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Name: Answer Key Block:____________

Unit 3: Linear Functions

Section 3.1: Identifying Linear Functions

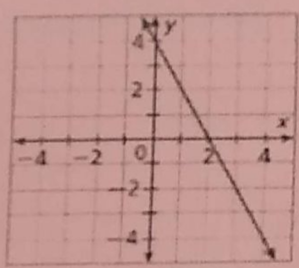
Objective: *I CAN . . . Identify and graph linear functions and linear equations.*

REMEMBER: *A graph represents a function if it passes the* vertical *test.*

A linear function forms a straight line when graphed,

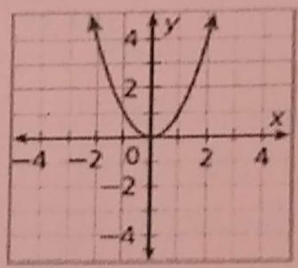
Identify whether each graph represents a function. If the graph does represent a function, is the function linear?

A.



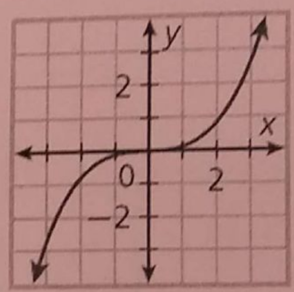
Function: Yes or No
Linear: Yes or No

B.



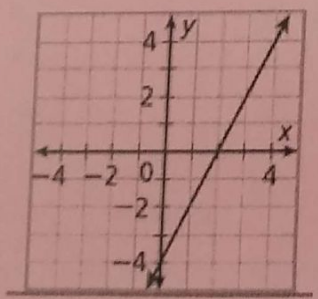
Function: Yes or No
Linear: Yes or No

C.



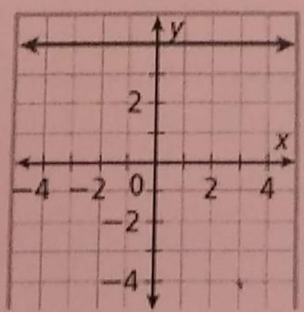
Function: Yes or No
Linear: Yes or No

D.



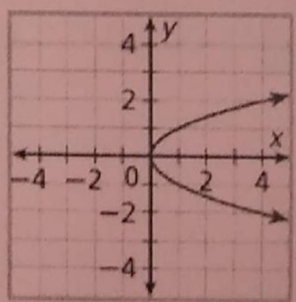
Function: Yes or No
Linear: Yes or No

E.



Function: Yes or No
Linear: Yes or No

F.



Function: Yes or No
Linear: Yes or No

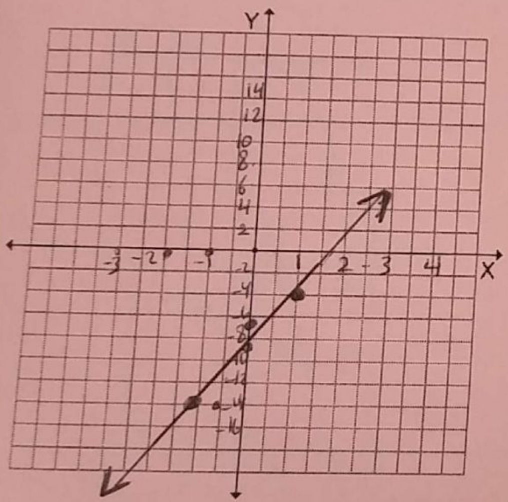
Circle the function that is linear.

a. $x = 2y + 4$ b. $xy = 4$ c. $12x + y = 5x - 9$ d. $y = 12$ e. $y = 2^x$

Tell whether the function is linear. If so, graph the function.

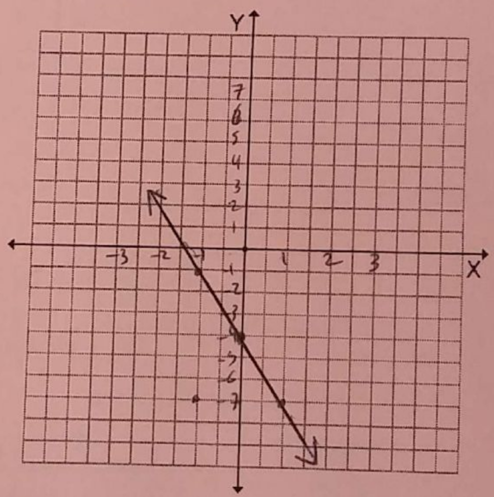
a. $y = 5x - 9$

X	Y=5x-9	(x,y)
-1	5(-1)-9=-14	(-1,-14)
0	5(0)-9=-9	(0,-9)
1	~~5(5)~~ 5(1)-9=-4	(1,-4)

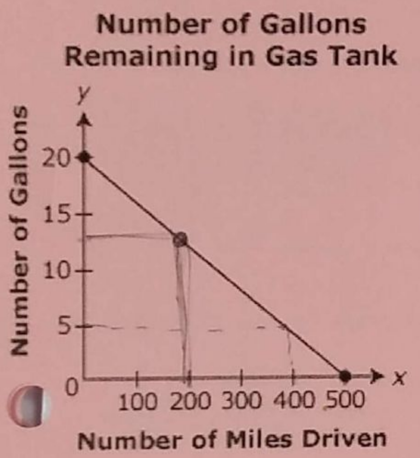


b. $3x + y = -4$ $y = -3x - 4$

X	Y=-3x-4	(x,y)
-1	Y=-3(-1)-4)=-1	(-1,-1)
0	-3(0)-4=-4	(0,-4)
1	-3(1)-4=-7	(1,-7)



1. A car owner recorded the number of gallons of gas remaining in the car's gas tank after driving a number of miles. Use the graph below to answer the following questions.



a. What does x-intercept represent on the graph?

The max number of miles driven before the end of the Gasolline.

b. What does the y-intercept represent on the graph?

The initial amount of Car's Gas

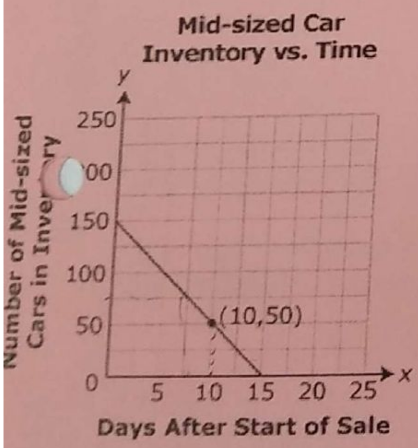
c. What does the point (200, 12) represent on the graph? Is the point a solution of the graph? when the Car moves 200 miles, there will be only 12 Gallons remaining in the tank. Yes

d. What does the point (400, 10) represent on the graph?

Is the point a solution of the graph? No

When the Car moves 400 miles, only 10 Gallons remaining

2. The graph below shows the relationship between the number of mid-sized cars in a car dealer's inventory and the number of days after the start of a sale.



a. What does x-intercept represent on the graph?

The last day of the sale.

b. What does the y-intercept represent on the graph?

The initial # of Mid-sized Cars.

c. What does the point (10, 50) represent on the graph?

Is the point a solution of the graph?

only 50 Cars are left @the After 10 days from the start of the Sale.

d. What does the point (5, 125) represent on the graph?

Is the point a solution of the graph?

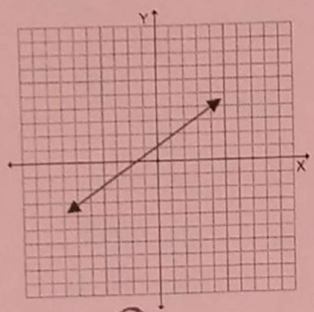
The number of Cars is 125 after 5 day from the Start day.

Section 3.3: Rate of Change/Slope

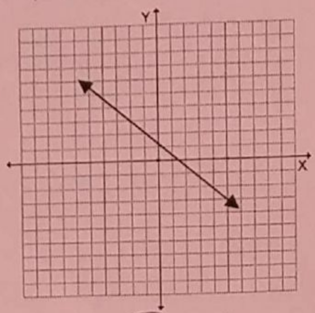
Objective: I CAN. . . *Find the slope of a line and rate of change.*

Slope - is the gradient of the line

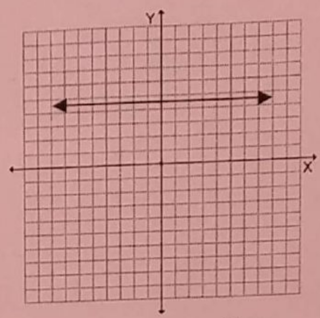
Write either (positive, negative, zero or undefined) slope



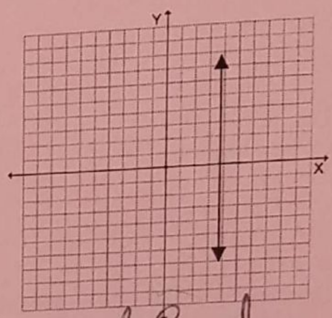
+ Slope



− Slope



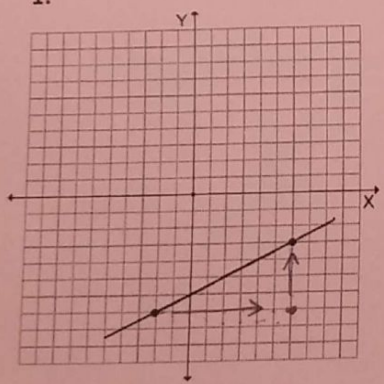
0 Slope



undefined Slope

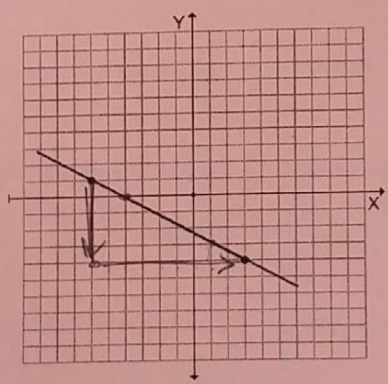
Find the slope using the graph: $m = \frac{\text{rise}}{\text{run}}$

1.



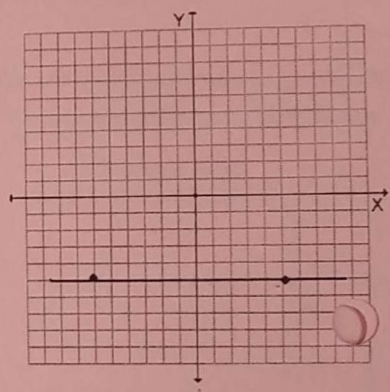
$m = \frac{4}{8} = \frac{1}{2}$

2.



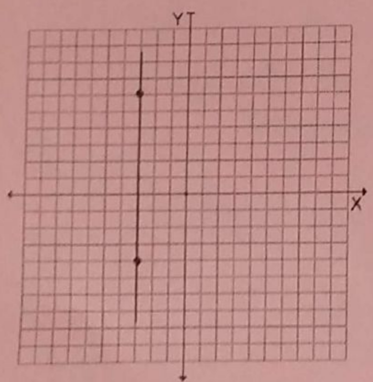
$m = \frac{-5}{9}$

3.



$m = \frac{0}{11} = 0$

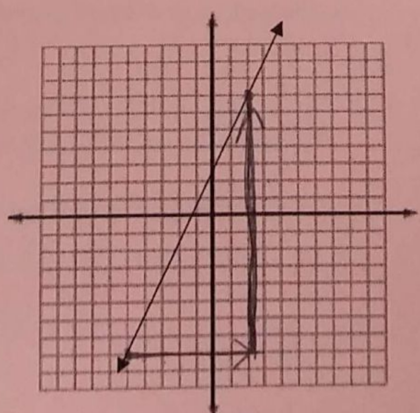
4.



$m = \frac{11}{0}$

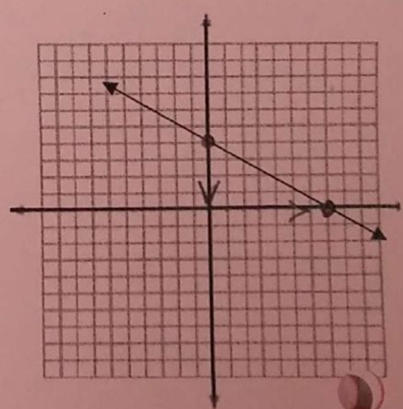
= undefined

5.



$m = \frac{15}{7}$

6.

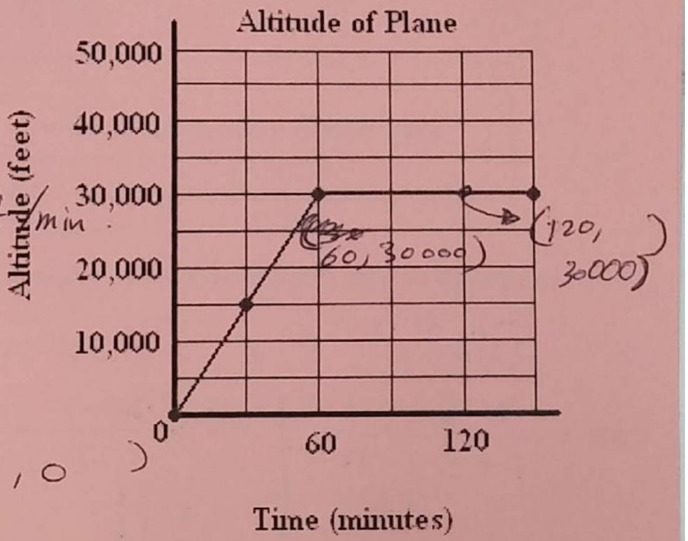


$m = \frac{-4}{7}$

Rate of Change = Slope

Applications:

7. **The graph shows the altitude of a plane.**



a. Find the plane's rate of change during the first hour.

$$m = \frac{30000 - 0}{60 - 0} = \frac{30000}{60} = 500\text{ft}/\text{min}$$

b. Find the plane's rate of change during the second hour.

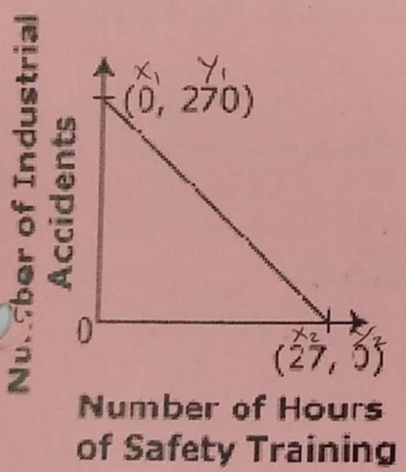
$$m = \frac{30000 - 30000}{120 - 60}$$

(0, 0)

$$= 0 \text{ ft}/\text{min}$$

8. **An industrial-safety study finds there is a relationship between the number of industrial accidents and the number of hours of safety training for employees. This relationship is shown in the graph below.**

Industrial Safety



a. Find the rate of change.

$$m = \frac{0 - 270}{27 - 0} = \frac{-270}{27} = -10 \text{ accidents}/\text{hour of safety training}$$

b. Explain what it represents.

As the number of training ~~decrea~~ increased, the number of accidents decreased.

Section 3.5: The Slope Formula

Objective: ***I CAN . . .*** *Find the slope by using the slope formula.*

Slope between two points on a line: $(x_1, y_1)\ (x_2, y_2)$ $\quad m = \dfrac{y_1 - y_2}{x_1 - x_2} = \dfrac{\text{change in } y}{\text{change in } x}$

Find the slope of the line that contains the two points.

1. $\overset{x_1\ y_1}{(3,5)}$ & $\overset{x_2\ y_2}{(1,4)}$

$m = \dfrac{4-5}{1-3} = \dfrac{-1}{-2} = \dfrac{1}{2}$

2. $(-2,1)$ & $(1,-3)$

$m = \dfrac{-3-1}{1-(-2)} = \dfrac{-4}{+3}$

3. $(1,2)$ & $(5,2)$

$m = \dfrac{2-2}{5-1} = \dfrac{0}{4} = 0$

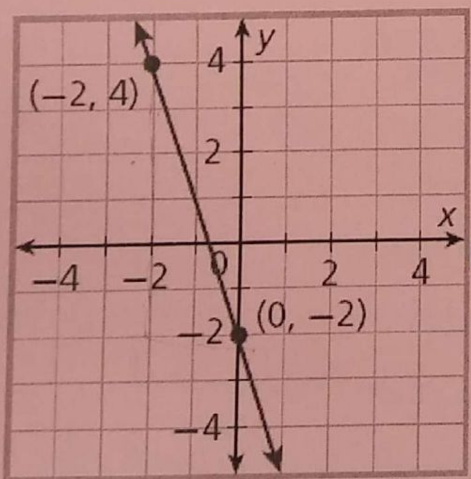
4. $(5,-1)$ & $(5,3)$

$m = \dfrac{3-(-1)}{5-5} = \dfrac{4}{0}$ = undefined

Find the slope of the line from a given graph.

***** Remember to find slope of a graph:*** $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

5.



(5) $m = \dfrac{\text{rise}}{\text{run}}$

$\boxed{m = \dfrac{-6}{2} = -3}$

6. *The table shows a linear relationship. Find the slope.*

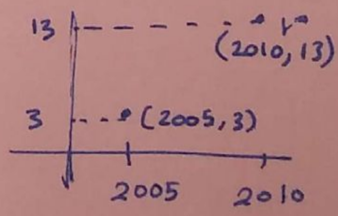
x	0 (x_1)	2 (x_2)	5	6
y	1 (y_1)	5 (y_2)	11	13

$\boxed{m = \dfrac{5-1}{2-0} = \dfrac{4}{2} = 2}$

7. In 2005, Joe planted a tree that was 3 feet tall. In 2010, it was 13 feet tall.

a) Find the rate of change.

~~$m = \dfrac{\text{rise}}{\text{run}} = \dfrac{-6}{2} = -3$~~



$m = \dfrac{13-3}{2010-2005} = \dfrac{10}{5} = 2$ Ft/year

b) How tall would you predict it would be now in 2013?

every year 2 ft → after 3 years.
it will be $(2\times3) = 6$ ft taller → $6+13 = 19$ ft

c) How tall you do you predict it will be 50 years?

every year 2 ft → after 50 years
it will be $(2\times50) = 100$ ft. taller → $13+100$
$= 113$ ft.