
0		
1		
2		
3		
4		
5		
6		

[GRAPH]



Use the representations in the example above to answer 1-5.

1. Explain how you found ordered pairs to create your graph.

2. What is the slope of the graph, and what does it represent?

3. What is the y-intercept of the graph, and what does it represent?

4. What does the ordered pair (9, 10.5) represent in the context of the situation?

5. If the giraffe is 12 feet tall, how many months old is it?

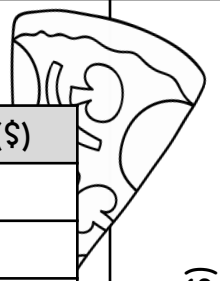
Use the given information for each situation below to fill in the missing representations.

[VERBAL DESCRIPTION]

[EQUATION]

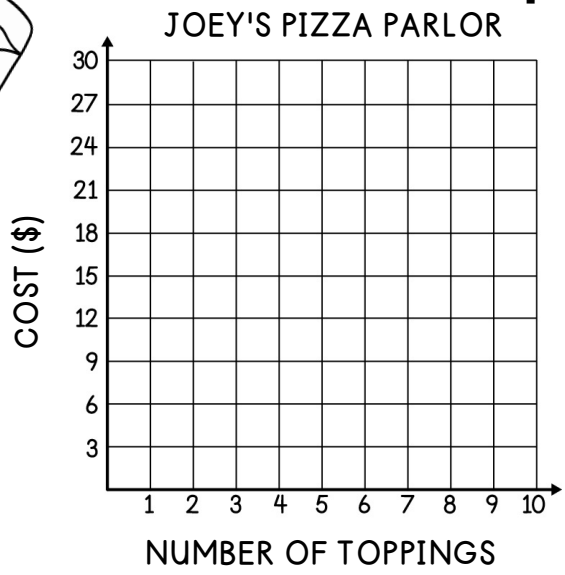
$$y = 12 + 1.5x$$

[TABLE]



TOPPINGS	PROCESS	COST ($)
0		
1		
2		
3		
4		
5		
6		

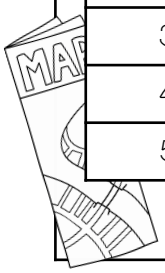
[GRAPH]



[VERBAL DESCRIPTION]

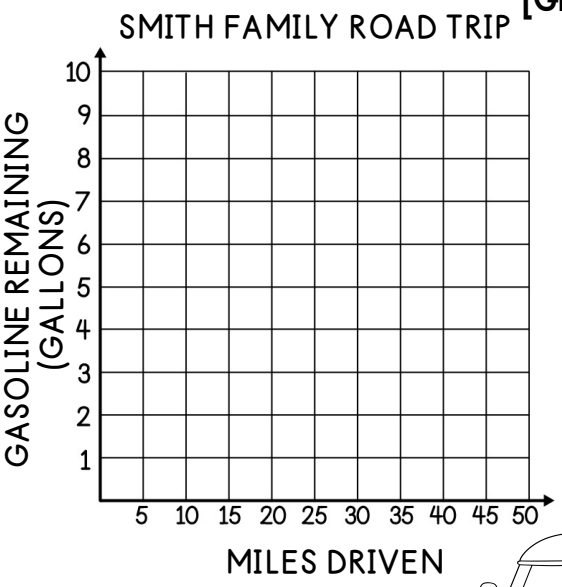
[EQUATION]

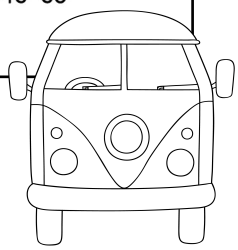
[TABLE]



MILES DRIVEN	PROCESS	GASOLINE REMAINING (GALLONS)
10		8.5
20		8
30		7.5
40		7
50		6.5

[GRAPH]





Summarize today's lesson:

Unit: Linear Relationships
Homework 6

Name _____

Date _____Pd_____

MULTIPLE REPRESENTATIONS

Andy's Appliance Repair charges a set fee for house calls and an additional fee for each hour of labor. Use the graph shown below to fill in the missing representations.

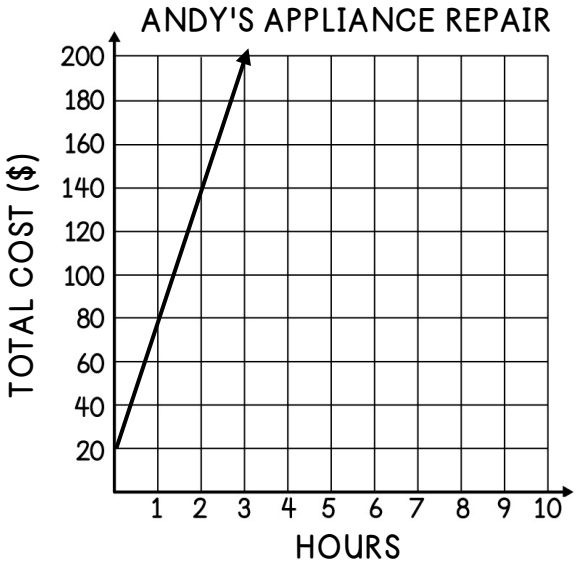
[VERBAL DESCRIPTION]

[EQUATION]

[TABLE]

HOURS	PROCESS	COST ($)
0		
1		
2		
3		
4		
5		
6		

[GRAPH]



1. What is the slope of the graph, and what does it represent?

2. What is the y-intercept of the graph, and what does it represent?

3. What does the ordered pair (7, 440) represent in the context of the situation?

4. How much would it cost for a 9-hour repair?

5. If the cost of a repair was $740, how many hours did it take?

Unit: Linear Relationships
Quiz 1

Name _____

Date _____Pd_____

QUIZ: FUNCTIONS, SLOPE AND SLOPE-INTERCEPT FORM

Answers

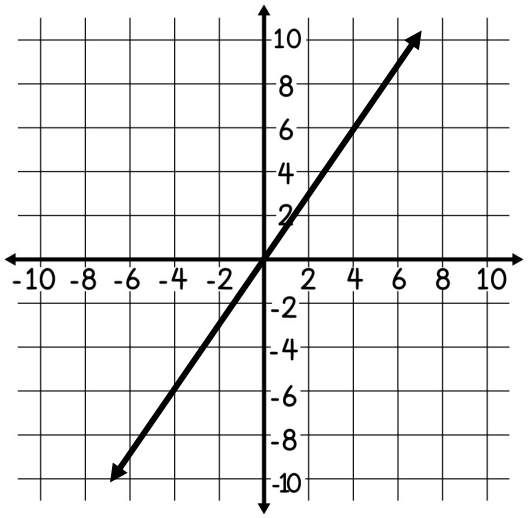
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

1. Kayla thinks that the slope of a vertical line is undefined, while Joshua argues that the slope of a vertical line is zero. Who is correct?

2. Find the rate of change shown in the table.

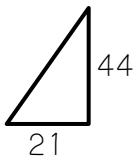
x	y
1	-3
2	-9
3	-15
4	-21

3. Find the slope of the graph.

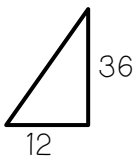


4. Which of the following triangles could lie on the line graphed in question #3?

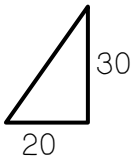
A.



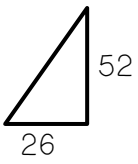
B.



C.



D.



5. A line has a slope of zero. Which of the following points could this line pass through?

A. (12, 9) and (12, 6)

B. (3, -6) and (7, -6)

C. (1, 4) and (2, 5)

D. (-9, 7) and (9, -7)

6. Which of the following is true about the graph of the equation $y = -5x + 10$?

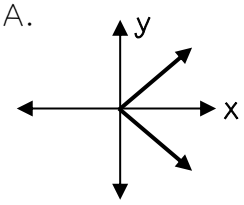
A. The graph would increase from left to right.

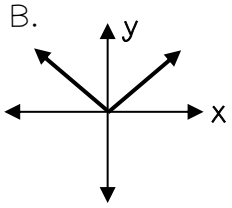
B. The graph would pass through the origin.

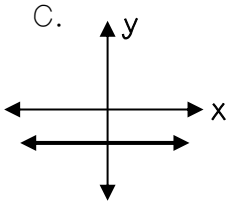
C. The graph would have a positive y-intercept.

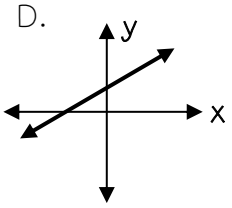
D. The graph would have a slope of 10.

7. Which of the following does not represent a function?

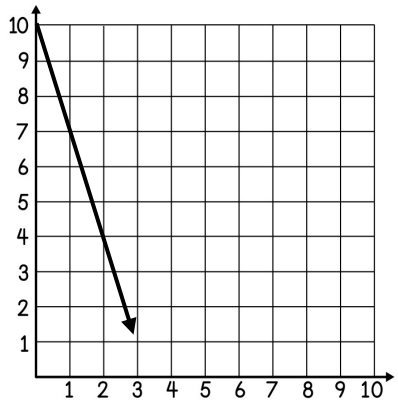
A. 

B. 

C. 

D. 

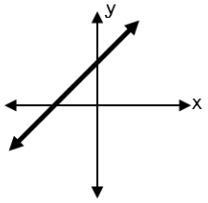
8. Write an equation for the graph in slope-intercept form.

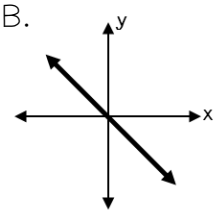


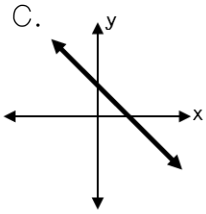
9. Write an equation for the table in slope-intercept form.

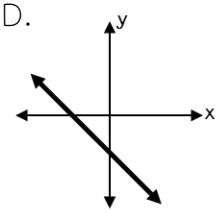
x	-2	0	2	4	6	8
y	-8.2	-5	-1.8	1.4	4.6	7.8

10. Which of the following could be the graph of the equation $y = -2x$?

A. 

B. 

C. 

D. 

11. Andre manages a company that currently has 35 employees and is gaining 4 new employees each month. Write an equation to represent the relationship between y, the total number of employees, and x, the number of months.

12. Which of the following sets of ordered pairs represents a function?

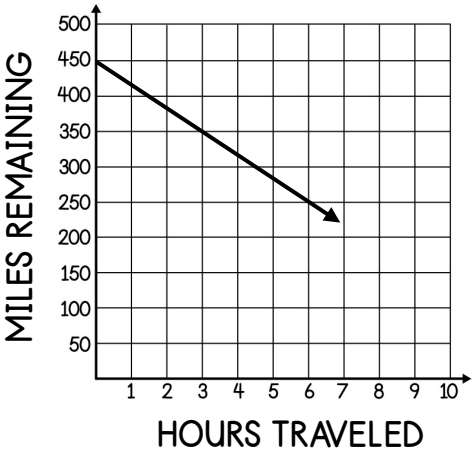
A. {(0, 3), (2, 6), (7, 12), (0, -3)}
B. {(6, 1), (6, 2), (6, 3), (6, 4)}
C. {(-12, 0), (-13, -1), (-14, -2), (-14, -3)}
D. {(1, 6), (2, 6), (3, 6), (4, 6)}

Misty is driving on a scenic road trip, and the graph shows the number of hours traveled compared to the number of miles remaining in the trip. Use the graph to answer 13-15.

13. Write an equation of the graph in slope-intercept form.

14. If Misty has been traveling for 9 hours, how many miles of the trip does she have remaining?

15. If there are 50 miles in the trip remaining, how many hours has Misty been traveling?



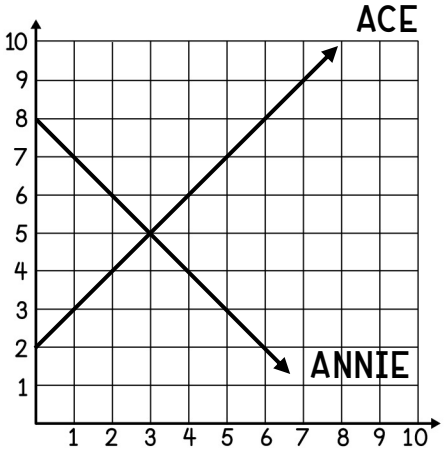
Unit: Linear Relationships
Student Handout 7

Name _____

Date _____Pd_____

SYSTEMS OF EQUATIONS

Ace and Annie graphed linear equations on the same grid as shown below. Use their graphs to answer a-d.



a. Write an equation to represent each person's line.

ACE:	ANNIE:

b. List the ordered pair where the lines intersect.

c. Is the point above a solution to Ace's equation? Give two ways you can tell.

d. Is the point from part b also a solution to Annie's equation? Give two ways you can tell.

SYSTEM OF EQUATIONS

- A system of equations is a set of more than _____ equation with the same _____.
- The point of intersection of two graphed equations is the _____ of the system of equations, or the ordered pair that makes both equations true.

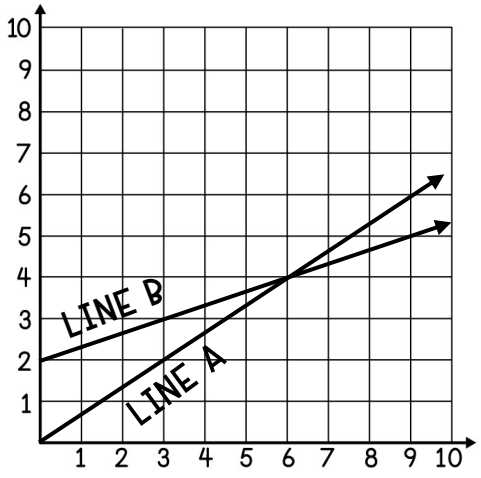
1. Use the system of linear equations graphed below to answer a-d.

a. List the two linear equations graphed at the right.

A:_____ B: _____

b. What is the solution to the system of equations? _____

c. Show work below to prove your answer is correct.



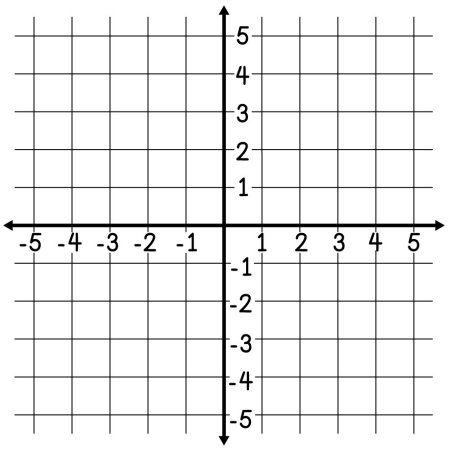
d. Record if each ordered pair below is a solution to equation A, B, both or neither.

(3, 2): _____ (4, 6): _____ (3, 3): _____ (6, 4): _____

In 2-3, graph the system of equations to find the solution to the system. Then, use the check step to prove that the solution works in both equations. Show all work.

2. $y = -\frac{1}{2}x + 3$

$y = 5$



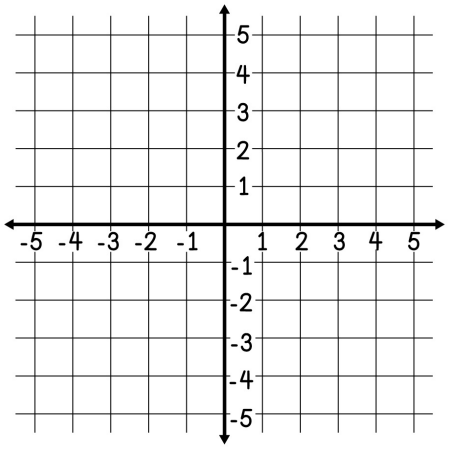
Solution:

_____

CHECK:

3. $y = \frac{1}{3}x - 2$

$y = -x + 2$



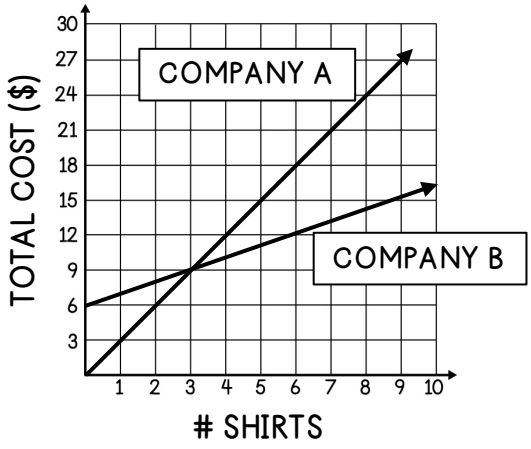
Solution:

_____

CHECK:

For 4-5, use the graph to answer a–c.

4. The total cost of two t-shirt companies based on the number of shirts ordered is shown below.

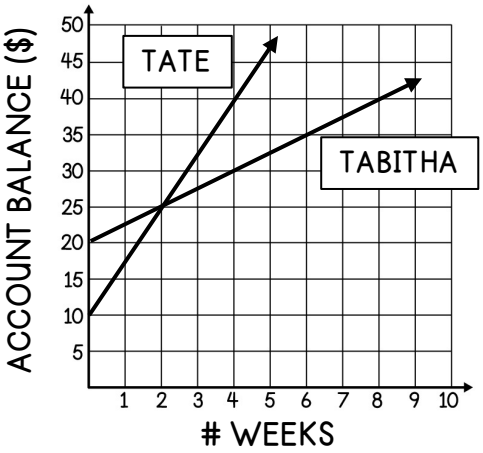


a. Write an equation to represent each company.

b. How many shirts would need to be ordered for the cost to be the same at either company? What would the total cost be?

c. If Justin needs to order 5 shirts, which company would be the cheaper option?

5. The balance of two siblings' savings accounts based on the number of weeks is shown below.



a. Describe the amount each sibling started with and the rate at which his or her account balance is changing.

b. After how many weeks will the siblings have the same amount, and what will the amount be?

c. Which sibling will have the highest balance after 5 weeks?

Unit: Linear Relationships
Homework 7

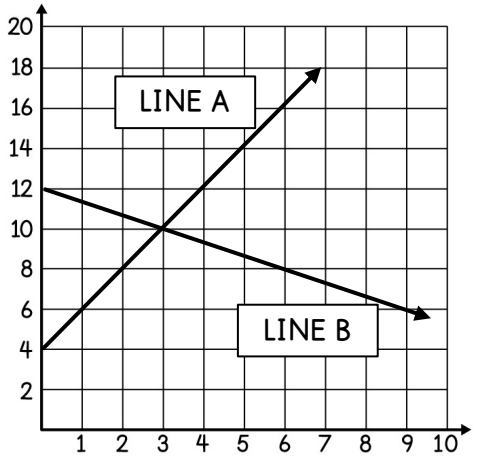
Name _____

Date _____ Pd_____

SYSTEMS OF EQUATIONS

Use the system of equations in A-C to answer the questions.

A Use the graphed system of equations to answer 1-3.



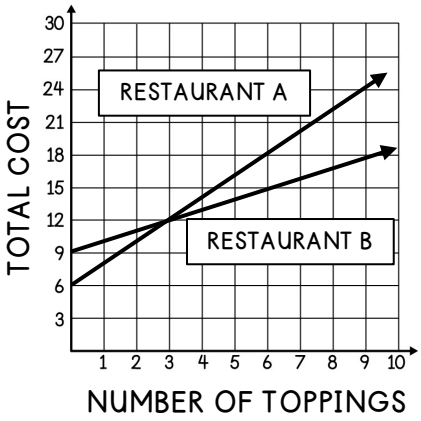
1. Write the equation of each line in slope-intercept form.

   A: _____ B: _____

2. What is the solution to the system of equations? _____

3. Show work below to prove the solution is correct.

B The graph shows the cost of a pizza at two restaurants based on the number of toppings ordered. Use the graph to answer 4-6.



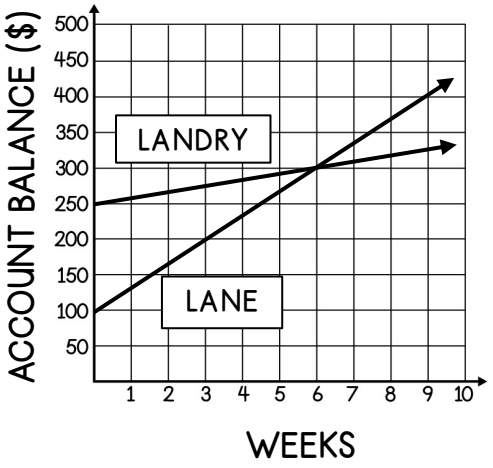
4. Write the equation of each line in slope-intercept form.

   A: _____ B: _____

5. What is the solution to the system of equations? _____

6. What does the solution mean in the context of the situation?

C The graph compares the amount of money in two accounts based on the number of weeks each person has been saving. Use the graph to answer 7-8.



7. What is the solution to the system of equations? _____

8. Which statement is true?
   a. At 6 weeks, Lane and Landry will have the same amount of money.
   b. After 6 weeks, Lane will have more money than Landry.
   c. Lane saves at a rate more than three times that of Landry.
   d. All of the above.

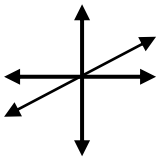
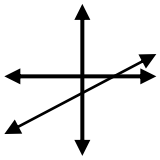
Unit: Linear Relationships
Student Handout 8

Name _____

Date _____Pd_____

PROPORTIONAL AND NON-PROPORTIONAL RELATIONSHIPS

Linear relationships can be proportional or non-proportional. A proportional relationship means that there is a constant _____ between the values of x and y. Complete the table below to review the differences in proportional and non-proportional representations.

	PROPORTIONAL	NON-PROPORTIONAL
EQUATION	• Can be written as _____ where k is the slope or rate of change. • Ex: _____	• Can be written as _____ where m is the slope and b does not equal 0 • Ex: _____
TABLE	• The ratio of _____ is constant • Ex:	• The ratio of _____ is not constant • Ex:
GRAPH	• Any graph that is both _____ and contains the _____ 	• Any graph that is not _____ or does not contain the _____ 

x	2	4	6	8
y	6	12	18	24

x	2	4	6	8
y	8	14	20	26

Complete each representation for the situation described below. Then, determine if the situation is proportional based on each representation.

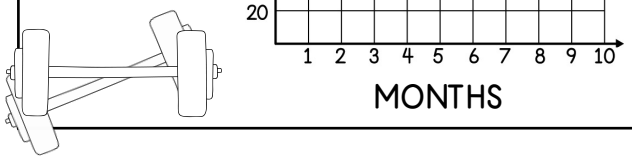
1. Hillary is looking for a gym to join. A local gym, Forever Fit, is offering a special deal where new members pay $30 per month and no sign-up fee.

A. EQUATION

B. TABLE

MONTHS (X)	0	1	2	3
COST (Y)				

C. GRAPH



D. PROPORTIONAL?

Explain based on each representation:

- equation:
- table:
- graph:

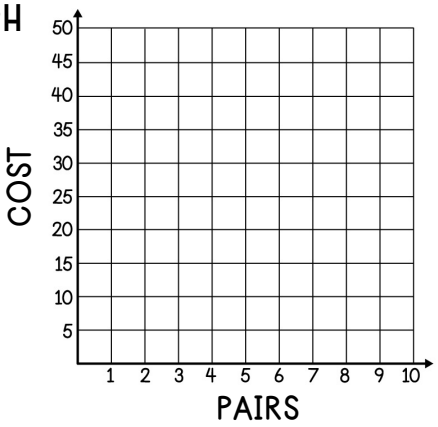
2. Javier is ordering custom sunglasses for an upcoming event. The website he is ordering from will charge $2.50 per pair of sunglasses and $5 for shipping.

A. EQUATION

B. TABLE

PAIRS (X)	0	1	2	3
COST (Y)				

C. GRAPH



D. PROPORTIONAL?

Explain based on each representation:

- equation:
- table:
- graph:

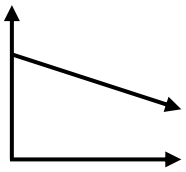
Label each representation below as "proportional" or "non-proportional." Justify your choice.

3. $y = \frac{8}{7}x$

4.

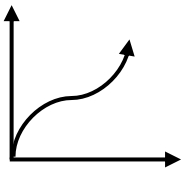
x	-9	-8	-7	-6
y	13.5	12	10.5	9

5.



6. Denzel has $13.50 and saves an additional $7.50 each week.

7.



8.

x	8	10	12	14
y	18	20	22	24

Create an example for each of the following. If an example is not possible, explain why.

9. A linear equation that is proportional with a negative y-intercept

10. A linear equation that is non-proportional with a positive slope and a negative y-intercept

Unit: Linear Relationships
Homework 8

Name _____

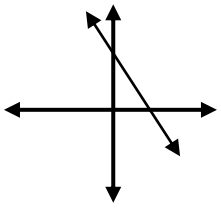
Date _____Pd_____

PROPORTIONAL AND NON-PROPORTIONAL RELATIONSHIPS

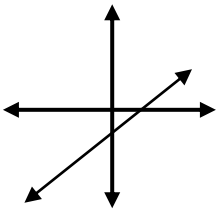
In A-D, mark each statement as true or false. If false, rewrite the statement correctly.

A Two students created the graphs shown below.

RAUL



BECKY



____ 1. Both graphs represent linear relationships.

____ 2. Both graphs have a positive slope.

____ 3. Both graphs represent proportional relationships between x and y.

B The table represents the amount of coffee in a coffee pot based on the number of minutes the coffee has been brewing.

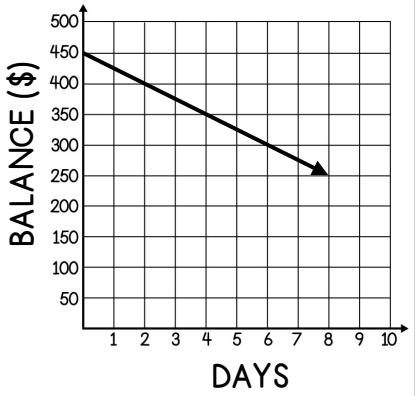
TIME (MIN)	COFFEE (OZ)
2	4.8
3	7.2
4	9.6
5	12

____ 4. The ratio of $\frac{y}{x}$ is not constant.

____ 5. The table represents a proportional relationship between x and y.

____ 6. The table can be represented by $y = x + 2.4$.

C The graph represents the balance in Jimena's checking account based on the number of days since her last paycheck.



____ 7. The relationship shown on the graph is non-proportional.

____ 8. The graph represents a linear relationship with a negative slope.

____ 9. The graph can be represented by $y = 450x - 25$.

D Two students wrote the equations shown below.

ERICA	ALIYAH
$y = -0.5x$	$y = 2.5x - 8$

____ 10. Graphs of both equations will pass through the origin.

____ 11. Only Erica's equation is proportional.

____ 12. Both equations have a negative slope.

Unit: Linear Relationships
Student Handout 9

Name _____

Date _____Pd_____

DIRECT VARIATION

DIRECT VARIATION	• Direct variation exists when a relationship is _____ . • You can also say that that value of y "varies _____" with x.	
CONSTANT OF PROPORTIONALITY	• Situations that vary directly can be represented with the equation _____. • The coefficient "____" is the constant of proportionality, or the ratio of _____.	$y = \underset{\uparrow}{\_\_\_\_}x$

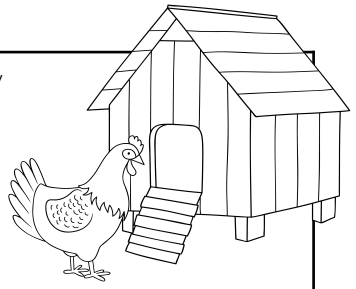
In 1-3, assume that y varies directly with x. Find the value of k, and then write an equation to describe the direct variation.

1.	2.	3.
$x = -3,\ y = 18$	$x = 9,\ y = 6$	$x = \frac{1}{4},\ y = 7$
k: _____	k: _____	k: _____
Equation: _____	Equation: _____	Equation: _____

4. The value of y varies directly with x. If x = 2, then y = 15. Use this to answer a-d.	
a. Find k, the constant of proportionality.	b. Write an equation to represent the situation.
c. Find the value of y when x = 13.	d. Find the value of x when y = 180.

5. The value of y varies directly with x. If $y = 30$, $x = \frac{1}{3}$. Use this to answer a-d.	
a. Find k, the constant of proportionality.	b. Write an equation to represent the situation.
c. Find the value of y when $x = 1\frac{1}{2}$.	d. Find the value of x when y = 810.

Apply your knowledge of direction variation to answer 6-9.



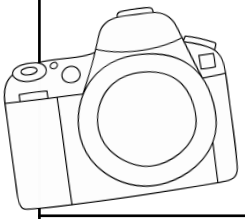
6. The number of eggs that Cain gathers on the farm each day varies directly with the number of hens on the farm. If Cain has 8 hens, he will gather 6 eggs a day.

a. Write an equation to represent the situation.

b. If there are 20 hens on the farm, how many eggs should Cain expect in a day?

c. If Cain gathered 9 eggs in a day, how many hens were on the farm?

7. Arturo is a photographer and the number of photos he can edit varies directly with the amount of time he spends editing. He can edit 25 photos in $\frac{1}{2}$ hour. Write and use an equation to determine the number of photos he can edit in 6 hours.



8. The number of cookies Marci can bake is directly proportional to the amount of flour that she has in her bakery. Marci can bake 24 cookies with $2\frac{1}{4}$ cups of flour. Write and use an equation to determine the amount of flour Marci had in her bakery if she baked 60 cookies.

9. Mrs. Hernandez told her students that the value of y is directly proportional to x, and that if y = 21, then x = 14. Circle the name of any student who made a true statement.

TAHLIA	FRANKIE	SONYA
"The situation can be represented by the equation $y = \frac{1}{2}x$."	"If x = 9, y = 13.5."	"If y = 30, x = 20."

Summarize today's lesson:

Unit: Linear Relationships
Homework 9

Name _____

Date _____ Pd_____

DIRECT VARIATION

Each of the cards below gives the values for x and y in a relationship that varies directly. Use the cards to answer 1-6.

A. $x = 2$, $y = 11$

B. $x = 15$, $y = 5$

C. $x = \frac{1}{4}$, $y = 16$

D. $x = 3$, $y = \frac{3}{7}$

E. $x = -10$, $y = 2$

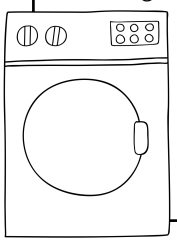
F. $x = 6$, $y = 21$

G. $x = 8$, $y = 4$

1. For card A, find the constant of proportionality. _____	2. For card E, find the value of "k." _____	3. Which card shows a relationship where the constant of proportionality is 64? _____
4. Write a direct variation equation to represent the relationship in card D. _____	5. Write a direct variation equation to represent the relationship in card F. _____	6. Which card can be represented by the equation $y = \frac{1}{3}x$? _____

Apply your knowledge of direct variation to answer 7-10.

7. The values of x and y vary directly, and when $x = 4$, $y = -10$. Find the value of y when $x = 10$. _____	8. The values of x and y vary directly, and when $x = 48$, $y = 36$. Find the value of x when $y = 18$. _____
9. The amount of water used by a washing machine varies directly with the weight of the load being washed. The washing machine uses 28 gallons to wash 7 pounds of clothing. How many gallons of water will the machine use to wash 24.5 pounds of laundry? _____	10. The number of bracelets Colleen can make varies directly with the amount of time she spends making the bracelets. She can make 5 bracelets in 2.5 hours. How many bracelets can she make in 10 hours? _____



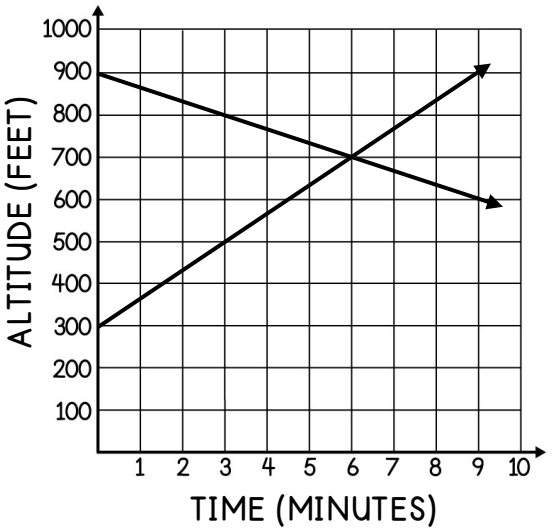
Unit: Linear Relationships
Mini-Quiz 2

Name _____

Date _____ Pd_____

LINEAR RELATIONSHIPS MINI-QUIZ

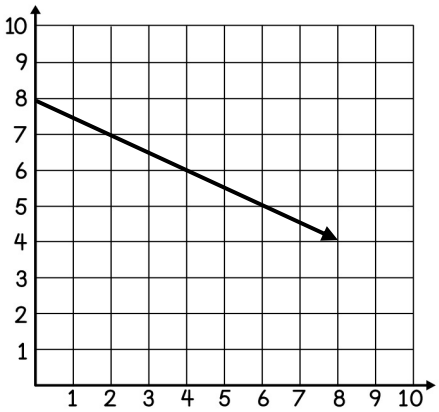
1. The altitudes of two different hot air balloons over time are represented by the linear relationships on the graph shown. Use the graph to answer a-b.



a. What is the solution to the system of equations?

b. What does the solution represent in the context of the situation?

2. Use the graph to answer a-b.



a. Is the graph proportional? Explain.

b. Write an equation for the graph.

_____

3. Use the table to answer a-b.

x	y
10	-25
20	-50
30	-75
40	-100

a. Is the table proportional? Explain.

b. Write an equation for the table.

_____

4. The value of y varies directly with x, and when $y = 9$, $x = \frac{1}{3}$.

a. Write an equation to represent the direct variation.

_____

a. Find the value of y when x is $\frac{1}{9}$.

_____

5. The number of avocados used by a restaurant in a day varies directly with the number of orders of guacamole that day. It takes 6.5 avocados to make 4 orders of guacamole. How many avocados would it take to make 14 orders of guacamole?

_____

Unit: Linear Relationships Review

Name _____

Date _____ Pd _____

LINEAR RELATIONSHIPS STUDY GUIDE

Solve each of the problems below. These represent the types of questions on your test. Be sure to ask questions if you need more help with a topic.

I CAN IDENTIFY FUNCTIONS. 8.5G

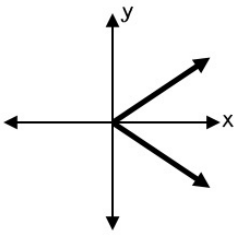
1. Does the set of ordered pairs represent a function? Explain.

{(6, -6), (7, -6), (8, -6), (9, -6)}

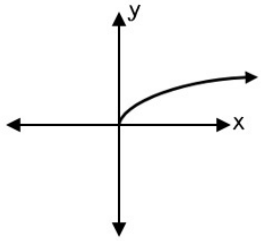
2. Does the table represent a function? Explain.

x	-3	-2	0	-3	-2
y	9	4	0	-9	-4

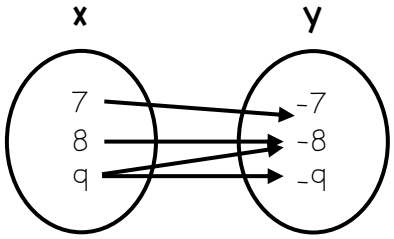
3. Does the graph represent a function? Explain.



4. Does the graph represent a function? Explain.



5. Does the mapping represent a function? Explain.



6. Does the set of ordered pairs represent a function? Explain.

{(0, 5), (-2, -1), (0, -5), (3, 20)}

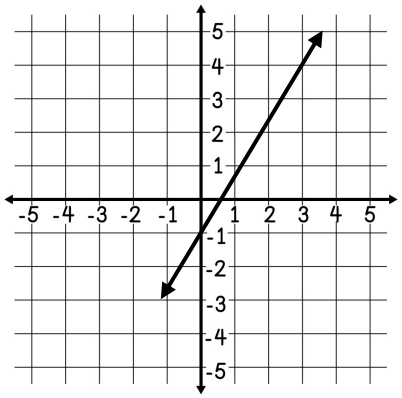
I CAN DETERMINE SLOPE AND RATE OF CHANGE. 8.4C

7. Find the rate of change from the table.

x	y
-3	10.5
-2	7
-1	3.5
0	0

_____

8. Find the slope of the graph.



_____

9. Find the slope of the line that passes through the following pairs of points.

a. (5, 4) and (-4, 3)

_____

b. (10, 8) and (9, 13)

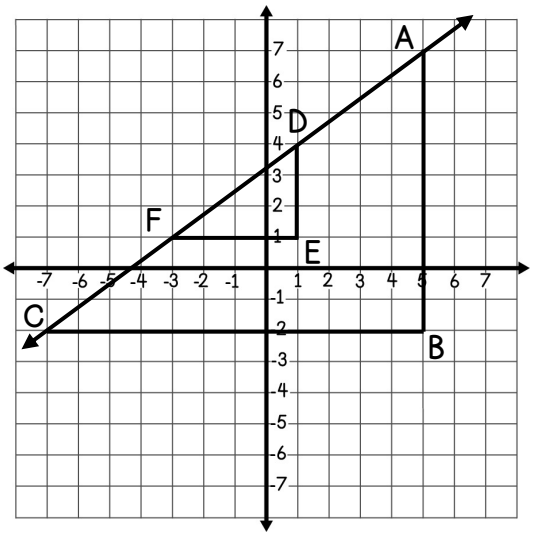
_____

I CAN USE SIMILAR TRIANGLES TO UNDERSTAND SLOPE. 8.4A

Use the graph to answer 10-11.

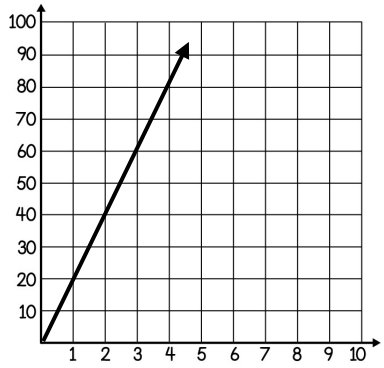
10. Igor believes the slope of $\overline{AC}$ is greater than the slope of $\overline{DF}$, while Keenan believes the two slopes are equal. Who do you agree with?

11. Justify your choice above.



I CAN DETERMINE SLOPE AND Y-INTERCEPT FROM MULTIPLE REPRESENTATIONS. 8.5I

12. Use the graph to fill in each blank.



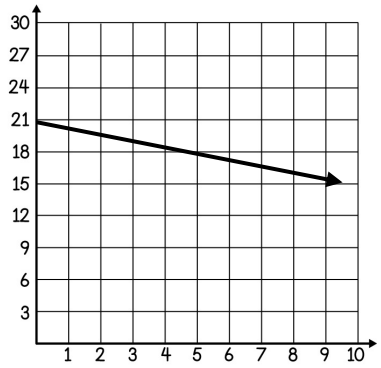
m: _____ b: _____

Equation:

_____

Proportional?_____

13. Use the graph to fill in each blank.



m: _____ b: _____

Equation:

_____

Proportional? _____

14. Use the equation to fill in each blank.

$$y = \frac{2}{7}x$$

m: _____ b: _____ Proportional? _____

15. Use the equation to fill in each blank.

$$y = -3.5x - 10$$

m: _____ b: _____Proportional? _____

16. Use the table to fill in each blank.

x	2	4	6	8
y	20	50	80	110

m: _____ b: _____ Equation: _____

Proportional? _____

17. Kayla works at a coffee shop and earned $6.25 an hour plus $8.50 in tips yesterday. Write an equation to represent the relationship between x, the number of hours worked and y, the total amount Kayla earned.

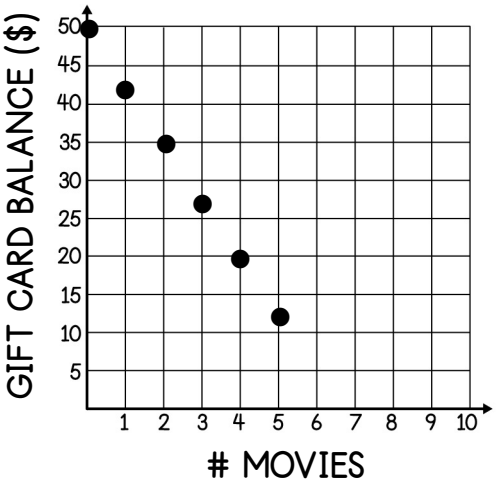
_____

18. Elyse has a gift card to a local movie theater. The graph shows the amount of money remaining on her gift card based on the number of movies she has seen.

a. Write an equation to represent the situation.

b. What is the y-intercept, and what does it mean in the context of the situation?

c. What is the slope, and what does it mean in the context of the situation?



19. Trish is ordering travel mugs from a website that charges a certain amount per mug plus a flat rate for shipping as shown in the table.

MUGS	0	3	6	9
COST	$5.99	$32.24	$58.49	$84.74

a. Write an equation to represent the situation.

b. What does the y-intercept mean in the context of the situation?

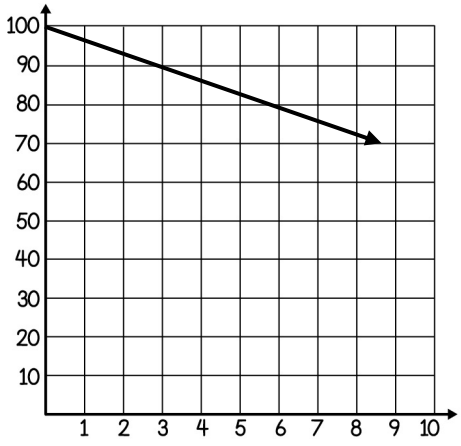
c. What does the slope mean in the context of the situation?

20. Which of the following situations could be modeled by the graph below?

A. Elaina has $100 in her bank account. Every 3 days, she saves another $10 and adds it to her account.

B. Hunter can bench press 100 pounds, and he plans to increase the weight by 10 pounds every 3 weeks.

C. Dawn's pond is 100 meters deep, but her city hasn't received much rain. As a result, the pond level decreases by 10 meters every 3 weeks.



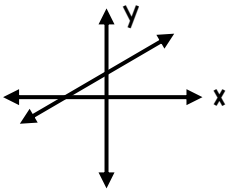
21. Write an equation for the linear relationship graphed in #20.

I CAN DISTINGUISH BETWEEN PROPORTIONAL AND NON-PROPORTIONAL SITUATIONS. 8.5F, 8.5H

22. Is the table below proportional? Explain.

x	28	36	40	56
y	21	27	30	42

23. Is the graph shown proportional? Explain.



I CAN SOLVE PROBLEMS INVOLVING DIRECT VARIATION. 8.5E

24. The amount of fertilizer Jon uses varies directly with the square feet he is treating. He uses 1.5 pounds of fertilizer to treat 120 square feet. How many pounds of fertilizer would Jon need to treat 300 square feet?

_____

25. The value of y varies directly with x, and when $x = \frac{1}{3}$, $y = 5$.

a. Write an equation to represent the direct variation. _____

b. Find the value of y if $x = -2$. _____

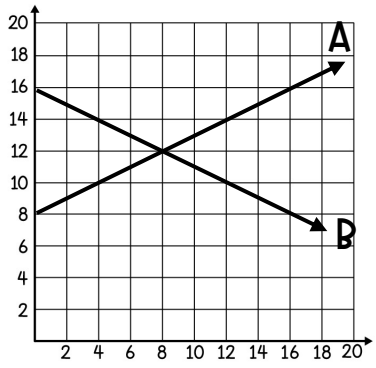
I CAN IDENTIFY VALUES THAT SATISFY TWO LINEAR EQUATIONS FROM A GRAPH. 8.9A

26. Write the equation of each line graphed at the right.

Line A: _____

Line B: _____

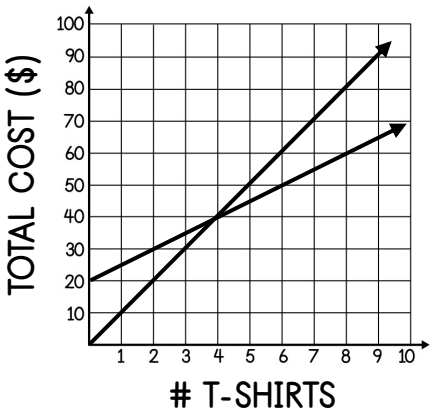
What is the solution to the system of equations? _____



27. Ralph's t-shirt company sells custom t-shirts for $5.00 each, plus a $20 shipping and design fee. Frank's t-shirt company sells t-shirts for $10 each with no additional fees. The relationship between x, the number of shirts sold and y, the total cost is shown on the graph for each company.

a. Label each line with the name of the company it represents.

b. Use the graph to find the solution to the system of equations. Explain what the solution means in the context of the situation.



Unit: Linear Relationships Test

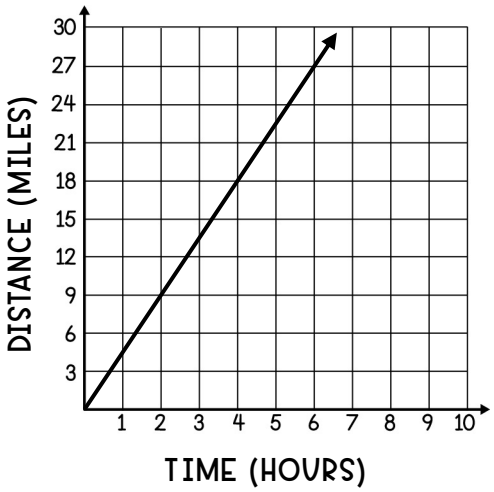
Name _____

Date _____ Pd _____

LINEAR RELATIONSHIPS UNIT TEST

Solve the problems below. Be sure to show your thinking.

1. Find the rate of change demonstrated in the graph below.



_____

2. Which is a true statement about the table below?

x	-4	-3	-2	-1	0
y	5	5	5	5	5

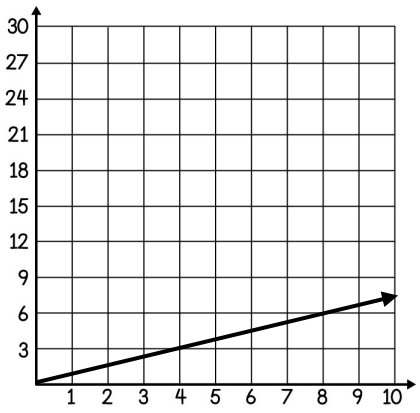
A. It is a function because each input has exactly one output.

B. It is not a function because each output has more than one input.

C. It is not a function because it does not contain the origin.

D. It is not a function because the ratio between y and x is not constant.

3. Which situation could be represented by the graph shown?



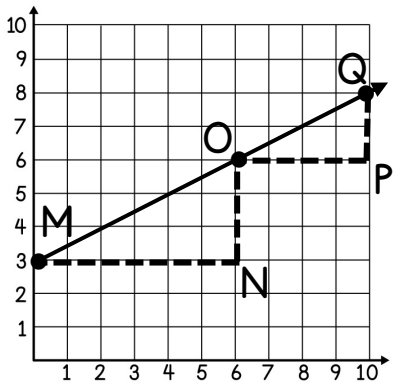
A. Garrett buys limes for $0.80 each.

B. Sophia buys 12-packs of soda for $1.75 each.

C. Jacob buys packs of gum for $1.50 each.

D. Allison purchases lemons for $0.75 each.

4. Which is a true statement about the slopes of $\overline{MO}$ and $\overline{OQ}$?



A. The slope of $\overline{MO}$ is greater than the slope of $\overline{OQ}$.

B. The slope of $\overline{OQ}$ is greater than the slope of $\overline{MO}$.

C. The slopes are equal because $\frac{6-0}{3-6} = \frac{10-6}{6-8}$.

D. The slopes are equal because $\frac{6-3}{6-0} = \frac{8-6}{10-6}$.

5. A line crosses through the points (0, 2) and (-10, -16). What is the slope of the line?

A. $\frac{5}{q}$ B. $-\frac{q}{5}$ C. $\frac{q}{5}$ D. $\frac{1}{3}$

Solve the problems below. Be sure to show your thinking.

6. A car repair company charges a $15 fee for an evaluation plus an hourly rate for any services required.

HOURS	0	2	4	6
CHARGE ($)	15	165	315	465

What is the hourly charge for services?

_____

7. Find the slope of the line that contains the following points:

a. (17, -12) and (17, 8) _____

b. (6, -2) and (-3, 1) _____

8. Which of the following equations represents a line with a positive slope and a negative y-intercept?

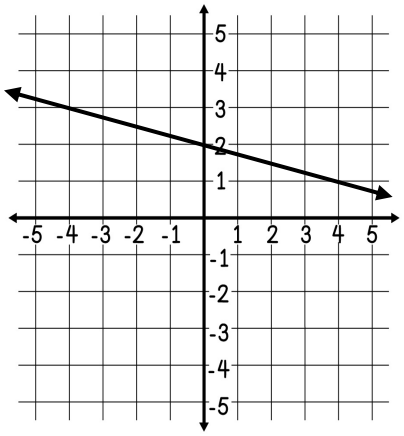
A. $y = 3.5x$

B. $y = 7.5x - 2$

C. $y = \frac{1}{4}x + 7$

D. $y = -5x - 8$

9. Write the equation of the graphed line.



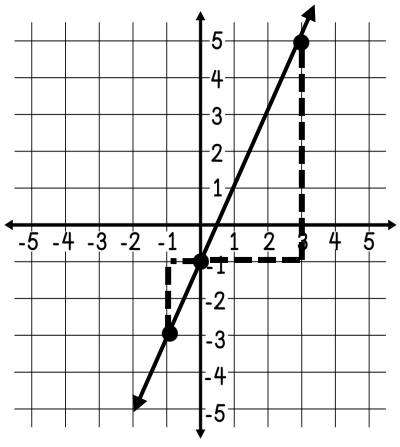
_____

10. Which of the following situations best matches the data in the table?

x	y
0	8
1	9.5
2	11
3	12.5

A. Robbie has $8 in his account and spends $1.50 each day for the next 3 days.
B. Zach sells t-shirts for $9.50 each.
C. A newborn weighs 8 pounds at birth and gains 1.5 pounds each month for the next 3 months.
D. Riley earns $8 an hour lifeguarding, plus $1.50 for any pool memberships she sells.

11. Two students found the slope of the line shown. Tavion used the points (-1, -3) and (0, -1) while Jess used the points (3, 5) and (0, -1). Which of the following is a true statement?

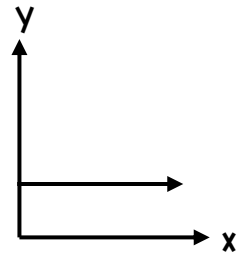


A. The triangles drawn between each pair of points are similar.
B. The ratio of $\frac{y_2 - y_1}{x_2 - x_1}$ will be the same for Tavion and Jess.
C. Both students should find a slope of 2.
D. All the above are true.

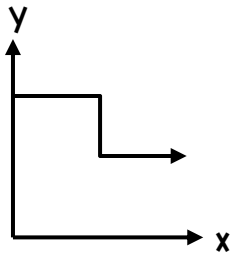
Solve the problems below. Be sure to show your thinking.

12. Which of the following graphs represents a functional relationship between x and y?

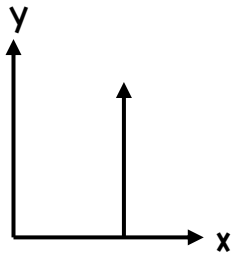
A.



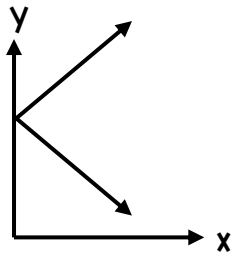
B.



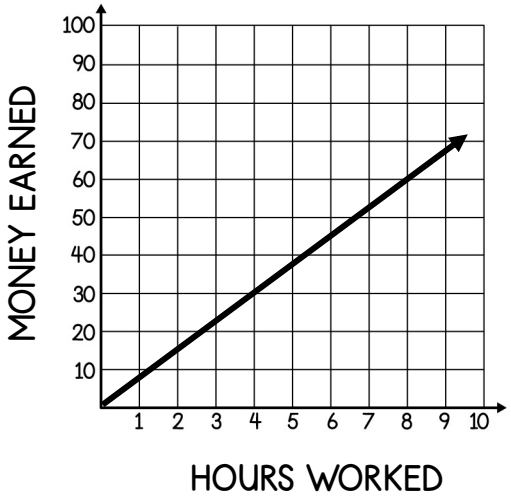
C.



D.



13. The graph below shows the relationship between the number of hours Cody works and the amount of money he earns at his job. Which of the following statements is NOT true about the relationship?



A. The graph can be represented by $y = 7.5x$.

B. If Cody has earned $120, he has worked 16 hours.

C. If Cody works 20 hours, he will earn $160.

D. The situation is a proportional relationship.

14. Which equation represents the linear relationship in the table below?

x	0	5	10	15	20
y	10	16.5	23	29.5	36

A. $y = 1.3x + 10$

B. $y = x + 10$

C. $y = 3.3x + 10$

D. $y = 1.3x$

15. Which of the following is true about the relationship in the table shown?

x	7	11	20	25	100
y	8.4	13.2	24	30	120

A. The table is non-proportional because it does not include the point (0, 0).

B. The table is non-proportional because the x-values do not increase at a constant interval.

C. The table is proportional because all of the x and y-values are positive and increasing.

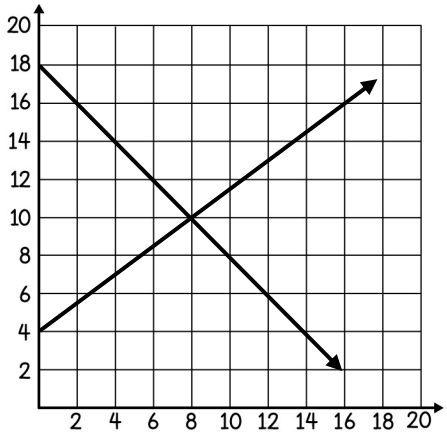
D. The table is proportional because the ratio between y and x is constant.

16. Belinda is altering dance costumes for an upcoming recital. The number of costumes she can alter varies directly with the amount of time spent working. If Belinda can alter 3 costumes in $\frac{3}{4}$ hour, find the number of costumes she can alter in $4\frac{1}{2}$ hours.

_____

Solve the problems below. Be sure to show your thinking.

17. What can you conclude from the graph of the equations shown below?



A. The solution to the equations $y = -2x + 18$ and $y = \frac{4}{3}x + 4$ is (8, 10).

B. The solution to the equations $y = -x + 18$ and $y = \frac{4}{3}x + 4$ is (10, 8).

C. The solution to the equations $y = -x + 18$ and $y = \frac{3}{4}x + 4$ is (10, 8).

D. The solution to the equations $y = -x + 18$ and $y = \frac{3}{4}x + 4$ is (8, 10).

18. The following set of ordered pairs represents a functional relationship between x and y:

{(-3, -8), (8, 25), (0, 1), (-5, -14), _____ }

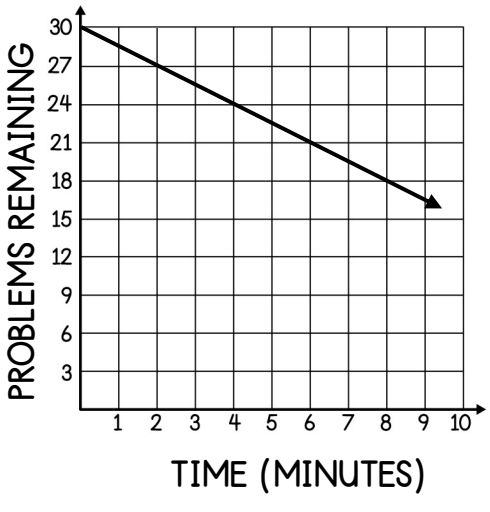
Which of the following could be the missing ordered pair?

A. (-5, 10)
B. (1, 2)
C. (-3, 8)
D. (0, 0)

19. The value of y varies directly with x, and when $x = \frac{2}{3}$, $y = 6$. Find the value of y when $x = 10\frac{1}{3}$.

A. $y = 9$
B. $y = 4$
C. $y = 93$
D. $y = 1\frac{1}{3}$

20. The graph shows the number of homework problems Amanda has remaining based on the number of minutes she has been working. Which of the following statements is not true?



A. Amanda started with 30 homework questions.

B. Amanda finishes 2 homework questions every 3 minutes.

C. The graph shows the equation $y = -\frac{3}{2}x + 30$.

D. After 10 minutes, Amanda has finished half of her homework.

Unit: Linear Relationships
Student Handout 1

Name Answer Key

Date _____ Pd_____

IDENTIFYING FUNCTIONS

A donut shop has a small vending machine with the items shown.

a. If Nate inputs B2, what will he receive? apple juice
b. If Mia inputs A2, what will she receive? orange juice
c. If 5 people in a row input B1, what should they each receive? chocolate milk

	A	B
1	MILK	CHOC. MILK
2	ORANGE JUICE	APPLE JUICE
3	FRUIT PUNCH	WATER

FUNCTIONS

- A function is a relation or rule that assigns each _input_ exactly one _output_. Each _x_-value is paired with exactly one _y_-value.
- A graph that is a function will pass the _vertical_ line test where any _vertical_ line drawn on the graph will pass through only _one_ point.

- Would a vending machine like the one shown represent a function? Explain.

  Sample answer: Yes; each input (button) corresponds with exactly one output (beverage).

- A customer chose A3 and received fruit punch. If the next customer chooses A3 and receives milk, would the vending machine represent a function? Explain.

  No; the input of A3 would have two different outputs.

Determine if each representation shows y as a function of x. Explain your choice.

1.

x	-2	-1	0	1	2
y	7	1	-1	1	7

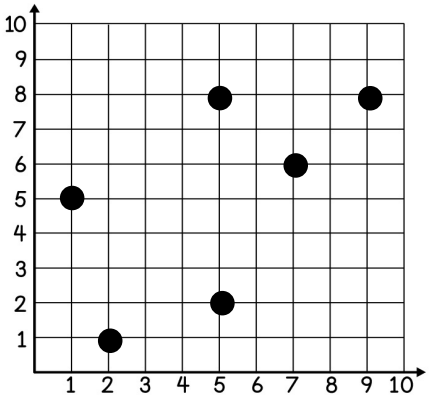
Yes; each input has exactly one output.

2.

{(-2, 1), (3, 11), (-4, -3), (-2, 8), (0, 5)}

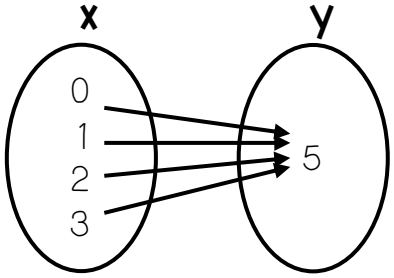
No; the input of -2 has two different outputs.

3.



No; the graph does not pass vertical line test.

4.



Yes; each input has exactly one output.

Determine if each representation is a function by writing "yes" or "no." Justify your answers.

5.

{(3, 7), (4, 7), (5, 7), (6, 7)}

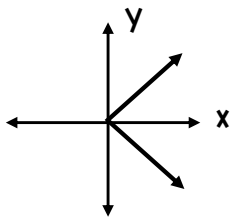
Yes; each input has exactly one output.

6.

x	-7	-5	-7	5
y	1	3	-1	13

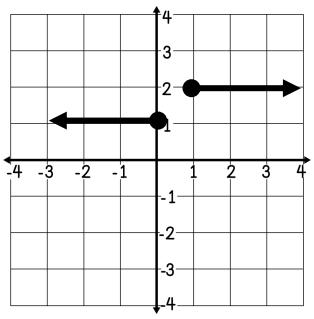
No; the input of -7 has two different output values.

7.



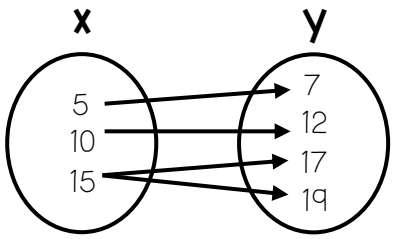
No; the graph does not pass the vertical line test.

8.



Yes; the graph passes the vertical line test.

9.



No; the input of 15 has two different outputs.

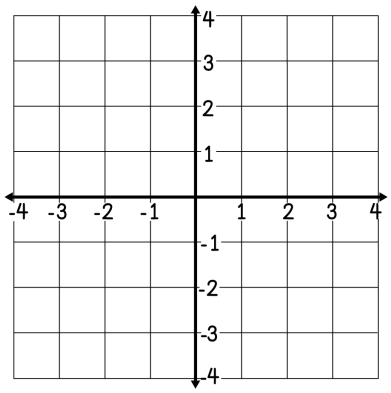
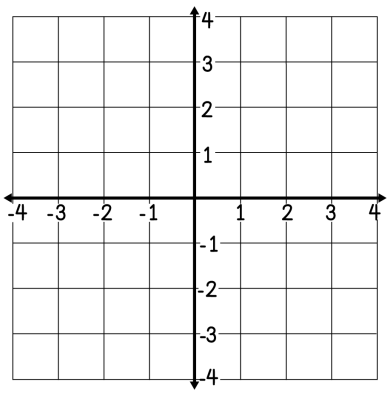
10. The set of ordered pairs shown is missing an x-value.

{(9, -15), (0, 0), (4, 0), (___, 2)}

a. Give an example of an x-value that would result in y as a function of x. Sample answer: 8

b. Give an example of an x-value that would not result in y as a function of x. Sample answer: 9

Create your own examples and non-examples of functions for each representation below.

EXAMPLES	NON-EXAMPLES
{(___ , ___) (___ , ___) (___ , ___)}	{(___ , ___) (___ , ___) (___ , ___)}
x | y	x | y
	

Summarize today's lesson: Answers in table will vary. It may be helpful to have students switch papers and check one another's work.

Unit: Linear Relationships
Homework 1

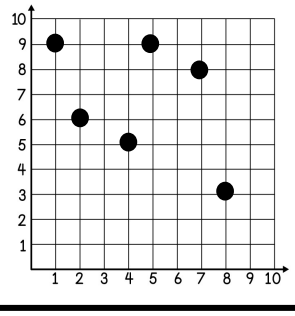
Name Answer Key

Date _____ Pd_____

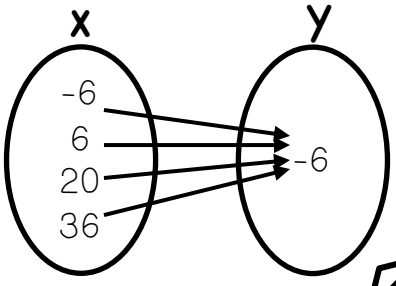
IDENTIFYING FUNCTIONS

Students were asked to create a representation of y as a function of x. Circle the names of the students who correctly completed the task. Then, unscramble the underlined letters of the circled names to answer the question at the bottom.

CHARLOTTE



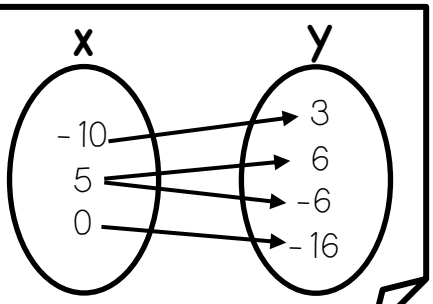
SOFIA



DESHAUN

{(-6, 7), (-1, 4), (2, 9), (-6, 11)}

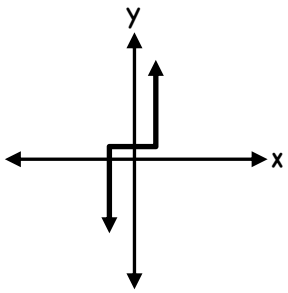
JACE



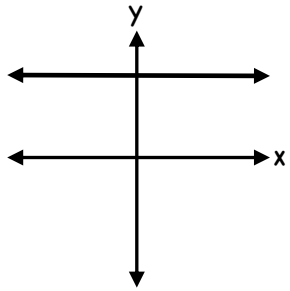
NATHAN

x	-4	0	5	11
y	-8	-13	-4	14

COLBY



ABBY



ORLANDO

{(9,-2), (7, 5), (4,-3), (-9, 6)}

STEPHANIE

x	-4	0	7	-4
y	6	0	-2	-6

WHAT IS THE ONLY NUMBER WHOSE LETTERS ARE IN ALPHABETICAL ORDER?

Forty

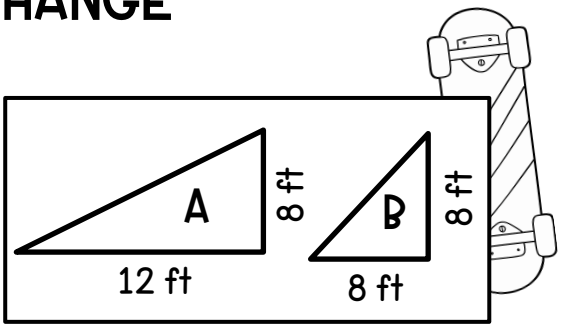
Unit: Linear Relationships
Student Handout 2

Name Answer Key

Date _____ Pd_____

SLOPE AND RATE OF CHANGE

The side view of two ramps at a local skate park are shown.



a. What measurement do the ramps have in common?
The vertical distance (8 ft)

b. What measurement is different between the ramps?
The horizontal distance (12 ft vs 8 ft)

c. Which ramp appears steeper? Justify your answer using a and b.

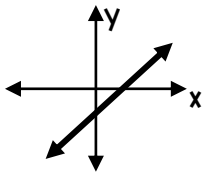
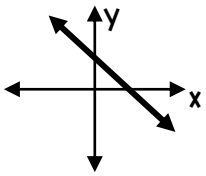
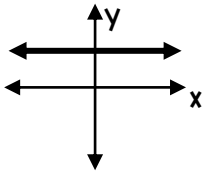
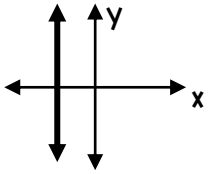
Ramp B appears steeper; it covers the same vertical distance as A but over a smaller horizontal distance and therefore must increase at a faster rate.

SLOPE

- When a linear relationship is graphed, the slope is a value used to describe the steepness of the line.
- Slope is the ratio of the vertical change compared to the horizontal change, or $\frac{\text{RISE}}{\text{RUN}}$. Slope is equal to the rate of change of the graph and the linear relationship.

There are four types of slope as described and shown in the table below.

TYPES OF SLOPE

A positive slope increases from left to right.	A negative slope decreases from left to right.	A zero slope is a horizontal line.	An undefined slope is a vertical line.
			

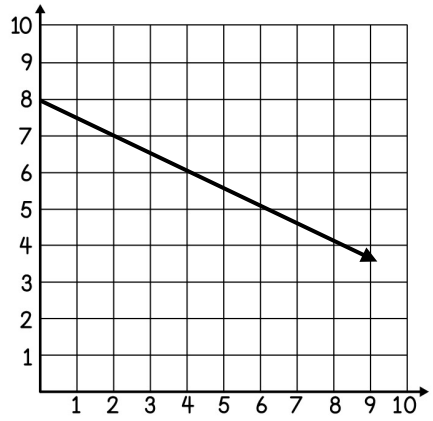
Follow the steps described below to find the slope of the graphed line.

FINDING SLOPE FROM A GRAPH

- Choose two points on the graphed line.
- Draw a right triangle to count the rise and the run between the points.
- Set up a ratio of $\frac{\text{RISE}}{\text{RUN}}$ and simplify.
- Double check if the graph is positive or negative.

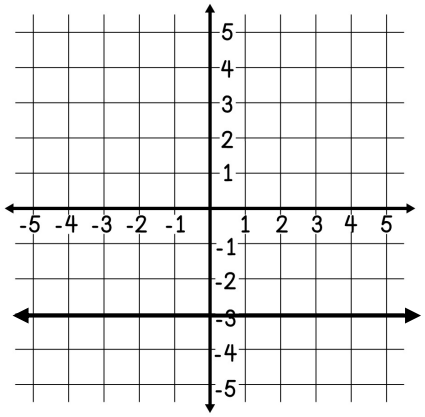
In 1-6, find the slope of each graphed line.

1.



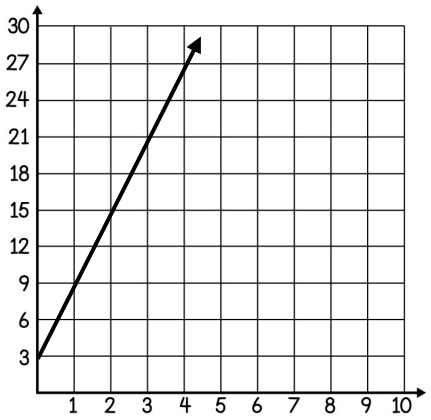
Slope: $-\frac{1}{2}$

2.



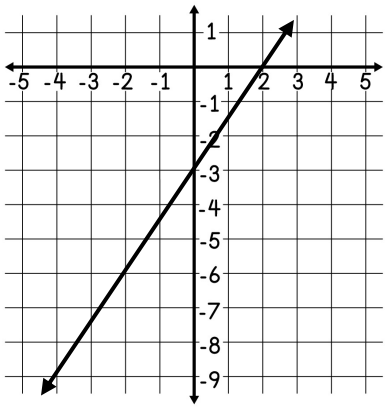
Slope: 0

3.



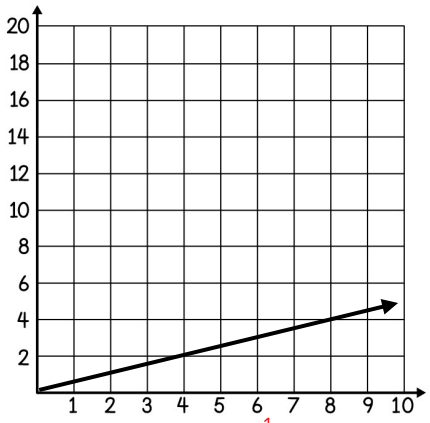
Slope: 6

4.



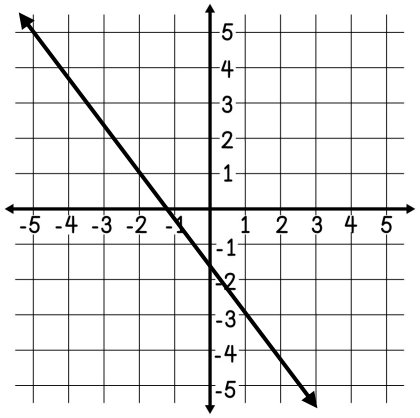
Slope: $\frac{3}{2}$

5.



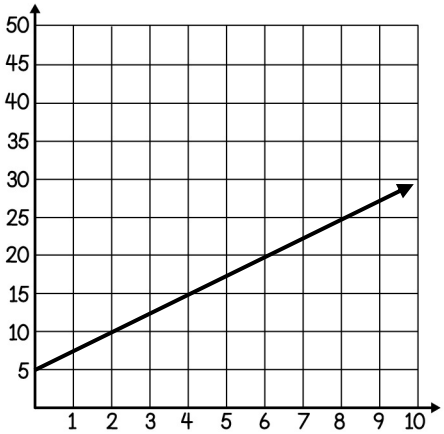
Slope: $\frac{1}{2}$

6.



Slope: $-\frac{4}{3}$

7. Luis thinks the slope is $\frac{1}{2}$. Explain his mistake and give the correct slope.



He did not notice the interval on the y-axis; the correct slope is $\frac{5}{2}$.

8. The graph shows the linear relationship between number of bagels a bagel shop has remaining, and the number of customers served so far that day. Find the rate of change of bagels remaining with respect to the number of customers served.

-5 bagels per customer

Unit: Linear Relationships
Homework 2

Name Answer Key

Date _____ Pd_____

SLOPE AND RATE OF CHANGE

In 1-6, complete each blank with the letter of the correct vocabulary term from the right.

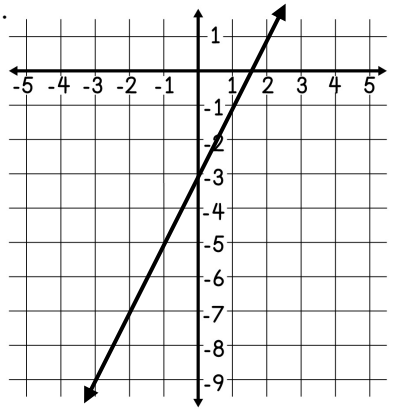
1. The slope of a vertical line will always be B.
2. A graph with a E slope decreases from left to right.
3. The vertical change on a graph is described as the F.
4. The horizontal change on a graph is described as the C.
5. The slope of a horizontal line will always be D.
6. A graph with a A slope increases from left to right.

A. Positive
B. Undefined
C. Run
D. Zero
E. Negative
F. Rise

In 7-12, find the slope of each line. Use the bank of answer choices below to check your work. Not all choices will be used.

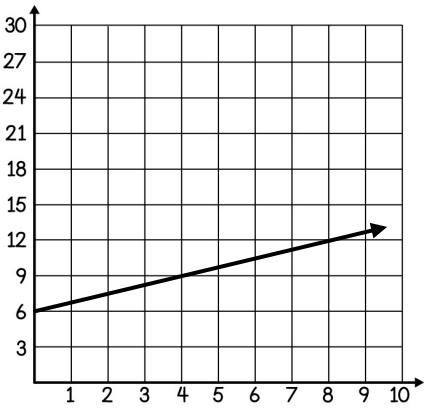
$\frac{2}{3}$	-25	UNDEFINED	$-\frac{1}{2}$	$\frac{3}{2}$	2	$\frac{1}{4}$	0	-3	$\frac{3}{4}$

7.



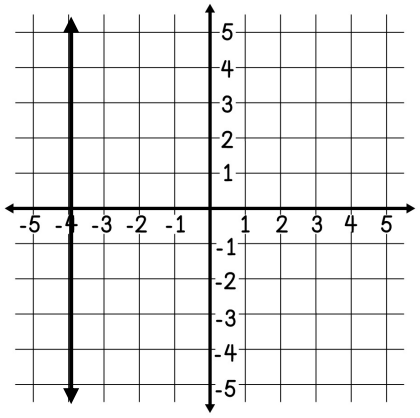
Slope: 2

8.



Slope: $\frac{3}{4}$

9

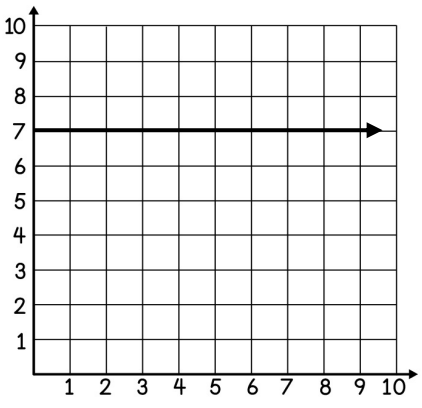


Slope: undefined

10.

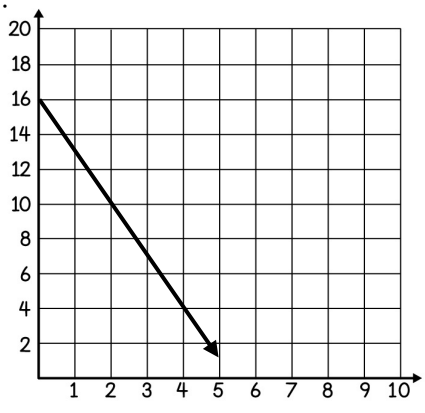
Slope: -25

11.



Slope: 0

12.



Slope: -3

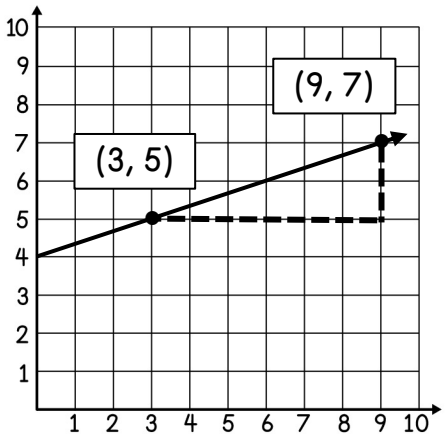
Unit: Linear Relationships
Student Handout 3

Name Answer Key

Date _____ Pd_____

THE SLOPE FORMULA

To find the slope of the graph, Aiden chose the two points shown and counted the rise to be 2 and the run to be 6. He used these values to set up the ratio $\frac{2}{6}$ and simplified the slope to $\frac{1}{3}$.



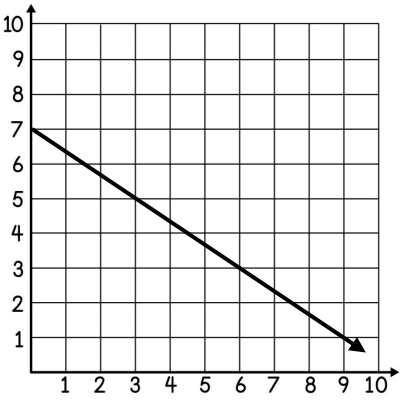
- Using the values in the ordered pairs, how else could Aiden have found the rise to be 2? Finding the difference in the y-values ($7 - 5 = 2$).
- Using the values in the ordered pairs, how else could Aiden have found the run to be 6? Finding the difference in the x-values ($9 - 3 = 6$).

THE SLOPE FORMULA

If a linear relationship contains two ordered pairs (x_1, y_1) and (x_2, y_2), the slope can be found using the formula below:

$$\frac{y_2 - y_1}{x_2 - x_1}$$

Ex. Use the formula to find the slope of the graphed line.



x_1 y_1 x_2 y_2

(0, 7) and (3, 5)

$$\frac{5 - 7}{3 - 0} = \frac{-2}{3} = -\frac{2}{3}$$

1. A graphed line passes through each of the following pairs of points. Use the slope formula to find the slope of each line. Show all work.

	POINTS	FORMULA AND WORK	SLOPE
A	(2, 4) and (1, 7)	$\frac{y_2 - y_1}{x_2 - x_1}$ $\frac{7 - 4}{1 - 2}$	-3
B	(-1, 3) and (5, -5)	$\frac{y_2 - y_1}{x_2 - x_1}$ $\frac{-5 - 3}{5 - (-1)}$	$-\frac{4}{3}$
C	(8, 11) and (10, 22)	$\frac{y_2 - y_1}{x_2 - x_1}$ $\frac{22 - 11}{10 - 8}$	$\frac{11}{2}$
D	(-1, 9) and (-1, 6)	$\frac{y_2 - y_1}{x_2 - x_1}$ $\frac{6 - 9}{-1 - (-1)}$	undefined

In 2-3, each table represents a linear relationship. Choose two ordered pairs from the table and use the slope formula to find the rate of change.

2.

X	0	1	2	3
Y	5	5.5	6	6.5

Formula: $\frac{5.5 - 5}{1 - 0}$ Slope: $\frac{1}{2}$

3.

X	3	8	11	14
Y	15	15	15	15

Formula: $\frac{15 - 15}{8 - 3}$ Slope: 0

4. A web designer charges customers an initial consultation fee plus an hourly rate. The table shows the linear relationship between x, the number of hours and y, the total cost of hiring the designer.

# HOURS	TOTAL COST
2	$205
5	$400
8	$595
10	$725

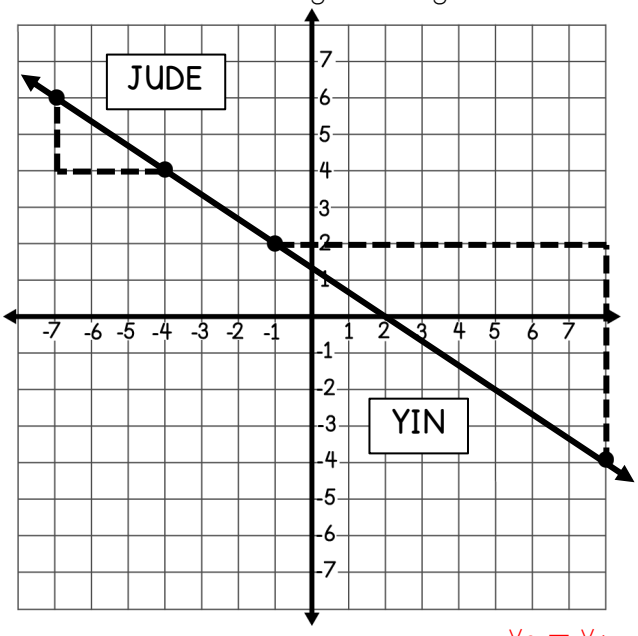
a. Find the rate of change. 65

b. What does the rate of change represent in the context of the situation? The designer charges an hourly rate of $65.

5. The post office calculates shipping costs based on the weight of the item in addition to a fee. The cost to ship a 2-pound item is $6.09, while the cost to ship a 7-pound item is $8.84. Find the rate of change of the cost with respect to the weight of the item.

$0.55 per pound

6. Jude and Yin each chose two points on the graphed line below and drew right triangles to find the slope of the line. Use their triangles to answer a-d.



a. Use Jude's points to set up and simplify the slope formula below.

$$\frac{6 - 4}{-7 - (-4)} = \frac{2}{-3} = -\frac{2}{3}$$

b. Use Yin's points to set up and simplify the slope formula below.

$$\frac{2 - (-4)}{-1 - 8} = \frac{6}{-9} = -\frac{2}{3}$$

c. How are the two triangles related to one another?

The two triangles are similar.

d. What can we assume about the slope between any two points on the same line? Explain.

The slope between any two points on the same line will be the same because the ratio of $\frac{y_2 - y_1}{x_2 - x_1}$ will always simplify to the same value.

Unit: Linear Relationships
Homework 3

Name Answer Key

Date _____ Pd_____

THE SLOPE FORMULA

In 1-3, find the slope of the graphed line that contains the given ordered pairs. Show all work.

1. (8, 7) and (2, 12)

slope: $-\frac{5}{6}$

2. (12, -10) and (15, -8)

slope: $\frac{2}{3}$

3. (1, 4) and (0, 11)

slope: -7

4. Madeline needs to find the slope of the line that passes through the points (9, 12) and (7, 4). She sets up the following work:

$$\frac{12-4}{7-9}$$

Has she set up her work correctly? Why or why not?

No; the order she subtracted the y-values is different than the order she subtracted the x-values.

5. A graphed line has a slope of $\frac{5}{3}$. Which of the following points could the line contain?

A. (15, 13) and (0, 4)

B. (3, 9) and (6, 14)

C. (0, 4) and (19, 9)

D. (5, 7) and (10, 10)

In 6-8, each table represents a linear relationship. Use the slope formula to find the slope or rate of change shown in each table.

6.

x	2	6	10	14
y	8	28	48	68

m = 5

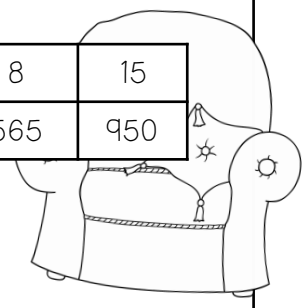
7.

x	-6	4	9	20
y	5	10	12.5	18

$m = \frac{1}{2}$

8. An interior designer charges customers an initial consultation fee plus an hourly rate. The table shows the linear relationship between x, the number of hours, and y, the total cost of hiring the designer.

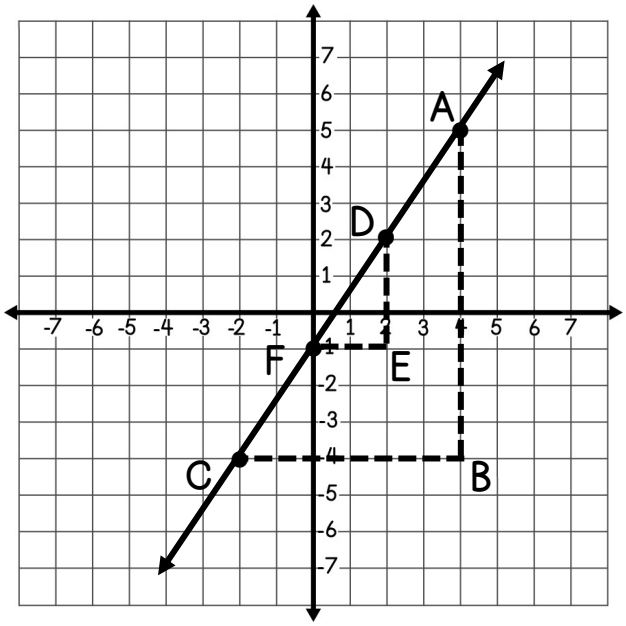
HOURS	0	2	8	15
TOTAL COST ($)	125	235	565	950



a. Find the rate of change. 55

b. What does the rate of change represent in the context of the situation?
The interior designer's hourly rate is $55.

Use the graphed line and triangles ABC and DEF below to answer 9-10.



9. Find the slope of $\overline{AC}$.

$\frac{3}{2}$

10. Which is a true statement about the slope of $\overline{AC}$ compared to the slope of $\overline{DF}$?

a. The slope of $\overline{AC}$ is greater than the slope of $\overline{DF}$.

b. The slope of $\overline{AC}$ is less than the slope of $\overline{DF}$.

c. The slopes are equal because $\frac{5-(-4)}{4-(-2)} = \frac{2-(-1)}{2-0}$.

d. The slopes are equal because $\frac{4-(-2)}{5-(-4)} = \frac{2-0}{2-(-1)}$.

Unit: Linear Relationships
Mini-Quiz 1

Name Answer Key

Date _____ Pd_____

FUNCTIONS AND SLOPE MINI-QUIZ

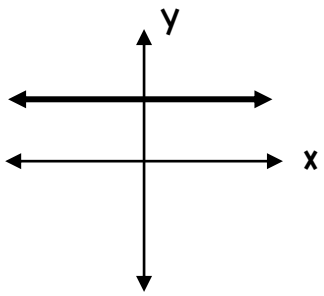
1. Determine if each representation shows y as a function of x by writing "yes" or "no."

a.

{(-2, 9), (0, -4), (3, 12), (1, 1)}

Yes

b.



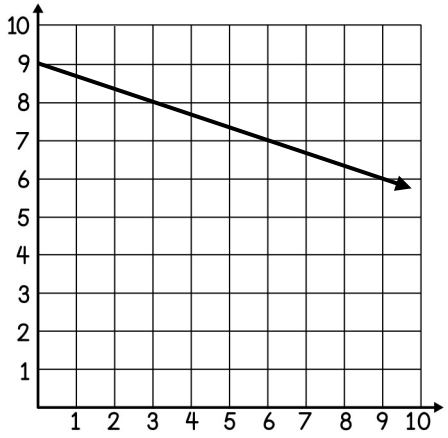
Yes

c.

x	y
-1	1
-1	2
-1	3
-1	4

No

2. Find the slope of the line graphed below.



$-\frac{1}{3}$

3. Find the rate of change represented in the table.

x	-2	0	2	4
y	-39	-11	17	45

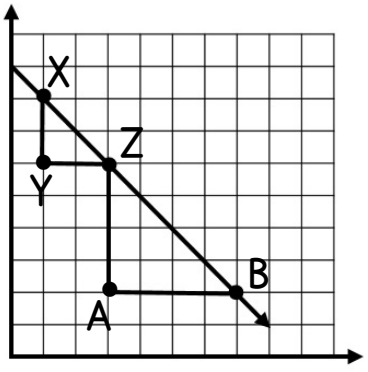
14

4. Find the slope of the line that passes through the following pairs of points:

a. (7, -51) and (10, -75) -8

b. (5, 10.5) and (25, 12.5) $\frac{1}{10}$ or 0.1

5. Which is NOT a true statement about the triangles shown on the graph at the right?



A. The slope of $\overline{XZ}$ is equal to the slope of $\overline{ZB}$.

B. The triangles are similar triangles.

C. The ratio of $\frac{y_2 - y_1}{x_2 - x_1}$ is greater for $\overline{ZB}$ than $\overline{XZ}$.

D. The length of $\overline{XY}$ is less than the length of $\overline{ZA}$.

Unit: Linear Relationships
Student Handout 4

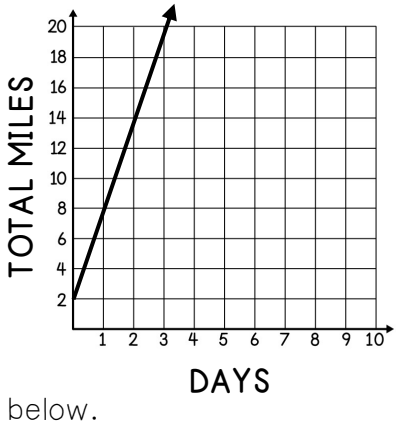
Name Answer Key

Date _____ Pd_____

SLOPE-INTERCEPT FORM: PART I

Xander has biked 2 miles so far this week and plans to bike an average of 6 miles each day over the next several days. Xander wrote the equation and created the graph to represent x, the number of days and y, the total number of miles traveled on his bike.

y = 6x + 2



a. Find the slope of the graph. Where do you see this value in Xander's equation?

6; the coefficient of the variable term

b. What value does the graph touch on the y-axis? Where do you see this value in Xander's equation?

2; the constant term in the equation

Xander's equation is written in slope-intercept form which is described below.

SLOPE-INTERCEPT FORM

- Slope-intercept form, or y = __m__ x + __b__, is one way to write the equation of a __linear__ relationship.
- The y-intercept of a graph is the value of y where the line __crosses__ the y-axis, or when x = __0__.

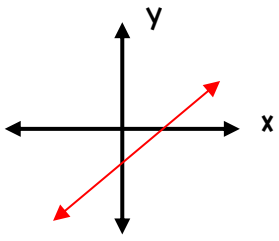
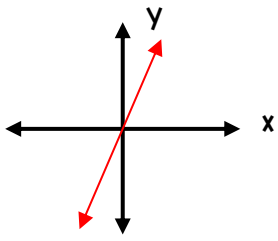
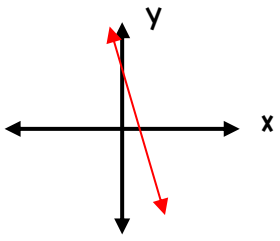
$y = mx + b$

slope y-intercept

In 1-3, use the given information to write an equation of the line in slope-intercept form.

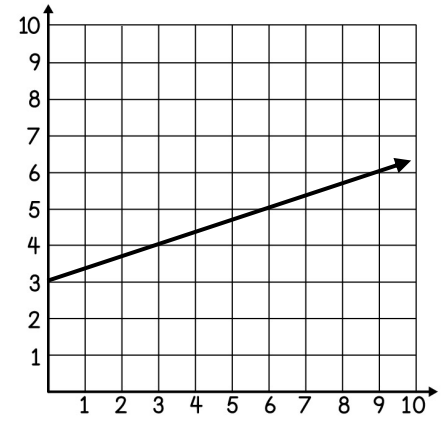
1. slope = -9, y-intercept = 2	2. m = 4.5, b = -10	3. A line has a slope of -5 and passes through the origin.
y = -9 x + 2	y = 4.5x – 10	y = -5x

4. Complete the table below by recording the slope, the y-intercept and a sketch of each linear equation's graph.

	y = x – 5	y = 3x	y = -5x + 7
SLOPE (m)	1	3	-5
Y-INT (b)	-5	0	7
GRAPH			

For each graph below, record the slope, y-intercept, and equation in slope-intercept form.

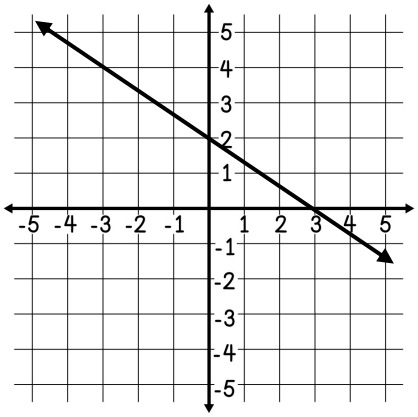
5.



m: $\frac{1}{3}$ b: 3

equation: $y = \frac{1}{3}x + 3$

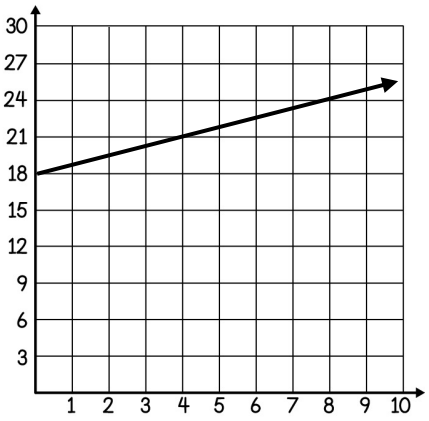
6.



m: $-\frac{2}{3}$ b: 2

equation: $y = -\frac{2}{3}x + 2$

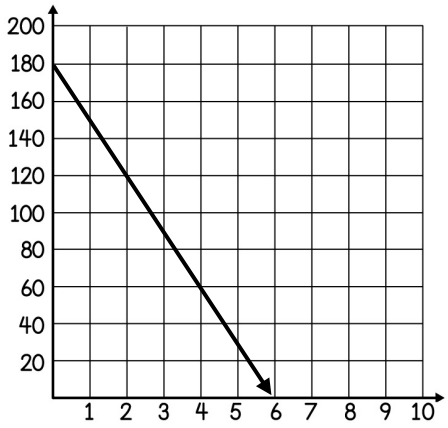
7.



m: $\frac{3}{4}$ b: 18

equation: $y = \frac{3}{4}x + 18$

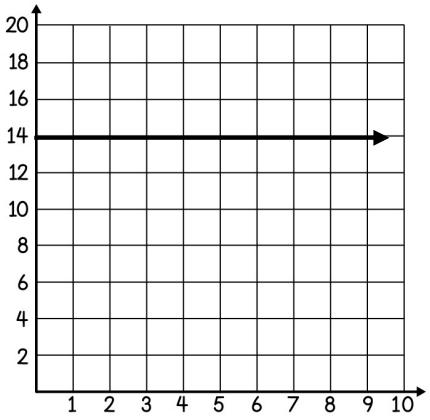
8.



m: -30 b: 180

equation: $y = -30x + 180$

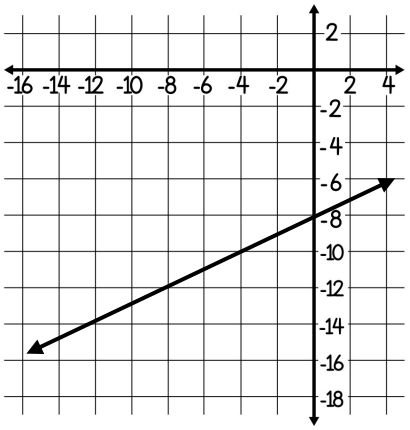
9.



m: 0 b: 14

equation: $y = 14$

10.



m: $\frac{1}{2}$ b: -8

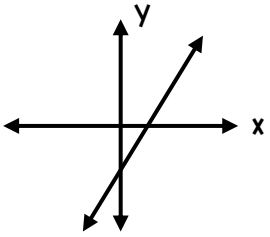
equation: $y = \frac{1}{2}x - 8$

11. Matt is going to create a graph of the equation $y = \frac{4}{5}x - 7$. Mark each statement as true or false and correct any false statements.

F a. Matt's graph will cross the y-axis at (-7, 0). His graph will cross the y-axis at (0, -7).

T b. Matt's graph will increase from left to right.

12. Circle the name of any student who wrote an equation that could possibly represent the graphed line shown at the right.



JAVIER	KARISSA	LIAM
$y = -3x - 2$	$y = 2x - 3$	$y = 2x + 3$

Summarize today's lesson:

Unit: Linear Relationships
Homework 4

Name Answer Key

Date _____ Pd_____

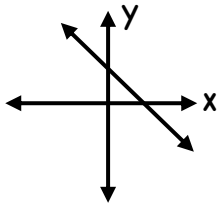
SLOPE-INTERCEPT FORM: PART I

Apply your knowledge of slope-intercept form to answer the questions below.

1. Harper is going to create a graph of the equation y = -0.5x + 12. Which of the following will be true about the graph?

a. The graph will contain the origin.
b. The graph will increase from left to right.
c. The graph will cross the x-axis at (12, 0).
d. The graph will have a slope of -0.5.

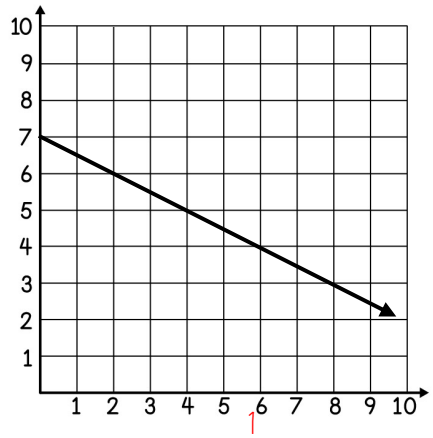
2. Khari graphed the line below. Which equation could represent Khari's graph?



a. y = -2x – 3
b. y = 3x + 4
c. y = -4x + 3
d. y = -2x – 5

For each graph below, record the slope, y-intercept, and equation in slope-intercept form.

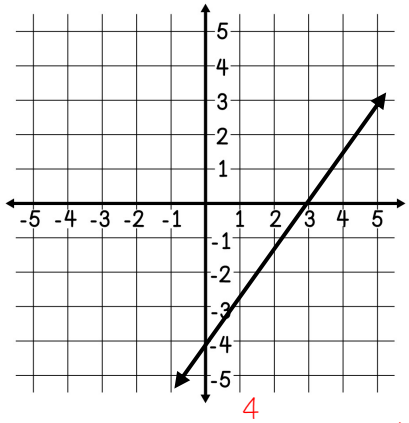
3.



m: $-\frac{1}{2}$ b: 7

equation: $y = -\frac{1}{2}x + 7$

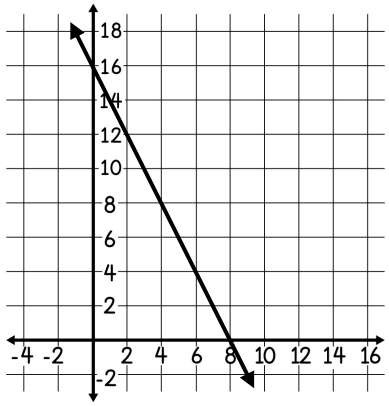
4.



m: $\frac{4}{3}$ b: -4

equation: $y = \frac{4}{3}x - 4$

5.

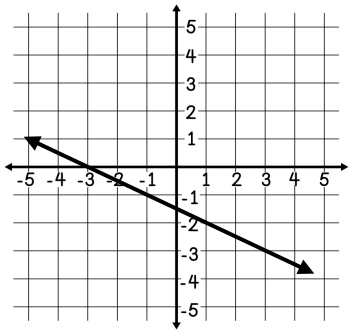


m: -2 b: 16

equation: y = -2x + 16

6. Li wrote the equation below to represent the graph shown. Explain her errors and correct the equation.

$y = \frac{1}{2}x - 3$



The slope should be negative and the y-intercept should be -1.5; $y = -\frac{1}{2}x - 1.5$

7. For a and b, write an equation in slope-intercept form that meets the given criteria.

a. A negative slope and passes through the origin

Sample answer: y = -3x

b. Slopes upward from left to right and has a y-intercept below the x-axis.

Sample answer: y = 3x – 4

8. Mr. Brown asked his students to write an equation that represents a line with a positive slope and a negative y-intercept. Circle the name of any student who correctly completed the task.

EZRA	AALIYAH	JACOBY	PENNY
y = -5x + 2.5	y = 4x – 7	y = -3x – 11	$y = \frac{4}{5}x - 20$

Unit: Linear Relationships
Student Handout 5

Name Answer Key

Date _____ Pd_____

SLOPE-INTERCEPT FORM: PART II

Manny needs to write an equation in slope-intercept form to represent the linear relationship between x and y in the table shown at the right.

x	0	1	4	11	18
y	6	2	-10	-38	-66

a. Describe how Manny can find m, the slope.

Manny should select two ordered pairs and use the slope formula $\frac{y_2 - y_1}{x_2 - x_1}$.

b. Describe how Manny can find b, the y-intercept.

Manny should find the corresponding y-value on the table where x = 0.

c. Write an equation to represent the relationship.

$y = -4x + 6$

In 1-4, write an equation in slope-intercept form to represent each linear relationship.

1.

x	-5	0	5	10
y	-0.25	6	12.25	18.5

m: 1.25 b: 6

equation: $y = 1.25x + 6$

2.

x	2	4	6	8
y	50	90	130	170

m: 20 b: 10

equation: $y = 20x + 10$

3.

x	3	6	9	12
y	-6	-12	-18	-24

m: -2 b: 0

equation: $y = -2x$

4.

x	0	1	2	3
y	1	$1\frac{1}{5}$	$1\frac{2}{5}$	$1\frac{3}{5}$

m: $\frac{1}{5}$ b: 1

equation: $y = \frac{1}{5}x + 1$

5. Luke's family goes to the movies and purchases a large popcorn. They are debating whether to purchase any drinks. The table shows the total cost based on the number of drinks they decide to purchase.

DRINKS	TOTAL COST
0	$6.25
1	$10.00
2	$13.75
3	$17.50
4	$21.25

a. Find the slope and explain what it represents.

3.75; it is the value of $\frac{y_2 - y_1}{x_2 - x_1}$ and it represents the cost per drink.

b. Find the y-intercept and explain what it represents.

6.25; it is the value of y when x is 0 and it represents the cost of the large popcorn.

c. Write an equation in slope-intercept form: $y = 3.75x + 6.25$

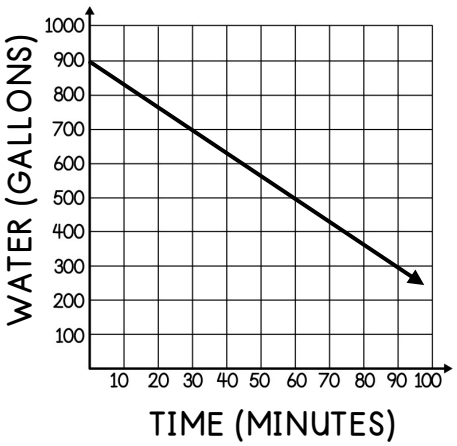
In 6-9, write an equation in slope-intercept form to represent the given situation.

6. At the end of the day, a pizzeria turns off its pizza oven. The table shows the linear relationship between the temperature of the oven and the first five minutes after it was turned off.

MINUTES	TEMPERATURE (°F)
1	425
2	400
3	375
4	350
5	325

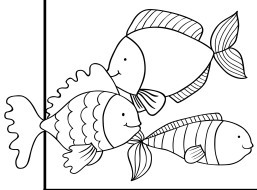
m: -25 b: 450 equation: y = -25x + 450

7. The graph shows the relationship between the number of gallons of water remaining in a storage tank and the number of minutes it has been draining.



m: $-\frac{20}{3}$ b: 900 equation: $y = -\frac{20}{3}+900$

8. Carly wants to buy some fish to keep in her room. At a local pet store, customers can pay $12.50 for a fish tank and $0.20 for each fish they purchase. Write an equation to represent the relationship between t, the total cost and n, the number of fish purchased.



m: $0.20 b: $12.50

equation: t = 0.2n + 12.5

9. Danny is diving for rings at the bottom of the pool and is 8.7 feet below the surface of the water. He grabs a ring and ascends 1.3 feet per second. Write an equation to represent the relationship between s, the number of seconds and f, Danny's depth in feet relative to the surface of the water.

m: 1.3 b: -8.7

equation: f = 1.3s – 8.7

10. A karate academy charges a monthly membership fee plus an additional fee per karate class. The table shows the linear relationship between the number of karate classes taken and the total cost including the membership fee. Find the error in each statement and rewrite them to make them true.

# OF CLASSES	1	5	8	14	20
TOTAL COST	36	60	78	114	150

a. The cost of each class is $8. The cost of each class is $6.

b. The monthly membership fee is $36. The monthly membership fee is $30.

c. A student who attended 30 classes would pay $220. 30 classes would cost $210.

Unit: Linear Relationships
Homework 5

Name Answer Key

Date _____ Pd_____

SLOPE-INTERCEPT FORM: PART II

In 1-2, write an equation in slope-intercept form to represent each linear relationship.

1.

x	0	5	10	15
y	-2	40.5	83	125.5

m: 8.5 b: -2

equation: y = 8.5x – 2

2.

x	3	6	9	12
y	5	-1	-7	-13

m: -2 b: 11

equation: y = -2x + 11

Apply your knowledge of slope-intercept form to answer each of the following questions.

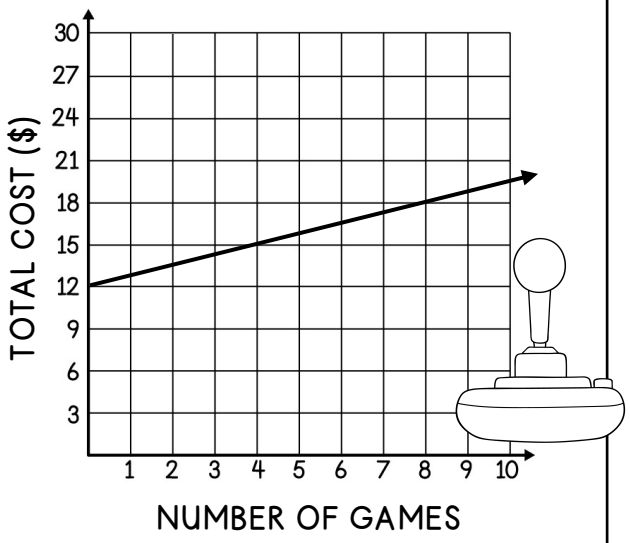
3. Mia has $50 on a gift card to her favorite coffee shop. Each time she visits the coffee shop she spends $3.75 on her favorite drink. Write an equation to represent the relationship between n, the number of times she visits the coffee shop, and b, the total balance on her gift card.

b = -3.75n + 50

4. A magician charges a $30 fee to cover travel and expenses, plus $19.99 per hour. Write an equation to represent the relationship between h, the number of hours, and t, the total charge for the magician.

t = 19.99h + 30

Robert pays for his family to go to the arcade. He pays an entrance fee for his group and an additional amount per game that his family plays as shown in the graph. Use the graph to answer 5-7.



5. Find the slope and interpret its meaning.

The slope is $\frac{3}{4}$; the arcade charges $3 for every 4 games played, or $0.75 per game.

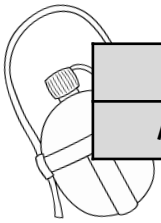
6. Find the y-intercept and interpret its meaning.

The y-intercept is 12; the cost of the entrance fee is $12.

7. Write an equation to represent the relationship between x, the number of games and y, the total cost.

$y = \frac{3}{4}x + 12$

8. A hiker hikes at a steady rate throughout the day on a mountain. Which student wrote a correct equation to represent the linear relationship shown on the table between x, the number of hours hiked and y, the current altitude of the climber?



# HOURS HIKED	1	2	3	5	8
ALTITUDE (FEET)	5,650	5,525	5,400	5,150	4,775

MATEO	JULIE	OLIVER
$y = 125x + 5{,}775$	$y = -125x + 5{,}775$	$y = -125x + 5{,}650$

The table shows the linear relationship between the number of pages left to read in a novel and the number of hours a student has already spent reading the novel. Mark each statement as true or false. If false, rewrite the statement correctly.

HOURS READ	PAGES REMAINING
1	644
4	500
8	308
12	116
14	20

True 9. The student reads at a rate of 48 pages per hour.

False 10. The number of pages in the novel is 644.

The novel has 692 pages.

True 11. The situation can be represented by the equation $y = -48x + 692$.

Unit: Linear Relationships
Student Handout 6

Name Answer Key

Date _____ Pd_____

MULTIPLE REPRESENTATIONS

Practice representing linear relationships in multiple ways with the following examples. Use the representation given to help you fill in the others.

[VERBAL DESCRIPTION]

A baby giraffe measures 6 feet tall when it is born and grows an average of $\frac{1}{2}$ foot each month. What is the relationship between x, the number of months and y, the height of the giraffe?

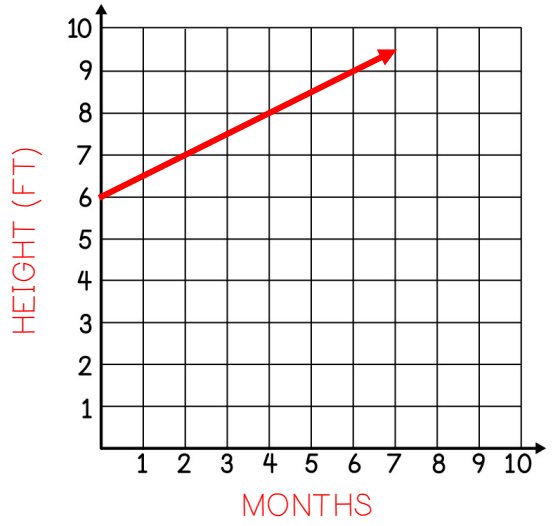
[EQUATION]

$y = 0.5x + 6$

[TABLE]

MONTHS	PROCESS	HEIGHT (FT)
0	0.5(0) + 6	6
1	0.5(1) + 6	6.5
2	0.5(2) + 6	7
3	0.5(3) + 6	7.5
4	0.5(4) + 6	8
5	0.5(5) + 6	8.5
6	0.5(6) + 6	9

[GRAPH]



Use the representations in the example above to answer 1-5.

1. Explain how you found ordered pairs to create your graph.

Sample: From the x and y-values in the table.

2. What is the slope of the graph, and what does it represent?

The slope is 0.5; it represents the rate the giraffe grows each month.

3. What is the y-intercept of the graph, and what does it represent?

The y-intercept is (0, 6); it represents the initial height of the giraffe at birth.

4. What does the ordered pair (9, 10.5) represent in the context of the situation?

After 9 months, the giraffe would be 10.5 feet tall.

5. If the giraffe is 12 feet tall, how many months old is it?

12 months

Use the given information for each situation below to fill in the missing representations.

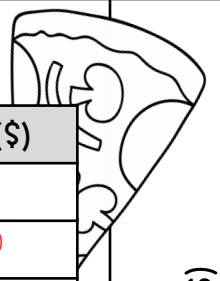
[VERBAL DESCRIPTION]

Sample answer: Joey's Pizza Parlor charges $12 per pizza plus $1.50 for each topping.

[EQUATION]

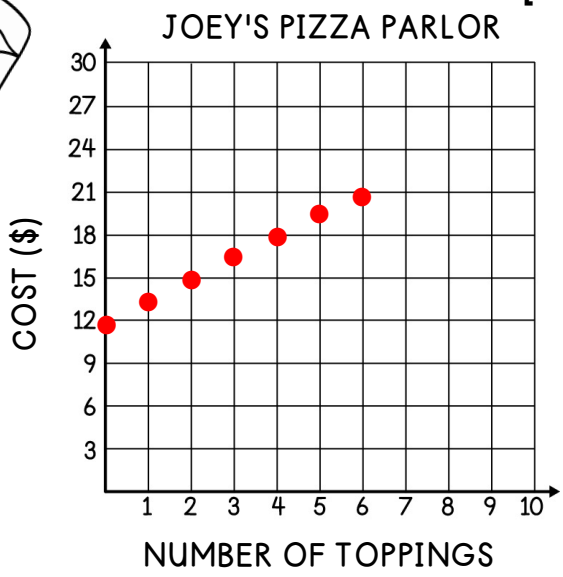
$$y = 12 + 1.5x$$

[TABLE]



TOPPINGS	PROCESS	COST ($)
0	12 + 1.5(0)	12
1	12 + 1.5(1)	13.50
2	12 + 1.5(2)	15
3	12 + 1.5(3)	16.50
4	12 + 1.5(4)	18
5	12 + 1.5(5)	19.50
6	12 + 1.5(6)	21

[GRAPH]



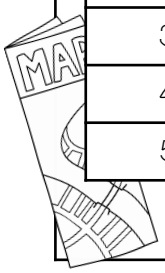
[VERBAL DESCRIPTION]

Sample answer: The Smiths started with 9 gallons of gas in their car and use 0.05 gallons of gas each mile driven.

[EQUATION]

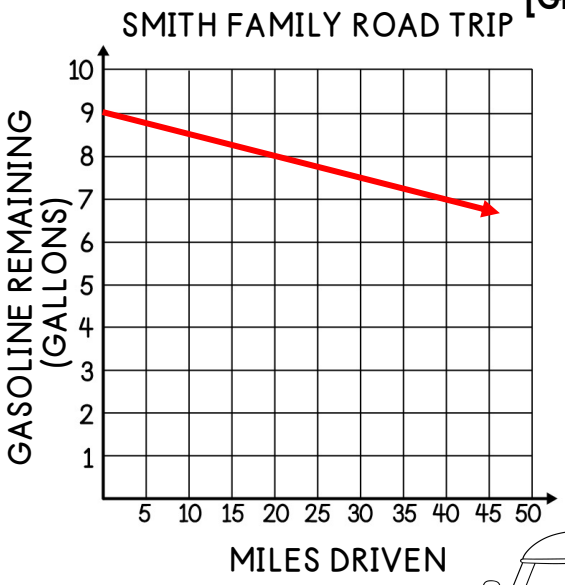
$$y = -0.05x + 9$$

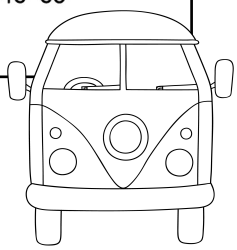
[TABLE]



MILES DRIVEN	PROCESS	GASOLINE REMAINING (GALLONS)
10	-0.05(10) + 9	8.5
20	-0.05(20) + 9	8
30	-0.05(30) + 9	7.5
40	-0.05(40) + 9	7
50	-0.05(50) + 9	6.5

[GRAPH]





Summarize today's lesson:

Unit: Linear Relationships
Homework 6

Name Answer Key

Date _____ Pd_____

MULTIPLE REPRESENTATIONS

Andy's Appliance Repair charges a set fee for house calls and an additional fee for each hour of labor. Use the graph shown below to fill in the missing representations.

[VERBAL DESCRIPTION]

Andy's Appliance Repair charges $20 for a house call plus $60 per hour.

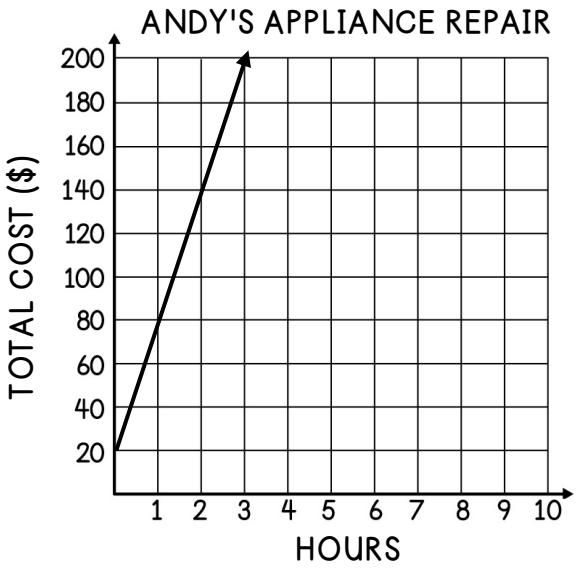
[EQUATION]

$y = 60x + 20$

[TABLE]

HOURS	PROCESS	COST ($)
0	$y = 60(0) + 20$	20
1	$y = 60(1) + 20$	80
2	$y = 60(2) + 20$	140
3	$y = 60(3) + 20$	200
4	$y = 60(4) + 20$	260
5	$y = 60(5) + 20$	320
6	$y = 60(6) + 20$	380

[GRAPH]



1. What is the slope of the graph, and what does it represent?

The slope is 60, and it represents the cost per hour.

2. What is the y-intercept of the graph, and what does it represent?

The y-intercept is 20, and it represents the set fee for a house call.

3. What does the ordered pair (7, 440) represent in the context of the situation?

After 7 hours, the total cost for a repair would be $440.

4. How much would it cost for a 9-hour repair?

$560

5. If the cost of a repair was $740, how many hours did it take?

12 hours

Unit: Linear Relationships
Quiz 1

Name Answer Key

Date _____ Pd_____

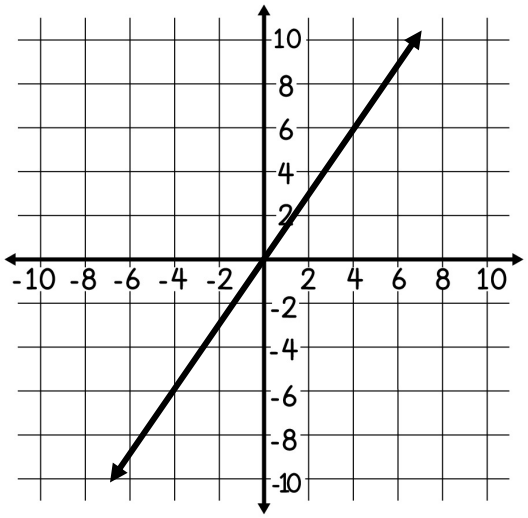
QUIZ: FUNCTIONS, SLOPE AND SLOPE-INTERCEPT FORM

1. Kayla thinks that the slope of a vertical line is undefined, while Joshua argues that the slope of a vertical line is zero. Who is correct?

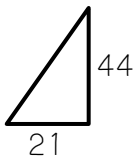
2. Find the rate of change shown in the table.

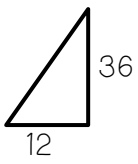
x	y
1	-3
2	-9
3	-15
4	-21

3. Find the slope of the graph.



4. Which of the following triangles could lie on the line graphed in question #3?

A.


B.


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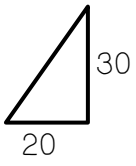
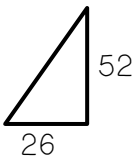


D.


5. A line has a slope of zero. Which of the following points could this line pass through?

A. (12, 9) and (12, 6)

B. (3, -6) and (7, -6)

C. (1, 4) and (2, 5)

D. (-9, 7) and (9, -7)

6. Which of the following is true about the graph of the equation y = -5x + 10?

A. The graph would increase from left to right.

B. The graph would pass through the origin.

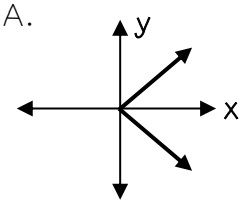
C. The graph would have a positive y-intercept.

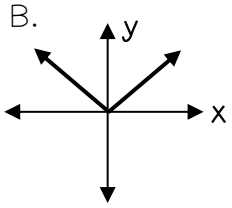
D. The graph would have a slope of 10.

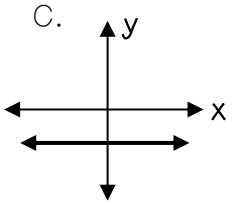
Answers

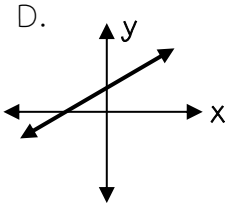
1. Kayla
2. -6
3. 3/2
4. C
5. B
6. C
7. A
8. y = -3x + 10
9. y = 1.6x – 5
10. B
11. y = 4x + 35
12. D
13. $y = -\frac{100}{3}x + 450$
14. 150 miles
15. 12 hours

7. Which of the following does not represent a function?

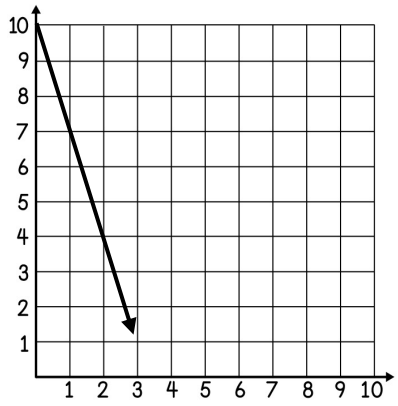
A. 

B. 

C. 

D. 

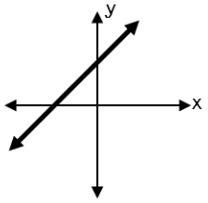
8. Write an equation for the graph in slope-intercept form.

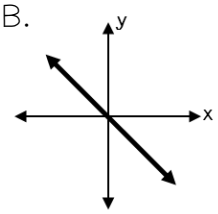


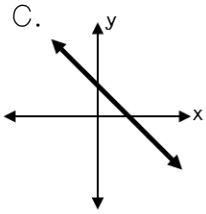
9. Write an equation for the table in slope-intercept form.

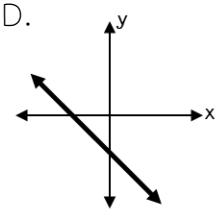
x	-2	0	2	4	6	8
y	-8.2	-5	-1.8	1.4	4.6	7.8

10. Which of the following could be the graph of the equation $y = -2x$?

A. 

B. 

C. 

D. 

11. Andre manages a company that currently has 35 employees and is gaining 4 new employees each month. Write an equation to represent the relationship between y, the total number of employees, and x, the number of months.

12. Which of the following sets of ordered pairs represents a function?

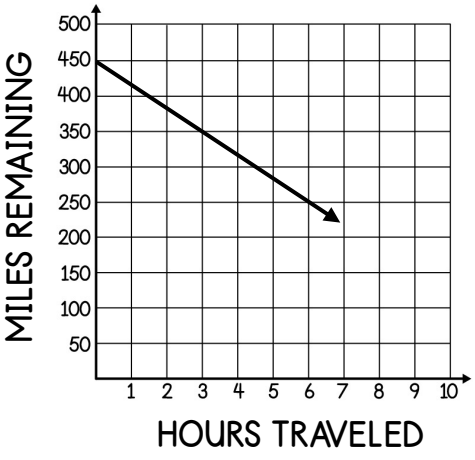
A. {(0, 3), (2, 6), (7, 12), (0, -3)}
B. {(6, 1), (6, 2), (6, 3), (6, 4)}
C. {(-12, 0), (-13, -1), (-14, -2), (-14, -3)}
D. {(1, 6), (2, 6), (3, 6), (4, 6)}

Misty is driving on a scenic road trip, and the graph shows the number of hours traveled compared to the number of miles remaining in the trip. Use the graph to answer 13-15.

13. Write an equation of the graph in slope-intercept form.

14. If Misty has been traveling for 9 hours, how many miles of the trip does she have remaining?

15. If there are 50 miles in the trip remaining, how many hours has Misty been traveling?



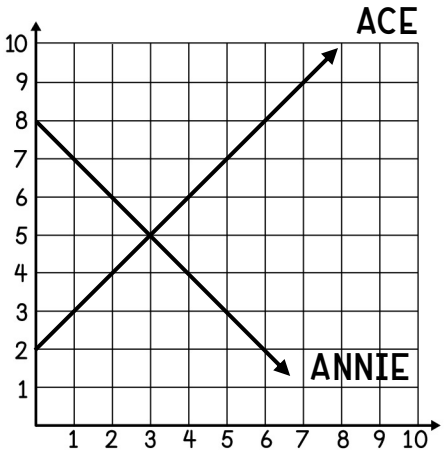
Unit: Linear Relationships
Student Handout 7

Name Answer Key

Date _____ Pd_____

SYSTEMS OF EQUATIONS

Ace and Annie graphed linear equations on the same grid as shown below. Use their graphs to answer a-d.



a. Write an equation to represent each person's line.

ACE: y = x + 2 **ANNIE:** y = -x + 8

b. List the ordered pair where the lines intersect. (3, 5)

c. Is the point above a solution to Ace's equation? Give two ways you can tell. Yes; it is a point on the graphed line and the values of x and y make the equation true when plugged in.

d. Is the point from part b also a solution to Annie's equation? Give two ways you can tell. Yes; it is a point on the graphed line and the values of x and y make the equation true when plugged in.

SYSTEM OF EQUATIONS

- A system of equations is a set of more than one equation with the same variables.
- The point of intersection of two graphed equations is the solution of the system of equations, or the ordered pair that makes both equations true.

1. Use the system of linear equations graphed below to answer a-d.

a. List the two linear equations graphed at the right.

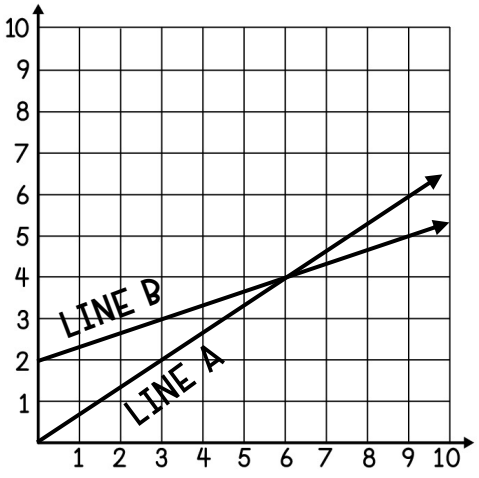
A: y = 2/3x B: y = 1/3x + 2

b. What is the solution to the system of equations? (6, 4)

c. Show work below to prove your answer is correct.

y = 2/3x
4 = (2/3)(6)
4 = 4

y = 1/3x + 2
4 = (1/3)(6) + 2
4 = 2 + 2
4 = 4



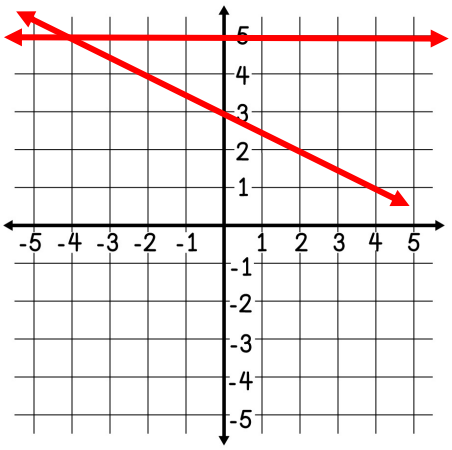
d. Record if each ordered pair below is a solution to equation A, B, both or neither.

(3, 2): A (4, 6): Neither (3, 3): B (6, 4): Both

In 2-3, graph the system of equations to find the solution to the system. Then, use the check step to prove that the solution works in both equations. Show all work.

2. $y = -\frac{1}{2}x + 3$

$y = 5$



Solution:

(-4, 5)

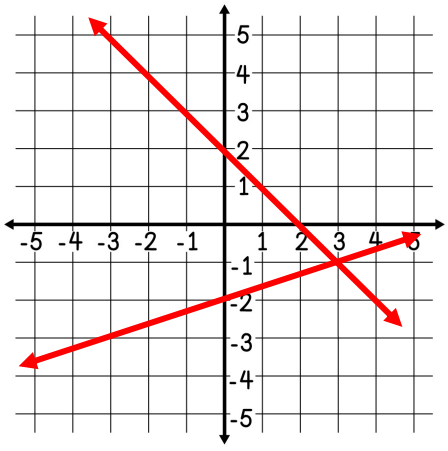
CHECK:

$y = -1/2x + 3$
$5 = -1/2(-4) + 3$
$5 = 2 + 3$
$5 = 5$

$y = 5$
$5 = 5$

3. $y = \frac{1}{3}x - 2$

$y = -x + 2$



Solution:

(3, -1)

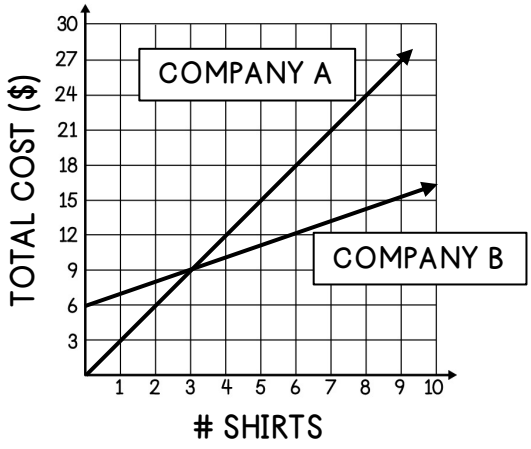
CHECK:

$y = 1/3x - 2$
$-1 = 1/3(3) - 2$
$-1 = 1 - 2$
$-1 = -1$

$y = -x + 2$
$-1 = -3 + 2$
$-1 = -1$

For 4-5, use the graph to answer a–c.

4. The total cost of two t-shirt companies based on the number of shirts ordered is shown below.



a. Write an equation to represent each company.

Company A: $y = 3x$
Company B: $y = x + 6$

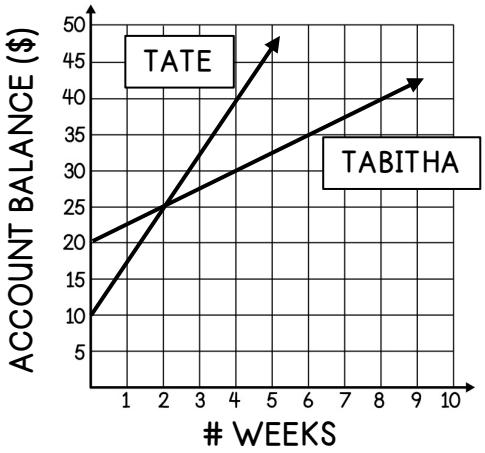
b. How many shirts would need to be ordered for the cost to be the same at either company? What would the total cost be?

3 shirts; $9

c. If Justin needs to order 5 shirts, which company would be the cheaper option?

Company B

5. The balance of two siblings' savings accounts based on the number of weeks is shown below.



a. Describe the amount each sibling started with and the rate at which his or her account balance is changing.

Tate began with $10 and saves at a rate of $7.50 each week. Tabitha began with $20 and saves at a rate of $2.50 each week.

b. After how many weeks will the siblings have the same amount, and what will the amount be?

2 weeks; $25

c. Which sibling will have the highest balance after 5 weeks?

Tate

Unit: Linear Relationships
Homework 7

Name Answer Key

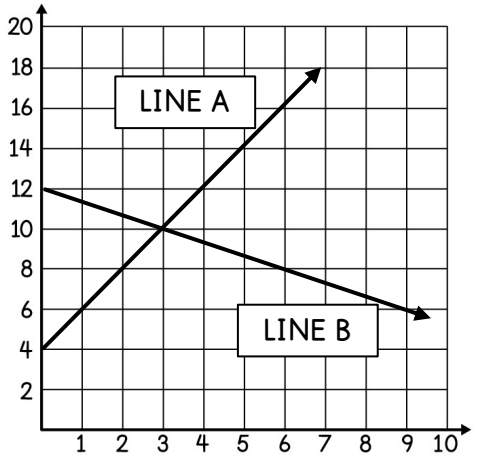
Date _____ Pd_____

SYSTEMS OF EQUATIONS

Use the system of equations in A-C to answer the questions.

A

Use the graphed system of equations to answer 1-3.



1. Write the equation of each line in slope-intercept form.

A: $y = 2x + 4$ B: $y = -\frac{2}{3}x + 12$

2. What is the solution to the system of equations? (3, 10)

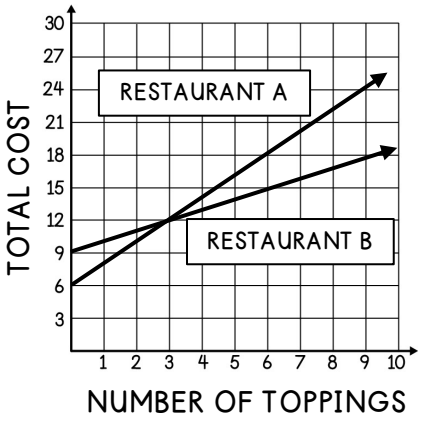
3. Show work below to prove the solution is correct.

$10 = 2(3) + 4$
$10 = 6 + 4$
$10 = 10$

$10 = -\frac{2}{3}(3) + 12$
$10 = -2 + 12$
$10 = 10$

B

The graph shows the cost of a pizza at two restaurants based on the number of toppings ordered. Use the graph to answer 4-6.



4. Write the equation of each line in slope-intercept form.

A: $y = 2x + 6$ B: $y = x + 9$

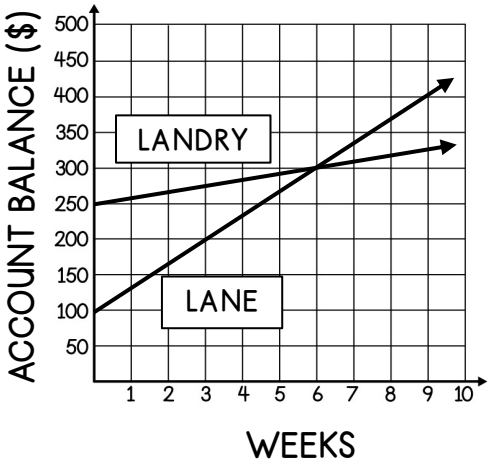
5. What is the solution to the system of equations? (3, 12)

6. What does the solution mean in the context of the situation?

A pizza with 3 toppings will cost $12 at either restaurant.

C

The graph compares the amount of money in two accounts based on the number of weeks each person has been saving. Use the graph to answer 7-8.



7. What is the solution to the system of equations? (6, 300)

8. Which statement is true?
   a. At 6 weeks, Lane and Landry will have the same amount of money.
   b. After 6 weeks, Lane will have more money than Landry.
   c. Lane saves at a rate more than three times that of Landry.
   d. All of the above.

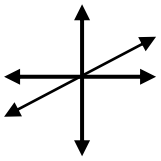
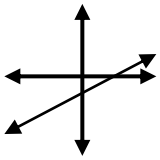
Unit: Linear Relationships
Student Handout 8

Name Answer Key

Date _____ Pd_____

PROPORTIONAL AND NON-PROPORTIONAL RELATIONSHIPS

Linear relationships can be proportional or non-proportional. A proportional relationship means that there is a constant ratio between the values of x and y. Complete the table below to review the differences in proportional and non-proportional representations.

	PROPORTIONAL	NON-PROPORTIONAL
EQUATION	• Can be written as $y = kx$ where k is the slope or rate of change. • Ex: $y = 5x$	• Can be written as $y = mx + b$ where m is the slope and b does not equal 0 • Ex: $y = 5x + 1$
TABLE	• The ratio of $\frac{y}{x}$ is constant • Ex:	• The ratio of $\frac{y}{x}$ is not constant • Ex:
GRAPH	• Any graph that is both linear and contains the origin 	• Any graph that is not linear or does not contain the origin 

x	2	4	6	8
y	6	12	18	24

x	2	4	6	8
y	8	14	20	26

Complete each representation for the situation described below. Then, determine if the situation is proportional based on each representation.

1. Hillary is looking for a gym to join. A local gym, Forever Fit, is offering a special deal where new members pay $30 per month and no sign-up fee.

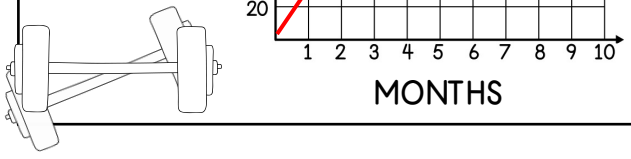
A. EQUATION

$y = 30x$

B. TABLE

MONTHS (X)	0	1	2	3
COST (Y)	0	30	60	90

C. GRAPH



D. PROPORTIONAL? Yes

Explain based on each representation:

- equation: Written in the form of $y = kx$
- table: The ratio of $\frac{y}{x}$ is constant and always equals 30
- graph: Linear and contains (0, 0)

2. Javier is ordering custom sunglasses for an upcoming event. The website he is ordering from will charge $2.50 per pair of sunglasses and $5 for shipping.

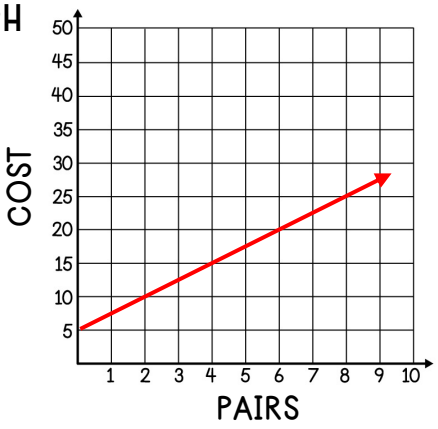
A. EQUATION

$y = 2.5x + 5$

B. TABLE

PAIRS (X)	0	1	2	3
COST (Y)	5	7.50	10	12.50

C. GRAPH



D. PROPORTIONAL? No

Explain based on each representation:

- equation: Written in the form of $y = mx + b$
- table: The ratio of $\frac{y}{x}$ is not constant
- graph: Does not contain (0, 0)

Label each representation below as "proportional" or "non-proportional." Justify your choice.

3. $y = \frac{8}{7}x$

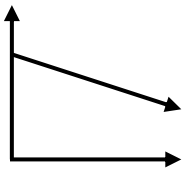
Proportional; written in the form of $y = kx$

4.

x	-9	-8	-7	-6
y	13.5	12	10.5	9

Proportional; ratio of y/x is constant

5.

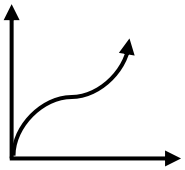


Non-proportional; does not contain the origin

6. Denzel has $13.50 and saves an additional $7.50 each week.

Non-proportional; can be represented by $y = 7.5x + 13.5$ ($y = mx + b$)

7.



Non-proportional; not linear

8.

x	8	10	12	14
y	18	20	22	24

Non-proportional; ratio of y/x is not constant

Create an example for each of the following. If an example is not possible, explain why.

9. A linear equation that is proportional with a negative y-intercept

Not possible; the y-intercept of a proportional relationship must be 0.

10. A linear equation that is non-proportional with a positive slope and a negative y-intercept

Sample answer: $y = 10x - 8$

Unit: Linear Relationships
Homework 8

Name Answer Key

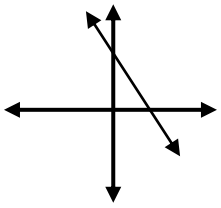
Date _____ Pd_____

PROPORTIONAL AND NON-PROPORTIONAL RELATIONSHIPS

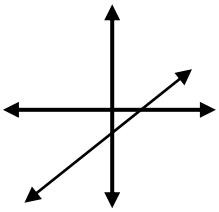
In A-D, mark each statement as true or false. If false, rewrite the statement correctly.

A Two students created the graphs shown below.

RAUL



BECKY



T 1. Both graphs represent linear relationships.

F 2. Both graphs have a positive slope.

Only Becky's graph has a positive slope.

F 3. Both graphs represent proportional relationships between x and y.

Neither graph represents a proportional relationship.

B The table represents the amount of coffee in a coffee pot based on the number of minutes the coffee has been brewing.

TIME (MIN)	COFFEE (OZ)
2	4.8
3	7.2
4	9.6
5	12

F 4. The ratio of $\frac{y}{x}$ is not constant.

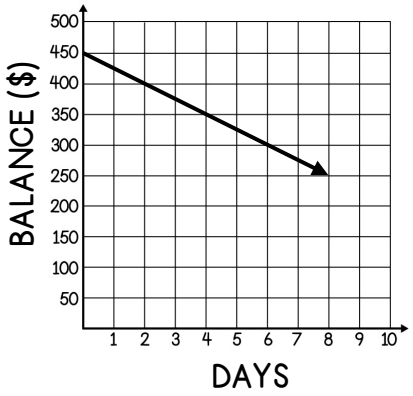
The ratio of $\frac{y}{x}$ is a constant 2.4.

T 5. The table represents a proportional relationship between x and y.

F 6. The table can be represented by $y = x + 2.4$.

The table can be represented by $y = 2.4x$.

C The graph represents the balance in Jimena's checking account based on the number of days since her last paycheck.



T 7. The relationship shown on the graph is non-proportional.

T 8. The graph represents a linear relationship with a negative slope.

F 9. The graph can be represented by $y = 450x - 25$.

The graph can be represented by $y = -25x + 450$.

D Two students wrote the equations shown below.

ERICA	ALIYAH
$y = -0.5x$	$y = 2.5x - 8$

F 10. Graphs of both equations will pass through the origin.

Only Erica's would pass through the origin.

T 11. Only Erica's equation is proportional.

F 12. Both equations have a negative slope.

Only Erica's equation has a negative slope.

Unit: Linear Relationships
Student Handout 9

Name Answer Key

Date _____ Pd_____

DIRECT VARIATION

DIRECT VARIATION	• Direct variation exists when a relationship is proportional . • You can also say that that value of y "varies directly" with x.	
CONSTANT OF PROPORTIONALITY	• Situations that vary directly can be represented with the equation $y = kx$. • The coefficient "k" is the constant of proportionality, or the ratio of $\frac{y}{x}$.	$y = \underset{\uparrow}{k}x$ equal to ratio of $\frac{y}{x}$

In 1-3, assume that y varies directly with x. Find the value of k, and then write an equation to describe the direct variation.

1.	2.	3.
$x = -3,\ y = 18$	$x = 9,\ y = 6$	$x = \frac{1}{4},\ y = 7$
k: -6	k: $\frac{2}{3}$	k: 28
Equation: $y = -6x$	Equation: $y = \frac{2}{3}x$	Equation: $y = 28x$

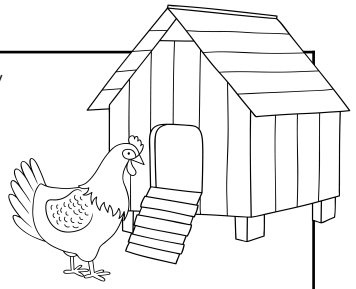
4. The value of y varies directly with x. If x = 2, then y = 15. Use this to answer a-d.

a. Find k, the constant of proportionality. $k = 7.5$	b. Write an equation to represent the situation. $y = 7.5x$
c. Find the value of y when x = 13. $y = 97.5$	d. Find the value of x when y = 180. $x = 24$

5. The value of y varies directly with x. If y = 30, $x = \frac{1}{3}$. Use this to answer a-d.

a. Find k, the constant of proportionality. $k = 90$	b. Write an equation to represent the situation. $y = 90x$
c. Find the value of y when $x = 1\frac{1}{2}$. $y = 135$	d. Find the value of x when y = 810. $x = 9$

Apply your knowledge of direction variation to answer 6-9.



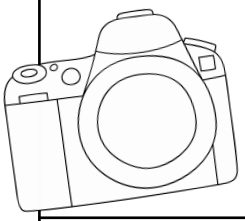
6. The number of eggs that Cain gathers on the farm each day varies directly with the number of hens on the farm. If Cain has 8 hens, he will gather 6 eggs a day.

a. Write an equation to represent the situation. $y = \frac{3}{4}x$

b. If there are 20 hens on the farm, how many eggs should Cain expect in a day? 15 eggs

c. If Cain gathered 9 eggs in a day, how many hens were on the farm? 12 hens

7. Arturo is a photographer and the number of photos he can edit varies directly with the amount of time he spends editing. He can edit 25 photos in $\frac{1}{2}$ hour. Write and use an equation to determine the number of photos he can edit in 6 hours.



300 photos

8. The number of cookies Marci can bake is directly proportional to the amount of flour that she has in her bakery. Marci can bake 24 cookies with $2\frac{1}{4}$ cups of flour. Write and use an equation to determine the amount of flour Marci had in her bakery if she baked 60 cookies.

$5\frac{5}{8}$ cups

9. Mrs. Hernandez told her students that the value of y is directly proportional to x, and that if $y = 21$, then $x = 14$. Circle the name of any student who made a true statement.

TAHLIA	FRANKIE	SONYA
"The situation can be represented by the equation $y = \frac{1}{2}x$."	"If $x = 9$, $y = 13.5$."	"If $y = 30$, $x = 20$."

Summarize today's lesson:

Unit: Linear Relationships
Homework 9

Name Answer Key

Date _____ Pd_____

DIRECT VARIATION

Each of the cards below gives the values for x and y in a relationship that varies directly. Use the cards to answer 1-6.

A. $x = 2$, $y = 11$

B. $x = 15$, $y = 5$

C. $x = \frac{1}{4}$, $y = 16$

D. $x = 3$, $y = \frac{3}{7}$

E. $x = -10$, $y = 2$

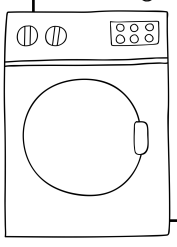
F. $x = 6$, $y = 21$

G. $x = 8$, $y = 4$

1. For card A, find the constant of proportionality. 5.5 or $\frac{11}{2}$	2. For card E, find the value of "k." $-\frac{1}{5}$	3. Which card shows a relationship where the constant of proportionality is 64? Card C
4. Write a direct variation equation to represent the relationship in card D. $y = \frac{1}{7}x$	5. Write a direct variation equation to represent the relationship in card F. $y = 3.5x$	6. Which card can be represented by the equation $y = \frac{1}{3}x$? Card B

Apply your knowledge of direct variation to answer 7-10.

7. The values of x and y vary directly, and when $x = 4$, $y = -10$. Find the value of y when $x = 10$. -25	8. The values of x and y vary directly, and when $x = 48$, $y = 36$. Find the value of x when $y = 18$. 24
9. The amount of water used by a washing machine varies directly with the weight of the load being washed. The washing machine uses 28 gallons to wash 7 pounds of clothing. How many gallons of water will the machine use to wash 24.5 pounds of laundry? 98 gallons	10. The number of bracelets Colleen can make varies directly with the amount of time she spends making the bracelets. She can make 5 bracelets in 2.5 hours. How many bracelets can she make in 10 hours? 20 bracelets



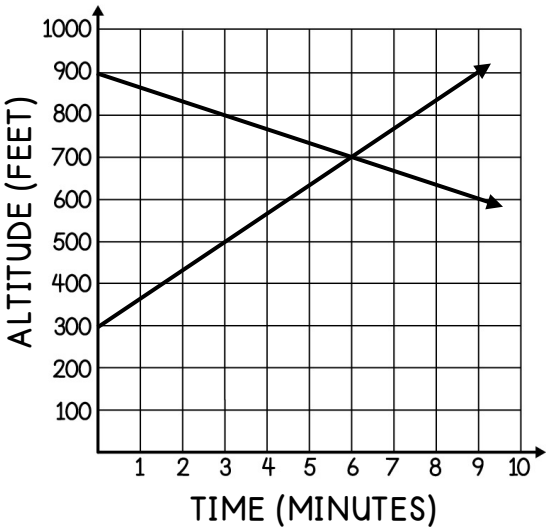
Unit: Linear Relationships
Mini-Quiz 2

Name Answer Key

Date _____ Pd_____

LINEAR RELATIONSHIPS MINI-QUIZ

1. The altitudes of two different hot air balloons over time are represented by the linear relationships on the graph shown. Use the graph to answer a-b.



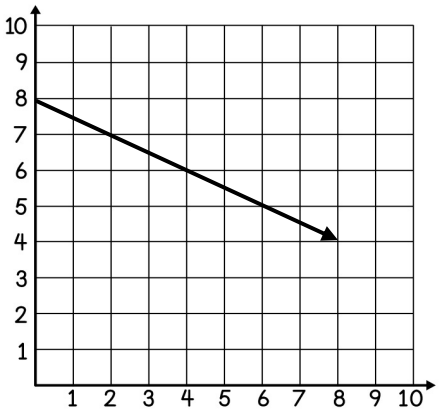
a. What is the solution to the system of equations?

(6, 700)

b. What does the solution represent in the context of the situation?

After 6 minutes, both hot air balloons will be at an altitude of 700 feet.

2. Use the graph to answer a-b.



a. Is the graph proportional? Explain.

No; it doesn't contain the origin.

b. Write an equation for the graph.

$y = -0.5x + 8$

3. Use the table to answer a-b.

x	y
10	-25
20	-50
30	-75
40	-100

a. Is the table proportional? Explain.

Yes; the ratio of $\frac{y}{x}$ is constant.

b. Write an equation for the table.

$y = -2.5x$

4. The value of y varies directly with x, and when $y = 9$, $x = \frac{1}{3}$.

a. Write an equation to represent the direct variation.

$y = 27x$

a. Find the value of y when x is $\frac{1}{9}$.

3

5. The number of avocados used by a restaurant in a day varies directly with the number of orders of guacamole that day. It takes 6.5 avocados to make 4 orders of guacamole. How many avocados would it take to make 14 orders of guacamole?

22.75 avocados

Unit: Linear Relationships Review

Name Answer Key

Date _____ Pd _____

LINEAR RELATIONSHIPS STUDY GUIDE

Solve each of the problems below. These represent the types of questions on your test. Be sure to ask questions if you need more help with a topic.

I CAN IDENTIFY FUNCTIONS. 8.5G

1. Does the set of ordered pairs represent a function? Explain.

{(6, -6), (7, -6), (8, -6), (9, -6)}

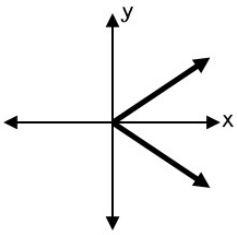
Yes; each input has exactly one output.

2. Does the table represent a function? Explain.

x	-3	-2	0	-3	-2
y	9	4	0	-9	-4

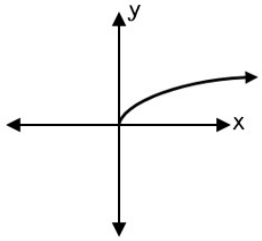
No; -3 and -2 have more than one output.

3. Does the graph represent a function? Explain.



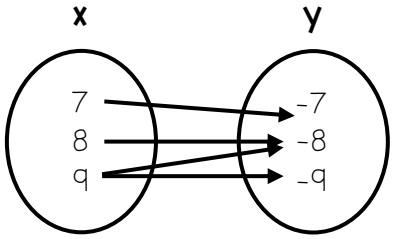
No; the graph does not pass the vertical line test.

4. Does the graph represent a function? Explain.



Yes; the graph passes the vertical line test.

5. Does the mapping represent a function? Explain.



No; the input of 9 has two different outputs.

6. Does the set of ordered pairs represent a function? Explain.

{(0, 5), (-2, -1), (0, -5), (3, 20)}

No; the input of 0 has two different outputs.

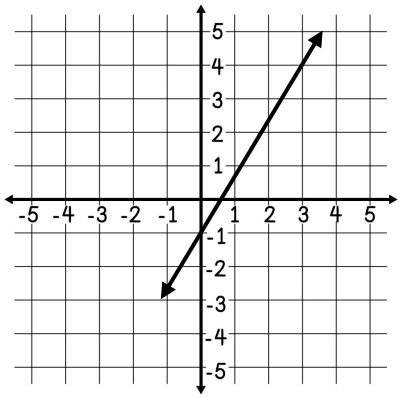
I CAN DETERMINE SLOPE AND RATE OF CHANGE. 8.4C

7. Find the rate of change from the table.

x	y
-3	10.5
-2	7
-1	3.5
0	0

-3.5

8. Find the slope of the graph.



$\frac{5}{3}$

9. Find the slope of the line that passes through the following pairs of points.

a. (5, 4) and (-4, 3)

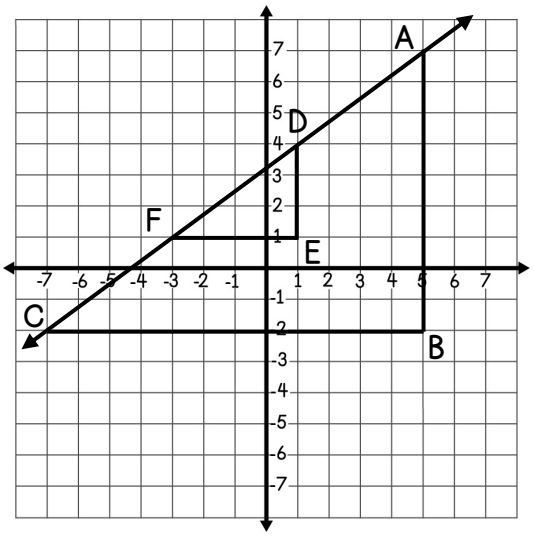
$\frac{1}{9}$

b. (10, 8) and (9, 13)

-5

I CAN USE SIMILAR TRIANGLES TO UNDERSTAND SLOPE. 8.4A

Use the graph to answer 10-11.



10. Igor believes the slope of $\overline{AC}$ is greater than the slope of $\overline{DF}$, while Keenan believes the two slopes are equal. Who do you agree with?

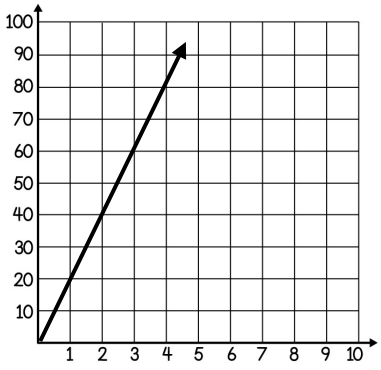
Kennan

11. Justify your choice above.

Sample answer: the slope between any two points on the same line will be the same.

I CAN DETERMINE SLOPE AND Y-INTERCEPT FROM MULTIPLE REPRESENTATIONS. 8.5I

12. Use the graph to fill in each blank.

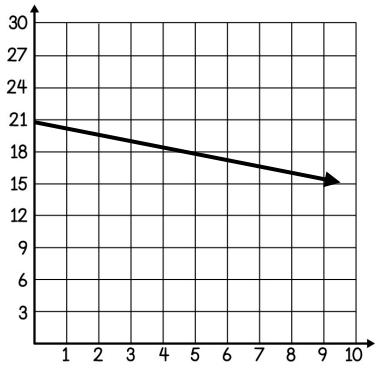


m: 20 b: 0

Equation: y = 20x

Proportional? Yes

13. Use the graph to fill in each blank.



m: $-\frac{3}{5}$ b: 21

Equation: $y = -\frac{3}{5}x + 21$

Proportional? No

14. Use the equation to fill in each blank.

$$y = \frac{2}{7}x$$

m: $\frac{2}{7}$ b: 0 Proportional? Yes

15. Use the equation to fill in each blank.

$$y = -3.5x - 10$$

m: -3.5 b: -10 Proportional? No

16. Use the table to fill in each blank.

x	2	4	6	8
y	20	50	80	110

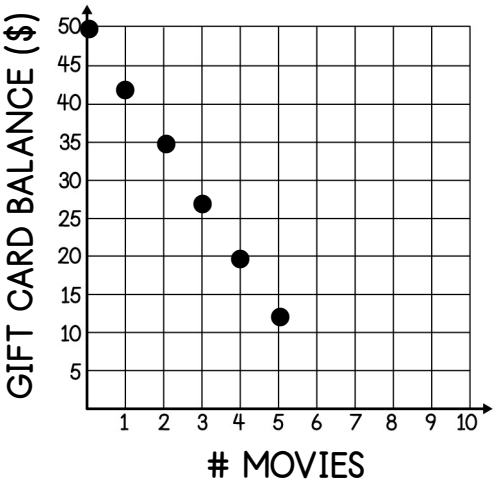
m: 15 b: -10 Equation: y = 15x – 10

Proportional? No

17. Kayla works at a coffee shop and earned $6.25 an hour plus $8.50 in tips yesterday. Write an equation to represent the relationship between x, the number of hours worked and y, the total amount Kayla earned.

y = 6.25x + 8.5

18. Elyse has a gift card to a local movie theater. The graph shows the amount of money remaining on her gift card based on the number of movies she has seen.



a. Write an equation to represent the situation.

y = -7.5x + 50

b. What is the y-intercept, and what does it mean in the context of the situation?

The y-intercept is 50. It means that the beginning balance on her gift card was $50.

c. What is the slope, and what does it mean in the context of the situation?

The slope is -7.5. It means that each movie costs $7.50, and her gift card balance will decrease by $7.50 for every movie seen.

19. Trish is ordering travel mugs from a website that charges a certain amount per mug plus a flat rate for shipping as shown in the table.

MUGS	0	3	6	9
COST	$5.99	$32.24	$58.49	$84.74

a. Write an equation to represent the situation. y = 8.75x + 5.99

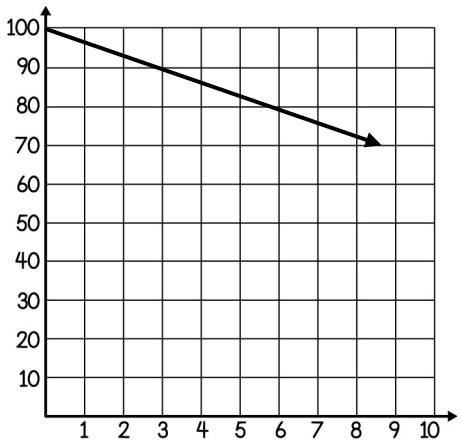
b. What does the y-intercept mean in the context of the situation?

The website charges $5.99 for shipping.

c. What does the slope mean in the context of the situation?

The website charges $8.75 travel mug.

20. Which of the following situations could be modeled by the graph below?



A. Elaina has $100 in her bank account. Every 3 days, she saves another $10 and adds it to her account.

B. Hunter can bench press 100 pounds, and he plans to increase the weight by 10 pounds every 3 weeks.

C. Dawn's pond is 100 meters deep, but her city hasn't received much rain. As a result, the pond level decreases by 10 meters every 3 weeks.

21. Write an equation for the linear relationship graphed in #20.

$y = -\frac{10}{3}x + 100$

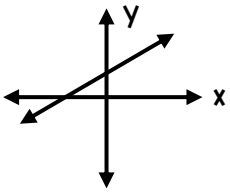
I CAN DISTINGUISH BETWEEN PROPORTIONAL AND NON-PROPORTIONAL SITUATIONS. 8.5F, 8.5H

22. Is the table below proportional? Explain.

x	28	36	40	56
y	21	27	30	42

Yes; the ratio of y/x is constant.

23. Is the graph shown proportional? Explain.



No; the graph does not pass through the origin.

I CAN SOLVE PROBLEMS INVOLVING DIRECT VARIATION. 8.5E

24. The amount of fertilizer Jon uses varies directly with the square feet he is treating. He uses 1.5 pounds of fertilizer to treat 120 square feet. How many pounds of fertilizer would Jon need to treat 300 square feet?

3.75 lbs

25. The value of y varies directly with x, and when $x = \frac{1}{3}$, $y = 5$.

a. Write an equation to represent the direct variation. $y = 15x$

b. Find the value of y if $x = -2$. -30

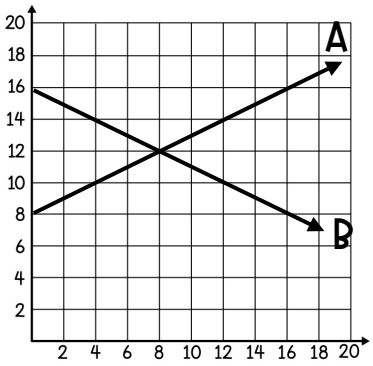
I CAN IDENTIFY VALUES THAT SATISFY TWO LINEAR EQUATIONS FROM A GRAPH. 8.9A

26. Write the equation of each line graphed at the right.

Line A: $y = \frac{1}{2}x + 8$

Line B: $y = -\frac{1}{2}x + 16$

What is the solution to the system of equations? (8, 12)

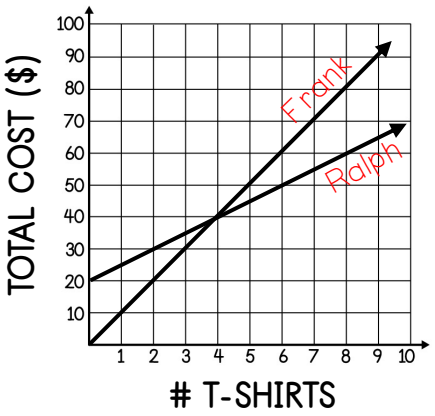


27. Ralph's t-shirt company sells custom t-shirts for $5.00 each, plus a $20 shipping and design fee. Frank's t-shirt company sells t-shirts for $10 each with no additional fees. The relationship between x, the number of shirts sold and y, the total cost is shown on the graph for each company.

a. Label each line with the name of the company it represents.

b. Use the graph to find the solution to the system of equations. Explain what the solution means in the context of the situation.

(4, 40); The cost for 4 t-shirts is $40 with both companies.



Unit: Linear Relationships Test

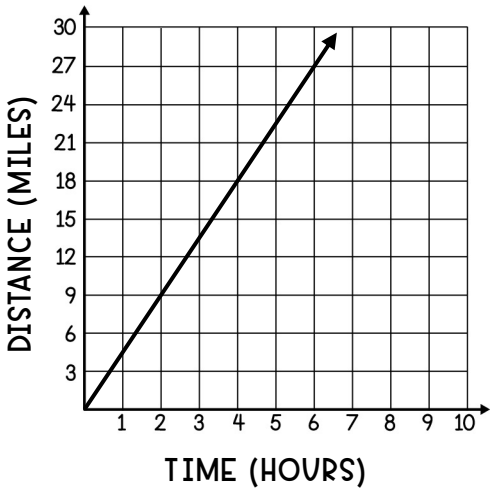
Name Answer Key

Date _____ Pd _____

LINEAR RELATIONSHIPS UNIT TEST

Solve the problems below. Be sure to show your thinking.

1. Find the rate of change demonstrated in the graph below.



4.5 miles per hour

2. Which is a true statement about the table below?

x	-4	-3	-2	-1	0
y	5	5	5	5	5

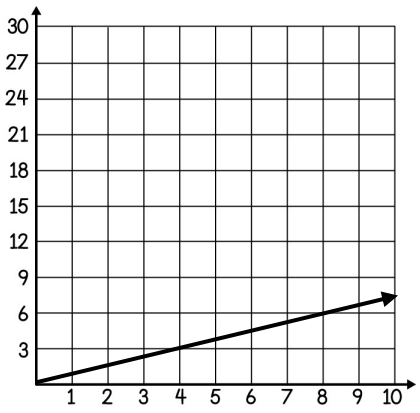
A. It is a function because each input has exactly one output.

B. It is not a function because each output has more than one input.

C. It is not a function because it does not contain the origin.

D. It is not a function because the ratio between y and x is not constant.

3. Which situation could be represented by the graph shown?



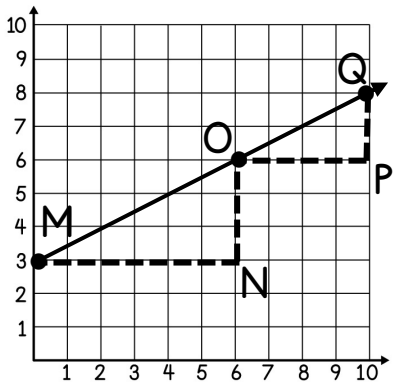
A. Garrett buys limes for $0.80 each.

B. Sophia buys 12-packs of soda for $1.75 each.

C. Jacob buys packs of gum for $1.50 each.

D. Allison purchases lemons for $0.75 each.

4. Which is a true statement about the slopes of $\overline{MO}$ and $\overline{OQ}$?



A. The slope of $\overline{MO}$ is greater than the slope of $\overline{OQ}$.

B. The slope of $\overline{OQ}$ is greater than the slope of $\overline{MO}$.

C. The slopes are equal because $\frac{6-0}{3-6} = \frac{10-6}{6-8}$.

D. The slopes are equal because $\frac{6-3}{6-0} = \frac{8-6}{10-6}$.

5. A line crosses through the points (0, 2) and (-10, -16). What is the slope of the line?

A. $\frac{5}{q}$ B. $-\frac{q}{5}$ C. $\frac{q}{5}$ D. $\frac{1}{3}$

Solve the problems below. Be sure to show your thinking.

6. A car repair company charges a $15 fee for an evaluation plus an hourly rate for any services required.

HOURS	0	2	4	6
CHARGE ($)	15	165	315	465

What is the hourly charge for services?

$75

7. Find the slope of the line that contains the following points:

a. (17, -12) and (17, 8) Undefined

b. (6, -2) and (-3, 1) $-\frac{1}{3}$

8. Which of the following equations represents a line with a positive slope and a negative y-intercept?

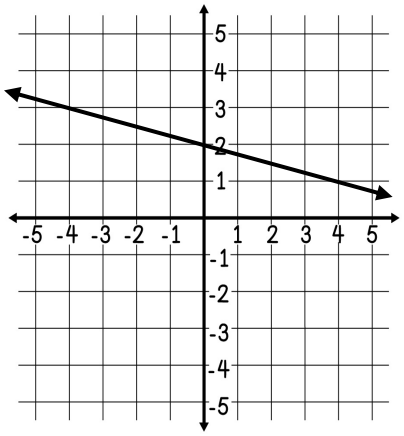
A. $y = 3.5x$

B. $y = 7.5x - 2$

C. $y = \frac{1}{4}x + 7$

D. $y = -5x - 8$

9. Write the equation of the graphed line.



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

10. Which of the following situations best matches the data in the table?

x	y
0	8
1	9.5
2	11
3	12.5

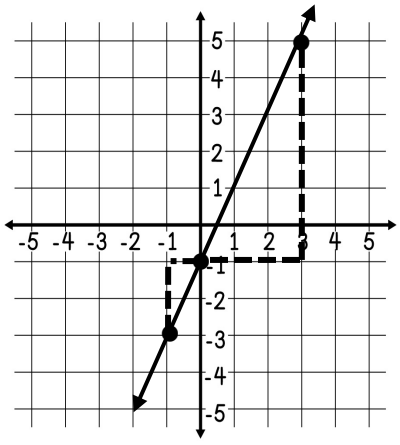
A. Robbie has $8 in his account and spends $1.50 each day for the next 3 days.

B. Zach sells t-shirts for $9.50 each.

C. A newborn weighs 8 pounds at birth and gains 1.5 pounds each month for the next 3 months.

D. Riley earns $8 an hour lifeguarding, plus $1.50 for any pool memberships she sells.

11. Two students found the slope of the line shown. Tavion used the points (-1, -3) and (0, -1) while Jess used the points (3, 5) and (0, -1). Which of the following is a true statement?



A. The triangles drawn between each pair of points are similar.

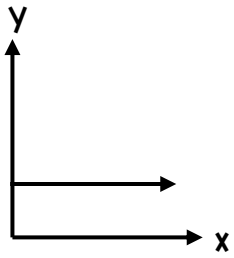
B. The ratio of $\frac{y_2 - y_1}{x_2 - x_1}$ will be the same for Tavion and Jess.

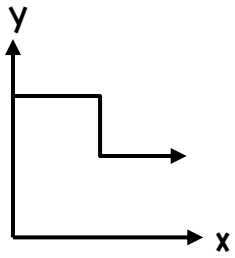
C. Both students should find a slope of 2.

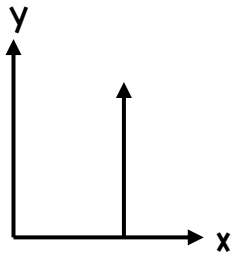
D. All the above are true.

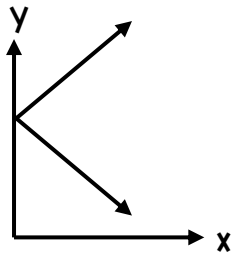
Solve the problems below. Be sure to show your thinking.

12. Which of the following graphs represents a functional relationship between x and y?

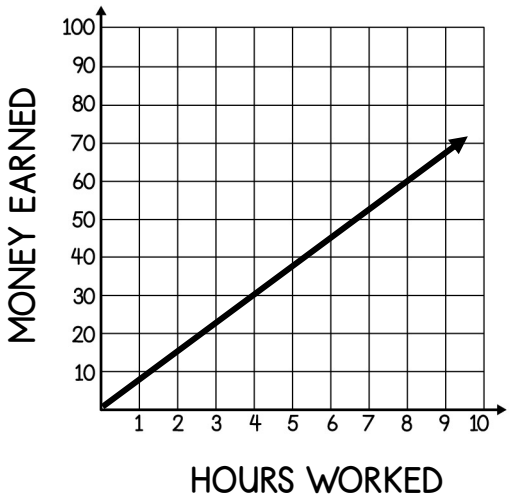
A. 

B. 

C. 

D. 

13. The graph below shows the relationship between the number of hours Cody works and the amount of money he earns at his job. Which of the following statements is NOT true about the relationship?



A. The graph can be represented by $y = 7.5x$.

B. If Cody has earned $120, he has worked 16 hours.

C. If Cody works 20 hours, he will earn $160.

D. The situation is a proportional relationship.

14. Which equation represents the linear relationship in the table below?

x	0	5	10	15	20
y	10	16.5	23	29.5	36

A. $y = 1.3x + 10$

B. $y = x + 10$

C. $y = 3.3x + 10$

D. $y = 1.3x$

15. Which of the following is true about the relationship in the table shown?

x	7	11	20	25	100
y	8.4	13.2	24	30	120

A. The table is non-proportional because it does not include the point (0, 0).

B. The table is non-proportional because the x-values do not increase at a constant interval.

C. The table is proportional because all of the x and y-values are positive and increasing.

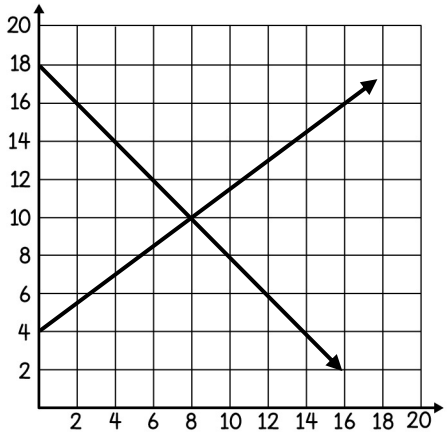
D. The table is proportional because the ratio between y and x is constant.

16. Belinda is altering dance costumes for an upcoming recital. The number of costumes she can alter varies directly with the amount of time spent working. If Belinda can alter 3 costumes in $\frac{3}{4}$ hour, find the number of costumes she can alter in $4\frac{1}{2}$ hours.

18 costumes

Solve the problems below. Be sure to show your thinking.

17. What can you conclude from the graph of the equations shown below?



A. The solution to the equations $y = -2x + 18$ and $y = \frac{4}{3}x + 4$ is (8, 10).

B. The solution to the equations $y = -x + 18$ and $y = \frac{4}{3}x + 4$ is (10, 8).

C. The solution to the equations $y = -x + 18$ and $y = \frac{3}{4}x + 4$ is (10, 8).

D. The solution to the equations $y = -x + 18$ and $y = \frac{3}{4}x + 4$ is (8, 10).

18. The following set of ordered pairs represents a functional relationship between x and y:

{(-3, -8), (8, 25), (0, 1), (-5, -14), _____ }

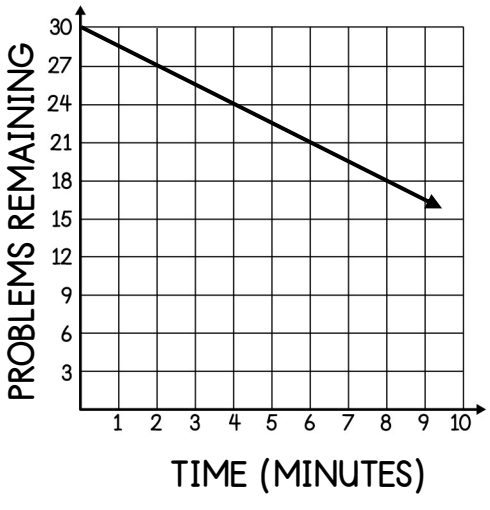
Which of the following could be the missing ordered pair?

A. (-5, 10)
B. (1, 2)
C. (-3, 8)
D. (0, 0)

19. The value of y varies directly with x, and when $x = \frac{2}{3}$, $y = 6$. Find the value of y when $x = 10\frac{1}{3}$.

A. $y = 9$
B. $y = 4$
C. $y = 93$
D. $y = 1\frac{1}{3}$

20. The graph shows the number of homework problems Amanda has remaining based on the number of minutes she has been working. Which of the following statements is not true?



A. Amanda started with 30 homework questions.

B. Amanda finishes 2 homework questions every 3 minutes.

C. The graph shows the equation $y = -\frac{3}{2}x + 30$.

D. After 10 minutes, Amanda has finished half of her homework.