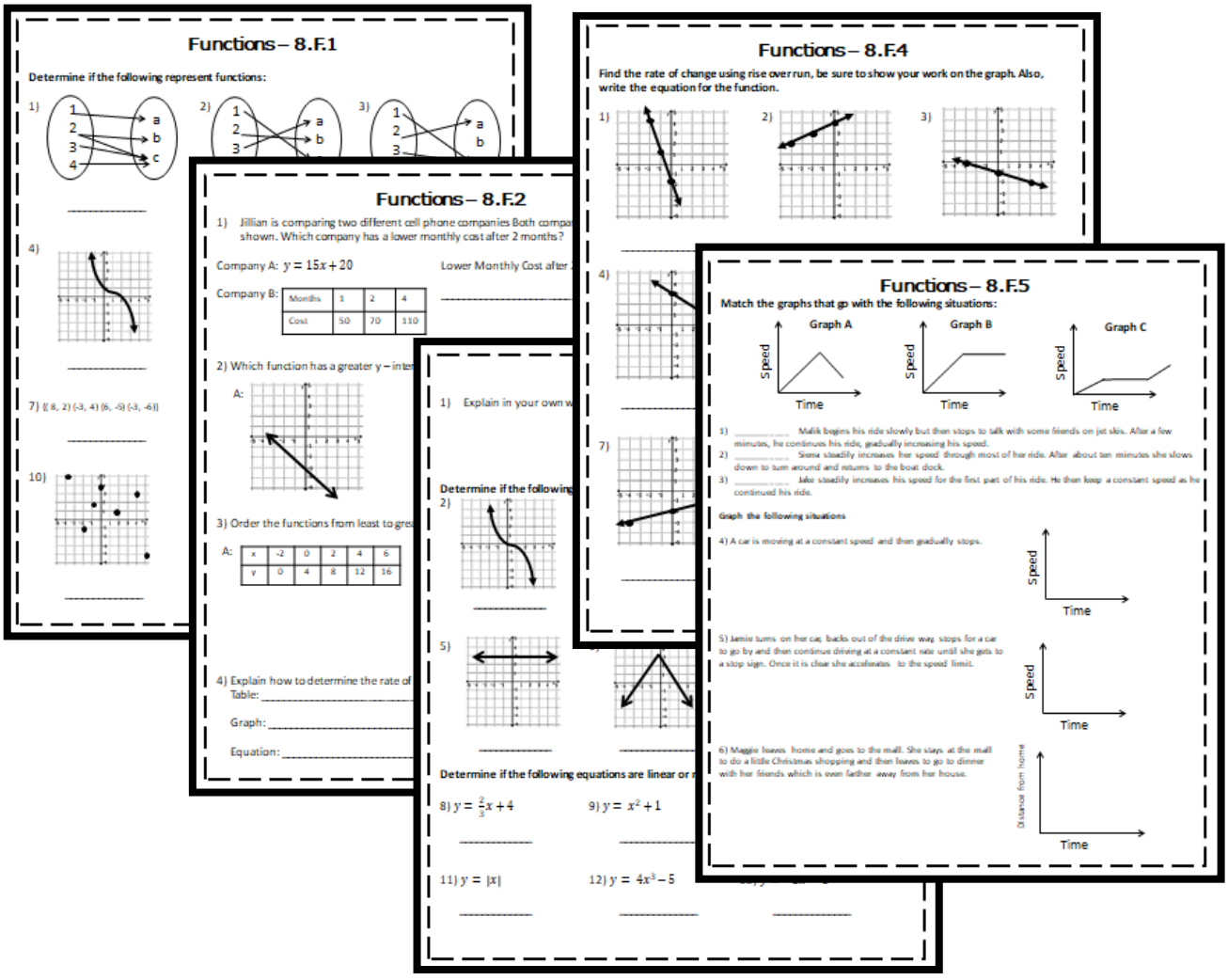
Grade 8

Functions Worksheets

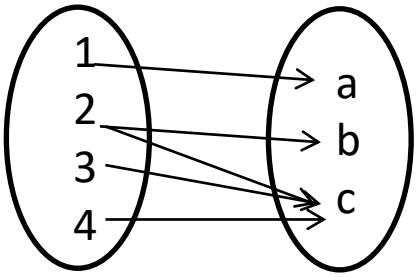


By: Math in the Midwest

Name: _____ Date: _____ Hour: _____

Functions – 8.F.1

Determine if the following represent functions:

1) 

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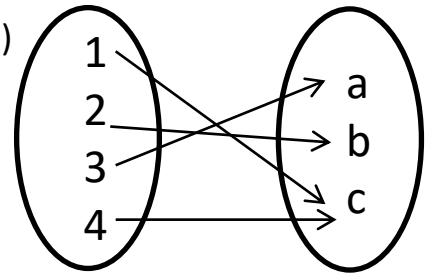
2) 

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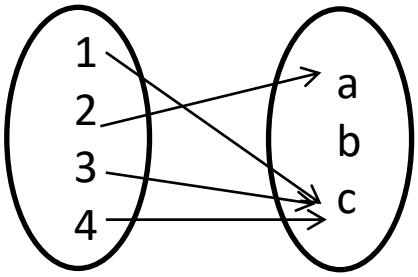
3) 

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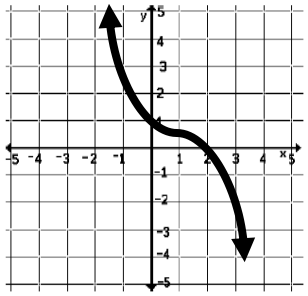
4) 

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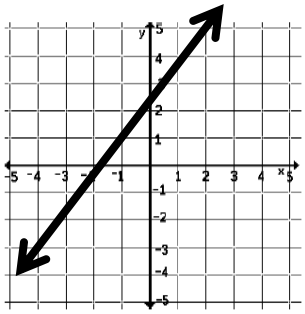
5) 

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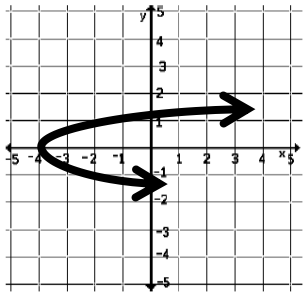
6) 

_____

7) {(8, 2) (-3, 4) (6, -5) (-3, -6)}

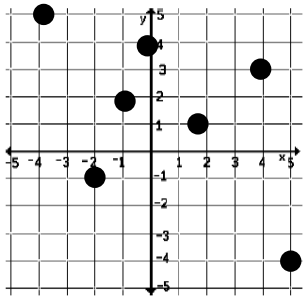
_____

8) {(-4, 2) (3, 3) (8, 4) (-4, -6)}

_____

9) {(-4, 2) (-6, 3) (-8, 4)(12, -6)}

_____

10) 

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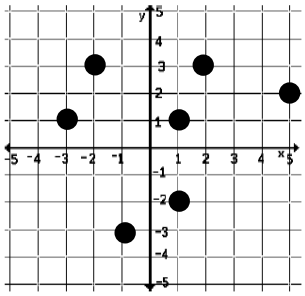
11) 

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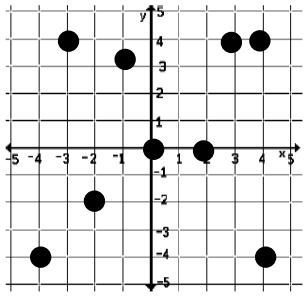
12) 

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Name: _____ Date: _____ Hour: _____

Functions – 8.F.1

Fill in the blanks:

1) A function is a rule that assigns to each _____ exactly one _____.

Determine if the following relationships represent functions:

2)

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

_____

3)

x	-1	2	5	6	9
y	-1	-1	3	0	2

_____

4) Give two examples of a function and two examples of a non-function in any representation you would like such as mapping, table, sequence, set, graph or a scenario. Do not use the examples above.

Function:

Non-Function:

Explain whether the following situation fits the definition of a function.

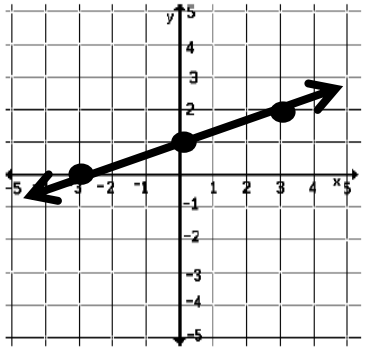
5) Input: The basketball tam has numbered uniforms.
Output: Each players wears a uniform with his assigned number.

6) Input: The presidential debate is being telecast.
Output: It appears on televisions in millions of homes.

Name: _____ Date: _____ Hour: _____

Functions – 8.F.2

Examine the following sets of functions and determine which one has a greater rate of change.

1) A: 

B: $y = 2x + 3$

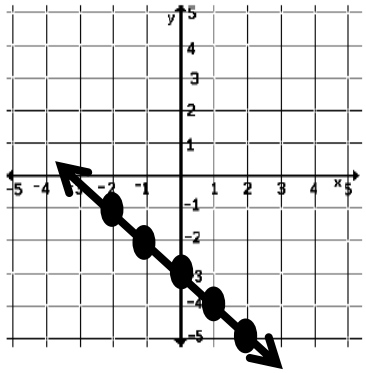
Greater Rate of Change: _____

2) A:

x	-1	0	1	2	3
y	0	4	8	12	16

B. A graph is decreasing by a rate of $\frac{1}{2}$

Greater Rate of Change: _____

3) A: 

B.

x	3	5	7	9	11
y	0	5	10	15	20

Greater Rate of Change: _____

4) A: A graph is increasing by rate of 4

B. $y = \frac{1}{4}x - 2$

Greater Rate of Change: _____

5) A: $y = -2x + 4$

B.

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

Greater Rate of Change: _____

Name: _____ Date: _____ Hour: _____

Functions – 8.F.2

1) Jillian is comparing two different cell phone companies Both company's monthly costs are shown. Which company has a lower monthly cost after 2 months?

Company A: $y = 15x + 20$

Lower Monthly Cost after 2 months:

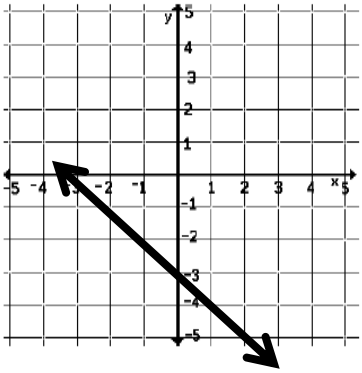
_____

Company B:

Months	1	2	4
Cost	50	70	110

2) Which function has a greater y – intercept?

A:



B: $10x + 4y = 20$

Greater y – intercept: _____

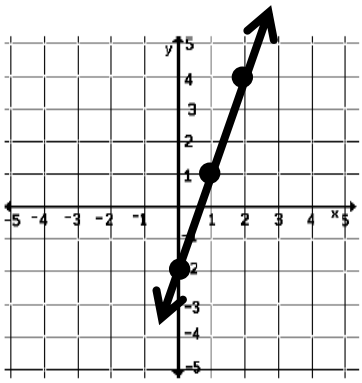
3) Order the functions from least to greatest rate of change:

A:

x	-2	0	2	4	6
y	0	4	8	12	16

B: $y = x - 4$

C:



4) Explain how to determine the rate of change from a:

Table: _____

Graph: _____

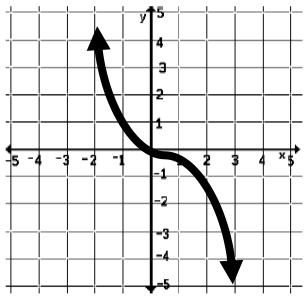
Equation: _____

Name: _____ Date: _____ Hour: _____

Functions – 8.F.3

1) Explain in your own words what it means for a function to be linear.

Determine if the following functions are linear or non-linear:

2) 

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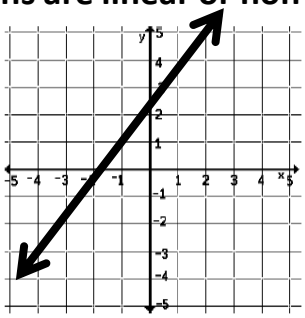
3) 

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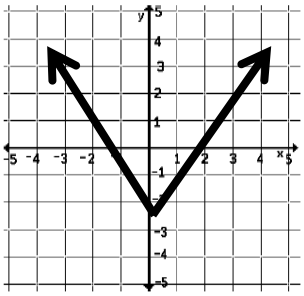
4) 

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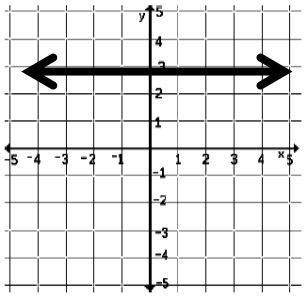
5) 

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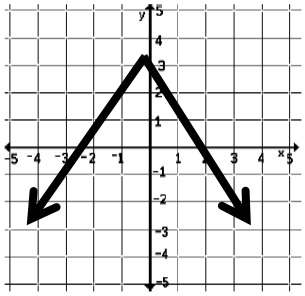
6) 

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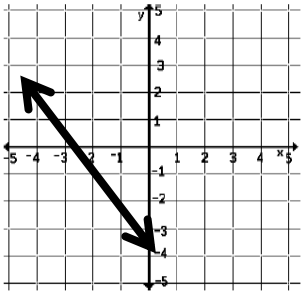
7) 

_____

Determine if the following equations are linear or non-linear:

8) $y = \frac{2}{3}x + 4$

_____

9) $y = x^2 + 1$

_____

10) $y = x$

_____

11) $y = |x|$

_____

12) $y = 4x^3 - 5$

_____

13) $y = -2x - 1$

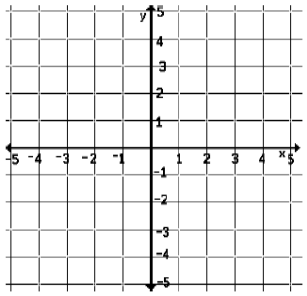
_____

Name: _____ Date: _____ Hour: _____

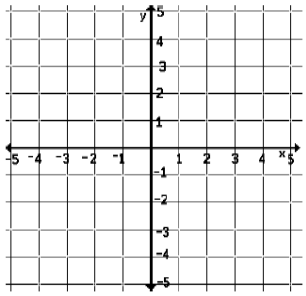
Functions – 8.F.3

1) Give an example of a graph that is linear and an example of a graph that is non-linear:

LINEAR



NON-LINEAR



2) Give an example of an equation that is linear and an example of an equation that is non-linear.

LINEAR NON-LINEAR

3) Write the equation of a linear function with slope m, initial value b, independent quantity x, and dependent quantity y.

Determine whether the following statements are true or false. If the statement is false correct the sentence to make it true.

_____ 4) A function whose graph is linear is a straight line.

_____ 5) Linear functions can be proportional and non-proportional.

_____ 6) Every line is a linear function.

_____ 7) A function that is linear is increasing or decreasing at a constant rate.

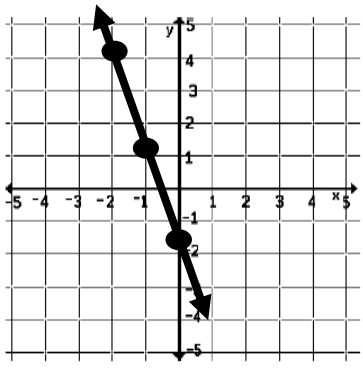
_____ 8) A graph that is linear has a curved line.

_____ 9) When both values of a function increase together, the function is called a decreasing function.

Name: _____ Date: _____ Hour: _____

Functions – 8.F.4

Find the rate of change using rise over run, be sure to show your work on the graph. Also, write the equation for the function.

1) 

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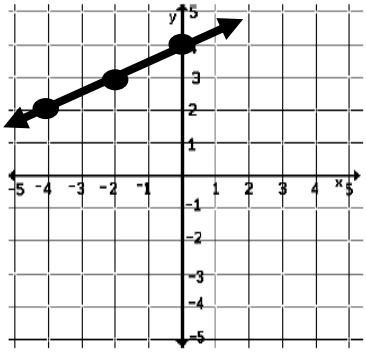
2) 

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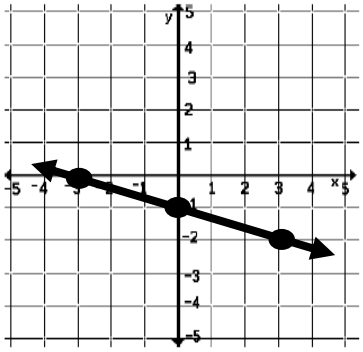
3) 

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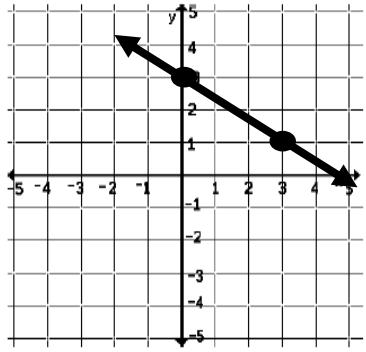
4) 

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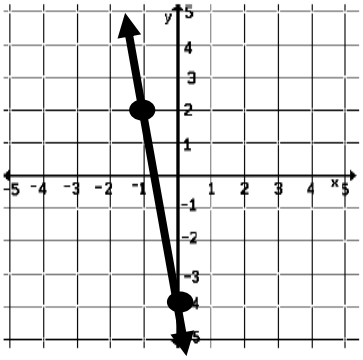
5) 

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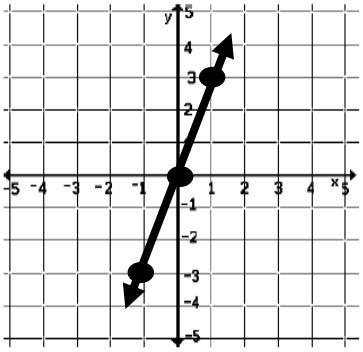
6) 

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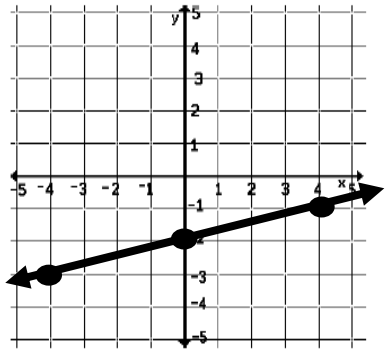
7) 

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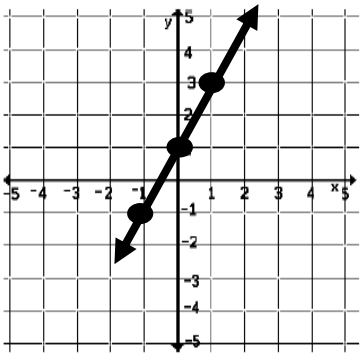
8) 

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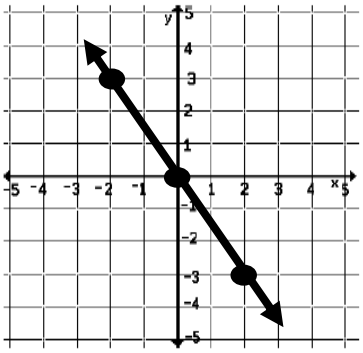
9) 

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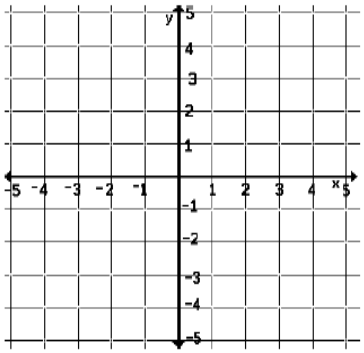
Name: _____ Date: _____ Hour: _____

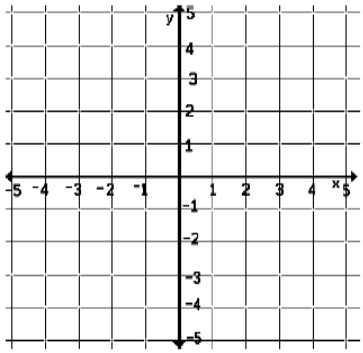
Functions – 8.F.4

Graph the following functions.

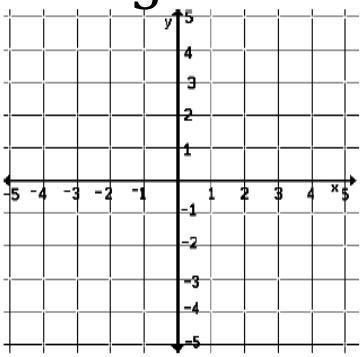
1) $y = 2x + 4$



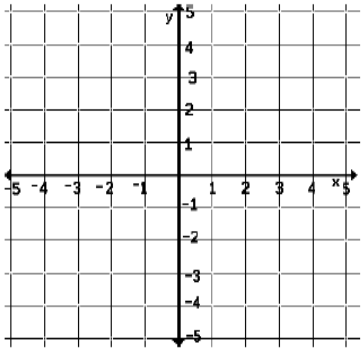
2) $y = -x - 3$



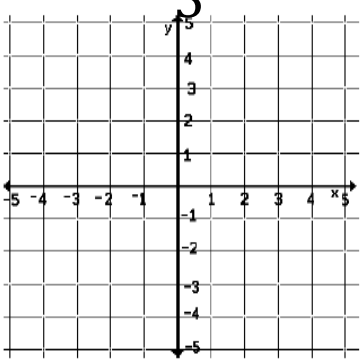
3) $y = \frac{1}{3}x + 2$



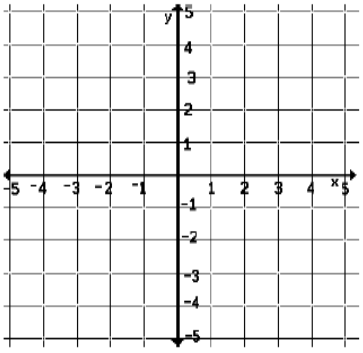
4) $y = -3x + 1$



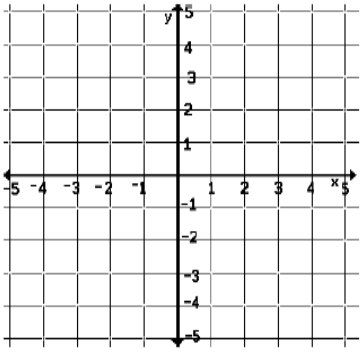
5) $y = -\frac{2}{3}x + 5$



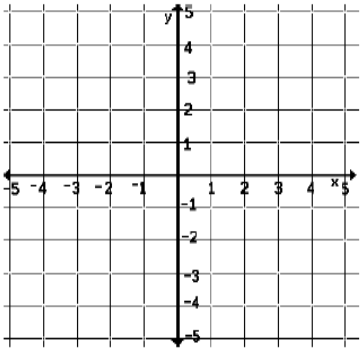
6) $y = x$



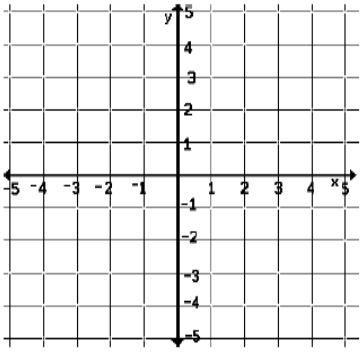
7) $y = \frac{1}{5}x - 3$



8) $y = 4x - 1$



9) $y = -2x$



Name: _____ Date: _____ Hour: _____

Functions – 8.F.4

Find the rate of change between the two ordered pairs:

1) $(2, 8)$ ***and*** $(1, 12)$

2) $(-4, 5)$ ***and*** $(3, 7)$

3) $(0, 6)$ ***and*** $(5, 16)$

4) $(-1, -1)$ ***and*** $(-4, -9)$

5) $(7, -4)$ ***and*** $(-4, 7)$

6) $(4, 5)$ ***and*** $(12, 29)$

Determine the rate of change of the following equations:

7) $5y = 15x + 10$

8) $y = \frac{3}{4}x + 1$

9) $2x + 4y = 12$

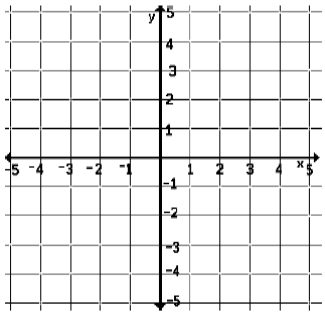
10) $6x + 3y = 18$

11) $2y = 5x - 8$

12) $y = x + 9$

Find the rate of change from the following table then graph the function on the coordinate plane.

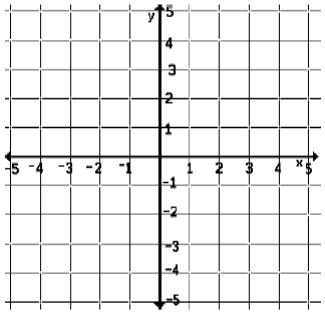
13) Rate of Change: _____



x	1	2	3
y	4	6	8

14) Rate of Change: _____

x	-1	0	1
y	4	2	0

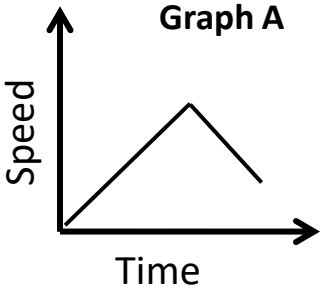


Name: _____ Date: _____ Hour: _____

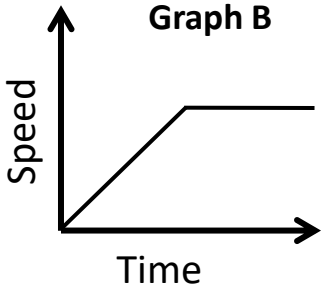
Functions – 8.F.5

Match the graphs that go with the following situations:

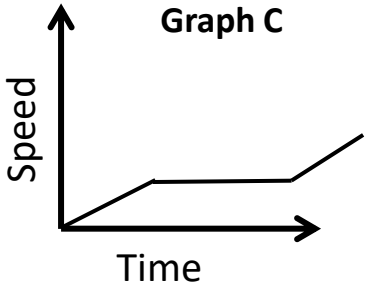
Graph A



Graph B



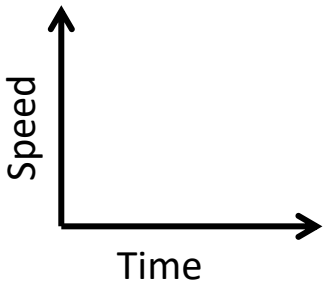
Graph C



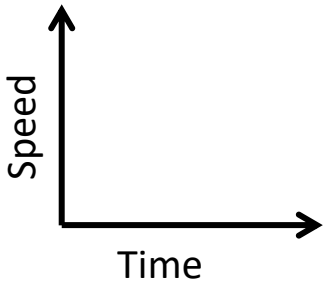
1) _____ Malik begins his ride slowly but then stops to talk with some friends on jet skis. After a few minutes, he continues his ride, gradually increasing his speed.
2) _____ Sierra steadily increases her speed through most of her ride. After about ten minutes she slows down to turn around and returns to the boat dock.
3) _____ Jake steadily increases his speed for the first part of his ride. He then keep a constant speed as he continued his ride.

Graph the following situations

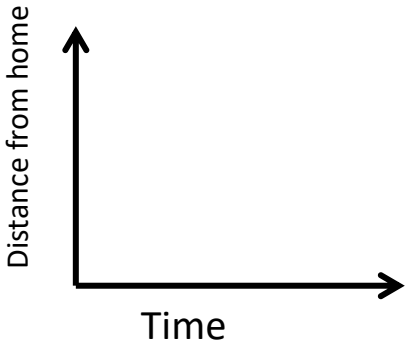
4) A car is moving at a constant speed and then gradually stops.



5) Jamie turns on her car, backs out of the drive way, stops for a car to go by and then continue driving at a constant rate until she gets to a stop sign. Once it is clear she accelerates to the speed limit.



6) Maggie leaves home and goes to the mall. She stays at the mall to do a little Christmas shopping and then leaves to go to dinner with her friends which is even farther away from her house.



Name: _____ Date: _____ Hour: _____

Functions – 8.F.5

Answer the following questions:

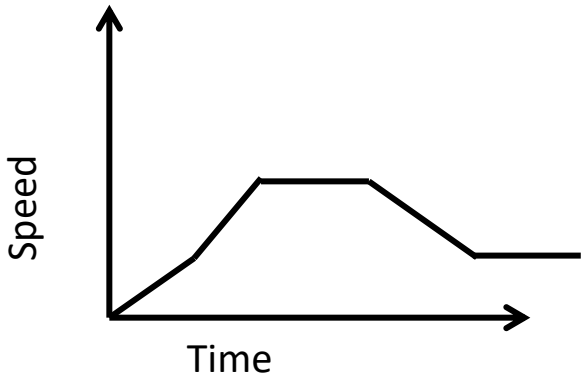
1) What does it mean when a graph of speed starts at (0, 0)?

2) If distance is represent on the y – axis and time on the x-axis, what does a line with an upward slope represent?

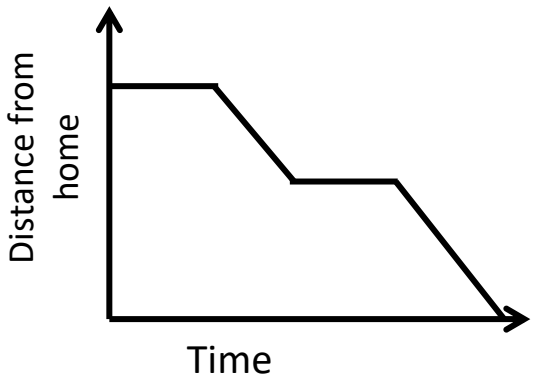
3) If speed is on the y axis and time on the x-axis, what does a line with a slope of zero represent?

Write a short story for the following graphs:

4)



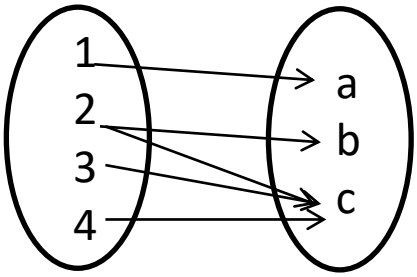
5)



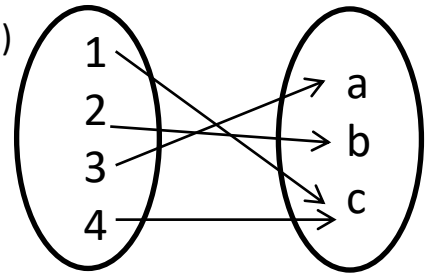
Name: _____ Date: _____ Hour: _____

Functions – 8.F.1

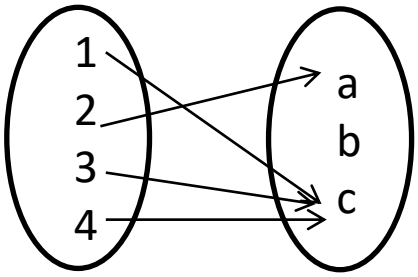
Determine if the following represent functions:

1) 

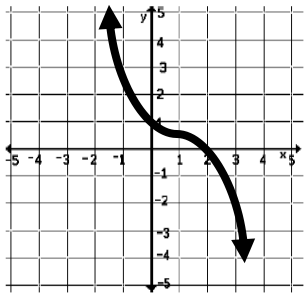
Not a function

2) 

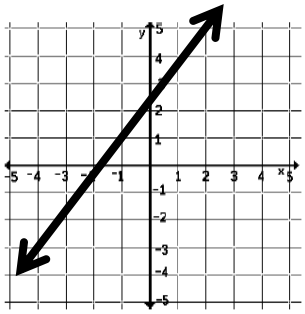
Function

3) 

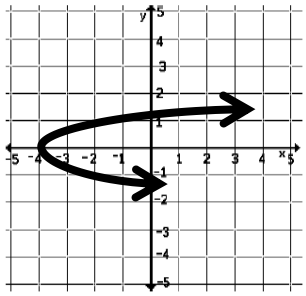
Function

4) 

Function

5) 

Function

6) 

Not a function

7) {(8, 2) (-3, 4) (6, -5) (-3, -6)}

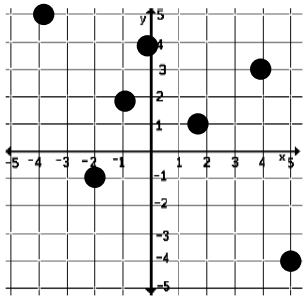
Not a function

8) {(-4, 2) (3, 3) (8, 4) (-4, -6)}

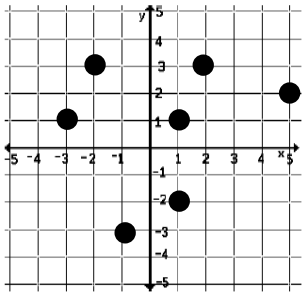
Not a function

9) {(-4, 2) (-6, 3) (-8, 4)(12, -6)}

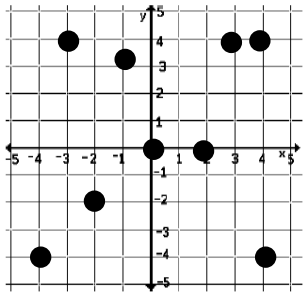
Function

10) 

Function

11) 

Not a function

12) 

Not a function

Name: _____ Date: _____ Hour: _____

Functions – 8.F.1

Fill in the blanks:

1) A function is a rule that assigns to each __input__ exactly one __output__.

Determine if the following relationships represent functions:

2)

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

__Not a function__

3)

x	-1	2	5	6	9
y	-1	-1	3	0	2

__function__

4) Give two examples of a function and two examples of a non-function in any representation you would like such as mapping, table, sequence, set, graph or a scenario. Do not use the examples above.

Function: Non-Function:

Answers will vary

Explain whether the following situation fits the definition of a function.

5) Input: The basketball tam has numbered uniforms.
Output: Each players wears a uniform with his assigned number.

Function, each player wears one uniform with one specific number

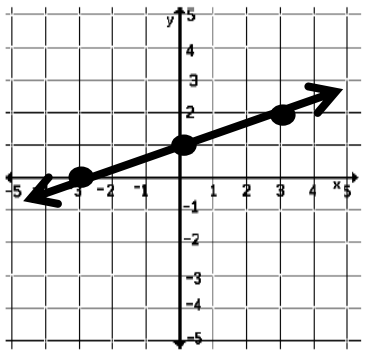
6) Input: The presidential debate is being telecast.
Output: It appears on televisions in millions of homes.

Not a function, the presidential debate is being mapped to more than one home

Name: _____ Date: _____ Hour: _____

Functions – 8.F.2

Examine the following sets of functions and determine which one has a greater rate of change.

1) A: 

B: $y = 2x + 3$

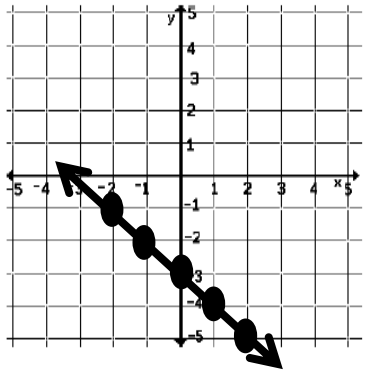
Greater Rate of Change: **Function B**

2) A:

x	-1	0	1	2	3
y	0	4	8	12	16

B. A graph is decreasing by a rate of $\frac{1}{2}$

Greater Rate of Change: **Function A**

3) A: 

B.

x	3	5	7	9	11
y	0	5	10	15	20

Greater Rate of Change: **Function B**

4) A: A graph is increasing by rate of 4

B. $y = \frac{1}{4}x - 2$

Greater Rate of Change: **Function A**

5) A: $y = -2x + 4$

B.

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

Greater Rate of Change: **Function A**

Name: _____ Date: _____ Hour: _____

Functions – 8.F.2

1) Jillian is comparing two different cell phone companies Both company's monthly costs are shown. Which company has a lower monthly cost after 2 months?

Company A: $y = 15x + 20$

Company B:

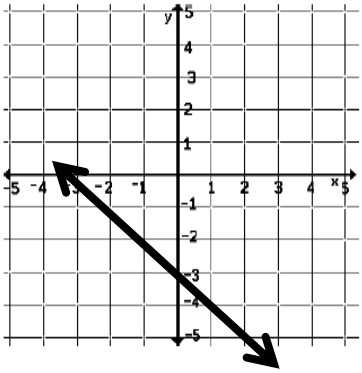
Months	1	2	4
Cost	50	70	110

Lower Monthly Cost after 2 months:

Company A

2) Which function has a greater y – intercept?

A:



B: $10x + 4y = 20$

Greater y – intercept: **Function B**

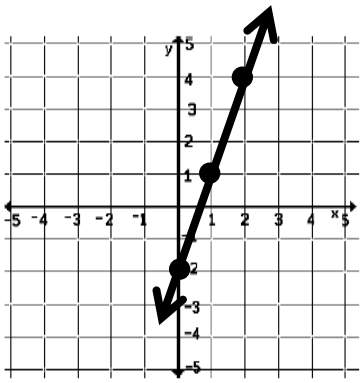
3) Order the functions from least to greatest rate of change:

A:

x	-2	0	2	4	6
y	0	4	8	12	16

B: $y = x - 4$

C:



Function B, Function A, Function C

4) Explain how to determine the rate of change from a:

Table: **Choose two ordered pairs and use the slope formula: $\frac{y_2 - y_1}{x_2 - x_1}$**

Graph: **Use rise over run (change in y over the change in x)**

Equation: **Put the equation in slope intercept form: y = mx+b**

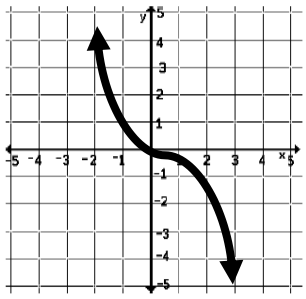
Name: _____ Date: _____ Hour: _____

Functions – 8.F.3

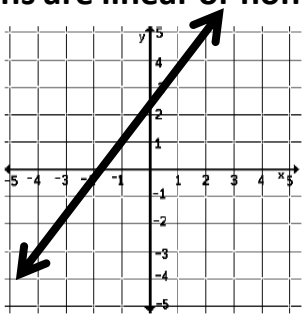
1) Explain in your own words what it means for a function to be linear.

Answers will vary, but for a function to be linear it must be increasing at a constant rate and the graph must be a straight line.

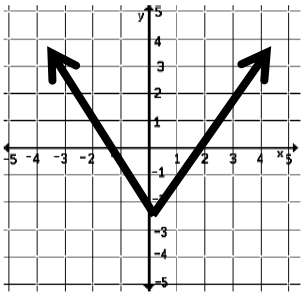
Determine if the following functions are linear or non-linear:

2) 

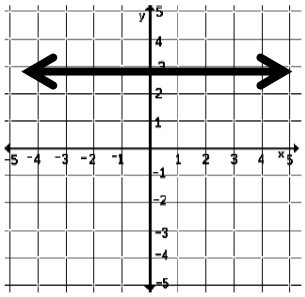
Non-Linear

3) 

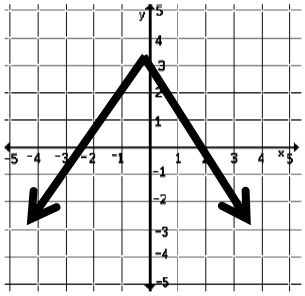
Linear

4) 

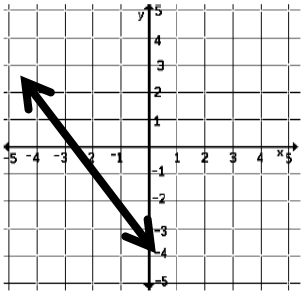
Non-Linear

5) 

Linear

6) 

Non-Linear

7) 

Linear

Determine if the following equations are linear or non-linear:

8) $y = \frac{2}{3}x + 4$

Linear

9) $y = x^2 + 1$

Non-Linear

10) $y = x$

Linear

11) $y = |x|$

Non-Linear

12) $y = 4x^3 - 5$

Non-Linear

13) $y = -2x - 1$

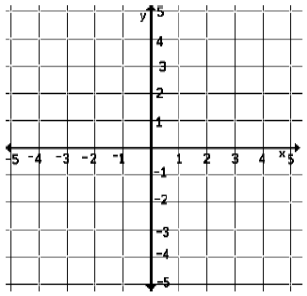
Linear

Name: _____ Date: _____ Hour: _____

Functions – 8.F.3

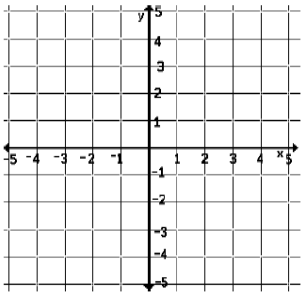
1) Give an example of a graph that is linear and an example of a graph that is non-linear:

LINEAR



Answers will vary

NON-LINEAR



2) Give an example of an equation that is linear and an example of an equation that is non-linear.

LINEAR

NON-LINEAR

Answers will vary

3) Write the equation of a linear function with slope m, initial value b, independent quantity x, and dependent quantity y.

$$y = mx + b$$

Determine whether the following statements are true or false. If the statement is false correct the sentence to make it true.

True 4) A function whose graph is linear is a straight line.

True 5) Linear functions can be proportional and non-proportional.

False 6) Every line is a linear function.

Not every line is a linear function and not every line is a function.

True 7) A function that is linear is increasing or decreasing at a constant rate.

False 8) A graph that is linear has a curved line.

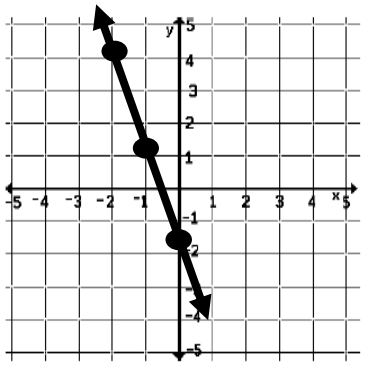
A graph that is linear has a straight line.

False 9) When both values of a function increase together, the function is called a decreasing function. *The function is called an incraesing function.*

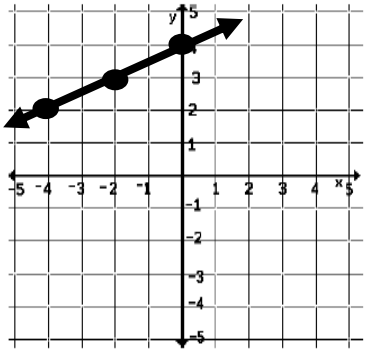
Name: _____ Date: _____ Hour: _____

Functions – 8.F.4

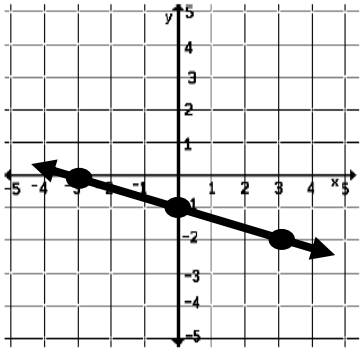
Find the rate of change using rise over run, be sure to show your work on the graph. Also, write the equation for the function.

1) 

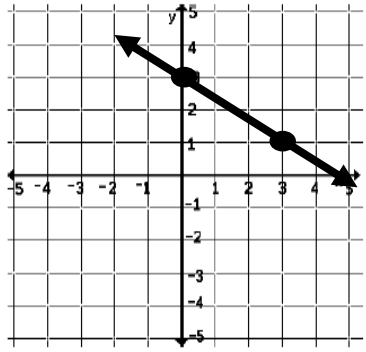
$y = -3x - 2$

2) 

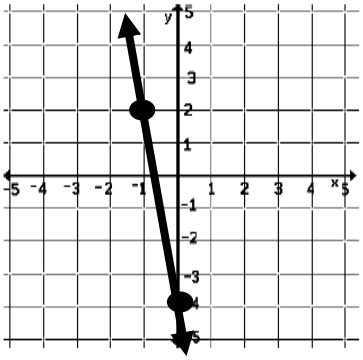
$y = \frac{1}{2}x + 4$

3) 

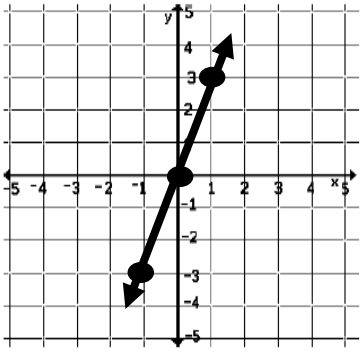
$y = -\frac{1}{3}x - 1$

4) 

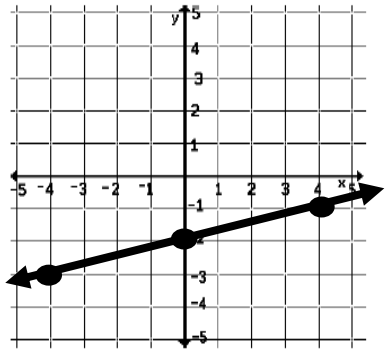
$y = -\frac{2}{3}x + 3$

5) 

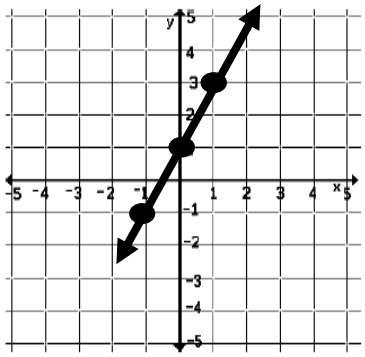
$y = -6x$

6) 

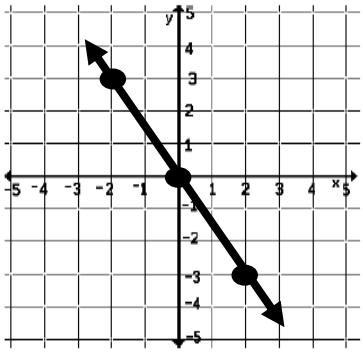
$y = 3x$

7) 

$y = \frac{1}{4}x - 2$

8) 

$y = 2x + 1$

9) 

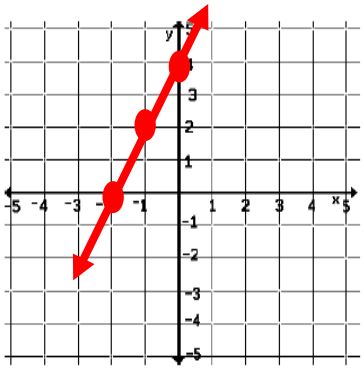
$y = -\frac{3}{2}x$

Name: _____ Date: _____ Hour: _____

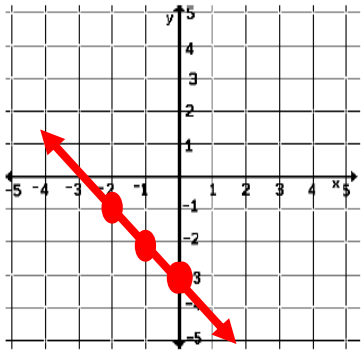
Functions – 8.F.4

Graph the following functions.

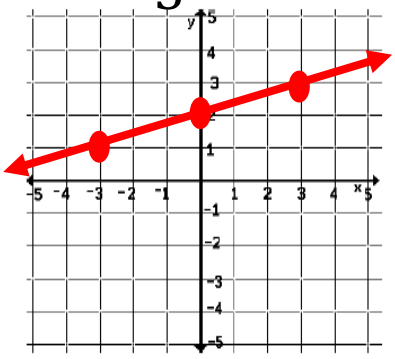
1) $y = 2x + 4$



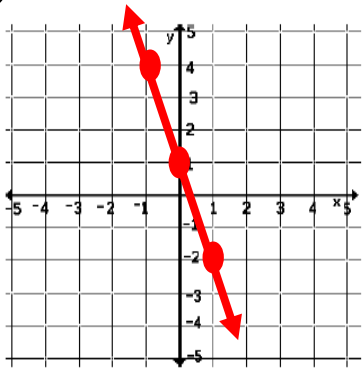
2) $y = -x - 3$



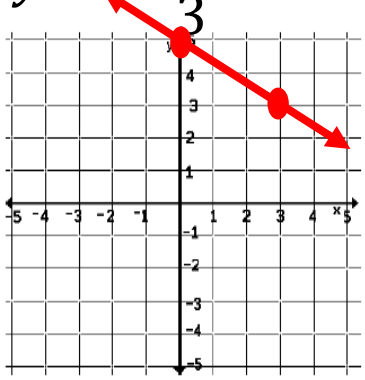
3) $y = \frac{1}{3}x + 2$



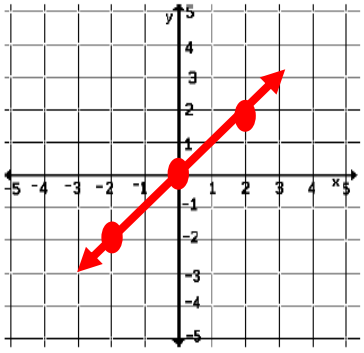
4) $y = -3x + 1$



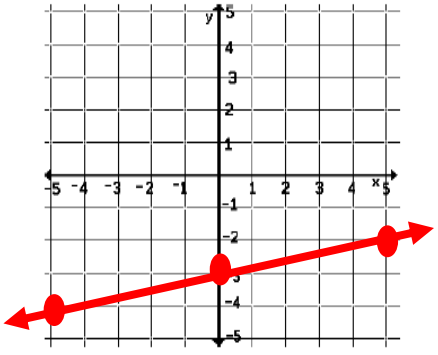
5) $y = -\frac{2}{3}x + 5$



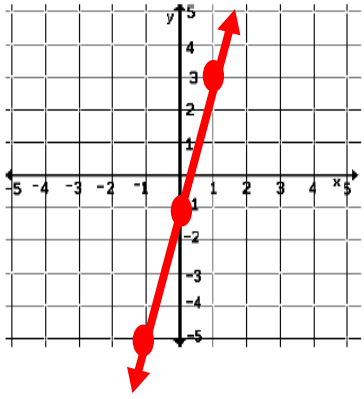
6) $y = x$



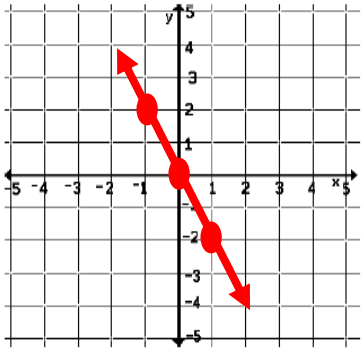
7) $y = \frac{1}{5}x - 3$



8) $y = 4x - 1$



9) $y = -2x$



Name: _____ Date: _____ Hour: _____

Functions – 8.F.4

Find the rate of change between the two ordered pairs:

1) $(2, 8) and (1, 12)$

-1

2) $(-4, 5) and (3, 7)$

$\frac{2}{7}$

3) $(0, 6) and (5, 16)$

2

4) $(-1, -1) and (-4, -9)$

$\frac{8}{3}$

5) $(7, -4) and (-4, 7)$

-1

6) $(4, 5) and (12, 29)$

3

Determine the rate of change of the following equations:

7) $5y = 15x + 10$

3

8) $y = \frac{3}{4}x + 1$

$\frac{3}{4}$

9) $2x + 4y = 12$

$-\frac{1}{2}$

10) $6x + 3y = 18$

-2

11) $2y = 5x - 8$

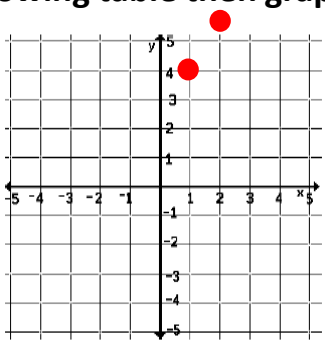
$\frac{5}{2}$

12) $y = x + 9$

1

Find the rate of change from the following table then graph the function on the coordinate plane.

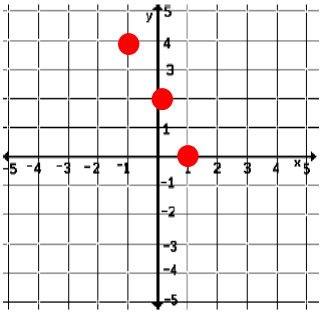
13) Rate of Change: 2



x	1	2	3
y	4	6	8

14) Rate of Change: -2

x	-1	0	1
y	4	2	0

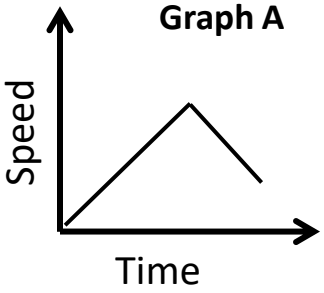


Name: _____ Date: _____ Hour: _____

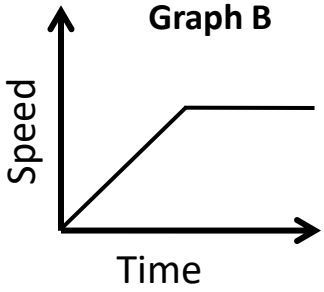
Functions – 8.F.5

Match the graphs that go with the following situations:

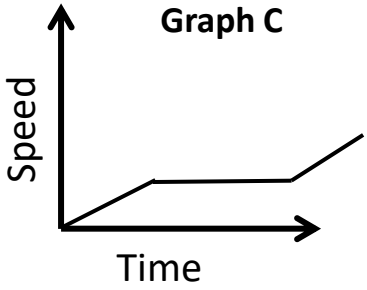
Graph A



Graph B



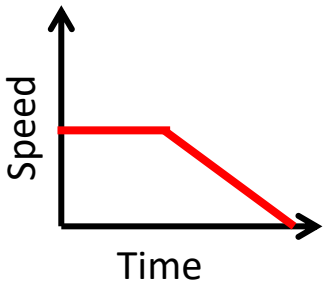
Graph C



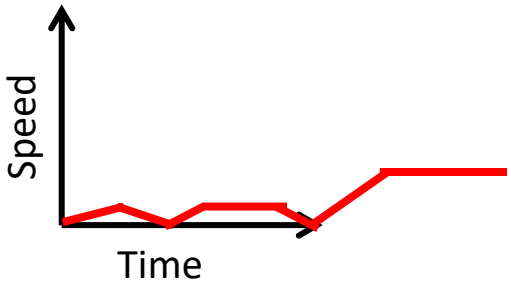
1) C Malik begins his ride slowly but then stops to talk with some friends on jet skis. After a few minutes, he continues his ride, gradually increasing his speed.
2) A Sierra steadily increases her speed through most of her ride. After about ten minutes she slows down to turn around and returns to the boat dock.
3) B Jake steadily increases his speed for the first part of his ride. He then keep a constant speed as he continued his ride.

Graph the following situations

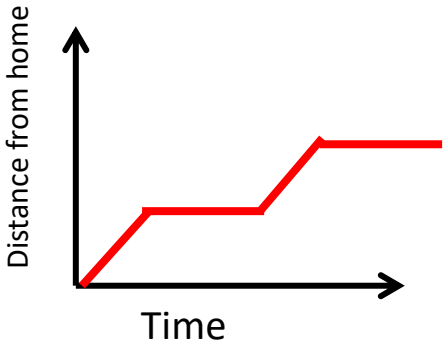
4) A car is moving at a constant speed and then gradually stops.



5) Jamie turns on her car, backs out of the drive way, stops for a car to go by and then continue driving at a constant rate until she gets to a stop sign. Once it is clear she accelerates to the speed limit.



6) Maggie leaves home and goes to the mall. She stays at the mall to do a little Christmas shopping and then leaves to go to dinner with her friends which is even farther away from her house.



Name: _____ Date: _____ Hour: _____

Functions – 8.F.5

Answer the following questions:

1) What does it mean when a graph of speed starts at (0, 0)?

The object is not moving to start

2) If distance is represent on the y – axis and time on the x-axis, what does a line with an upward slope represent?

The object is moving farther away

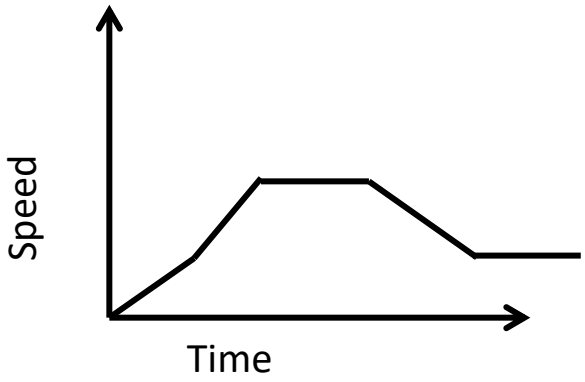
3) If speed is on the y axis and time on the x-axis, what does a line with a slope of zero represent?

The objet is moving at a constant speed

Write a short story for the following graphs:

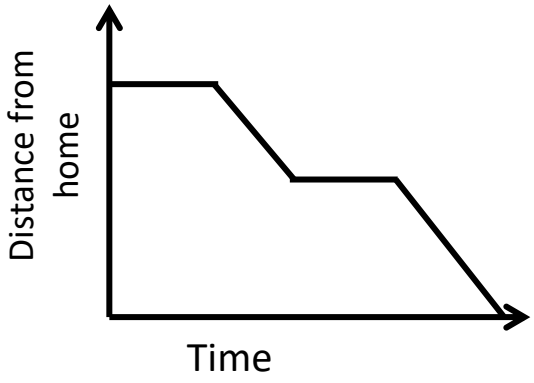
4)

Answers will vary



5)

Answers will vary



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~Math in the Midwest