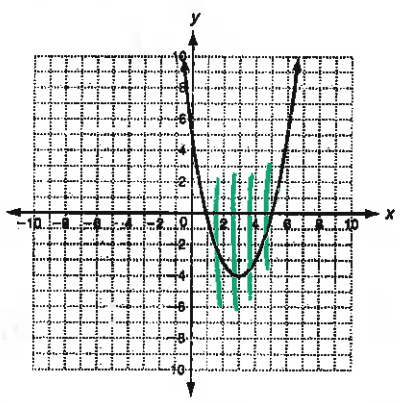


Section 1 - Identifying Linear Functions

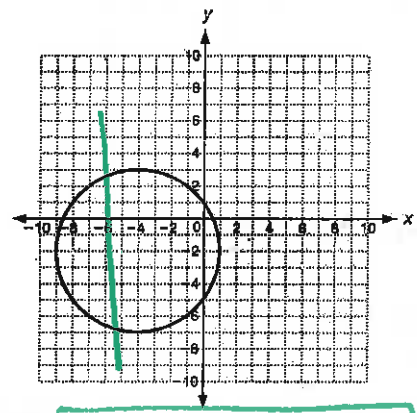
Identify whether each graph represents a function. Explain. If the graph does represent a function, is the function linear?

1.



Function, not linear
(parabola)

2.



Not a function

3. Which set of ordered pairs satisfies a linear function? Explain.

Set A: $\{(5, 1), (4, 4), (3, 9), (2, 16), (1, 25)\}$

Not a linear function

$\begin{matrix} +1 \downarrow 1, 25 \\ +1 \downarrow 2, 16 \\ +1 \downarrow 3, 9 \end{matrix} \begin{matrix} + -9 \\ -7 \end{matrix}$

Not the same

Set B: $\{(1, -5), (2, -3), (3, -1), (4, 1), (5, 3)\}$

$\begin{matrix} \xrightarrow{+2} \\ \xrightarrow{+2} \\ \xrightarrow{+2} \\ \xrightarrow{+2} \end{matrix}$

 $\rightarrow +1 \quad +1 \quad +1 \quad +1$

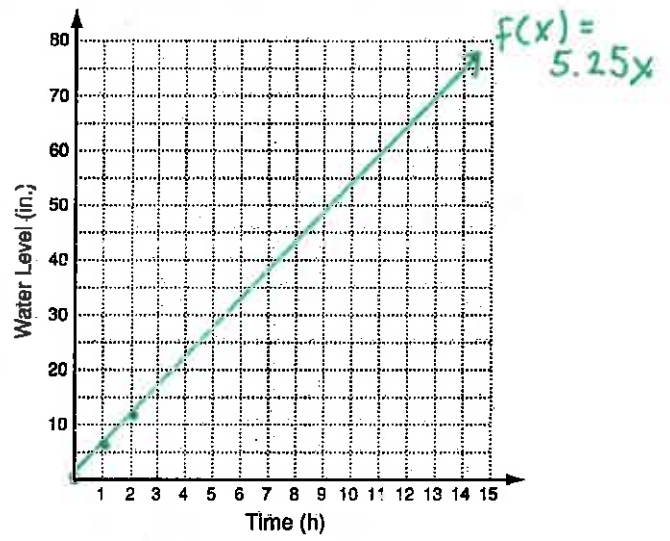
Yes linear function

all the same x and all same y!

5. In 2005, the Shabelle River in Somalia rose an estimated 5.25 inches every hour for 15 hours. The increase in water level is represented by the function $f(x) = 5.25x$, where x is the number of hours. Graph this function and give its domain and range.

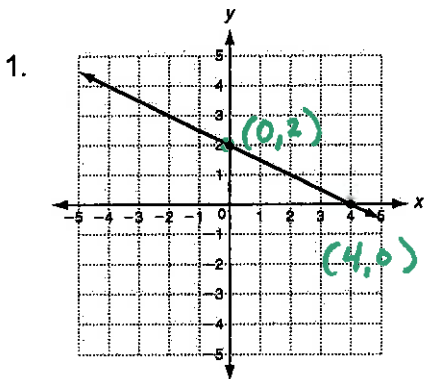
$x=0$ (zero hours, minutes, etc)

Domain: $x \geq 0$
 Range: $y \geq 0$

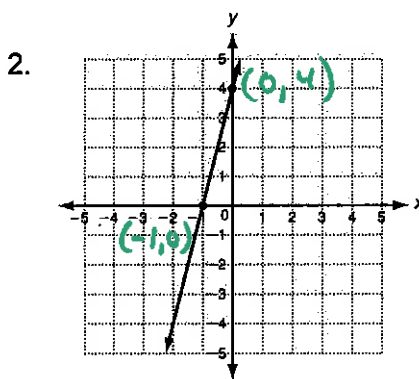


Section 2 - Using Intercepts

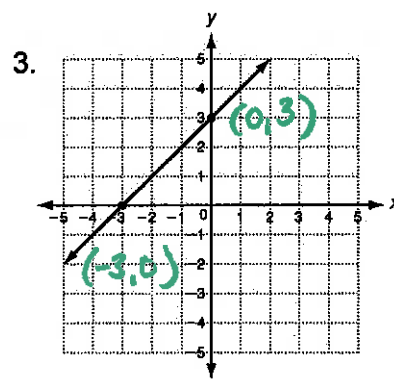
Find the x- and y-intercepts.



x-int: (4, 0)
y-int: (0, 2)



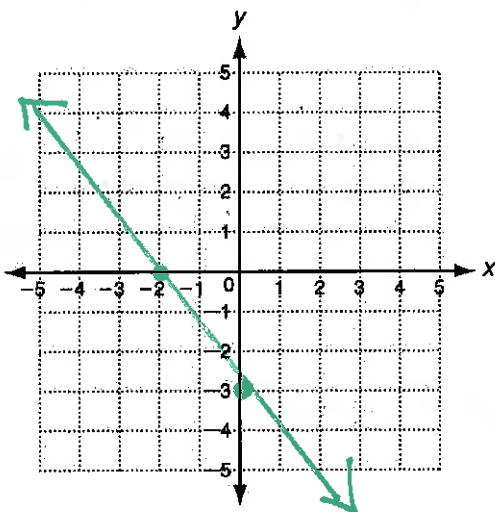
x-int: (-1, 0)
y-int: (0, 4)



x-int: (-3, 0)
y-int: (0, 3)

Use intercepts to graph the line described by each equation.

4. $3x + 2y = -6$



$3x + 2y = -6$

$x = 0$ (y-int)

$3(0) + 2y = -6$

$0 + 2y = -6$

$\frac{2y}{2} = \frac{-6}{2}$

$y = -3$ (0, -3)

$y = 0$ (x-int)

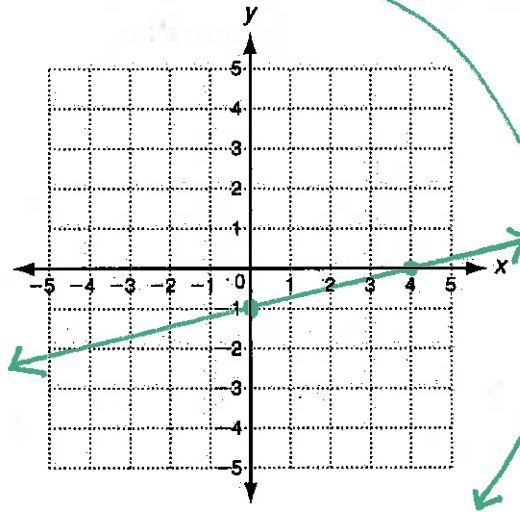
$3x + 2(0) = -6$

$3x + 0 = -6$

$\frac{3x}{3} = \frac{-6}{3}$

$x = -2$
(-2, 0)

5. $x - 4y = 4$



$x - 4y = 4$

$x = 0$ (y-int)

$0 - 4y = 4$

$\frac{-4y}{-4} = \frac{4}{-4}$

$y = -1$ (0, -1)

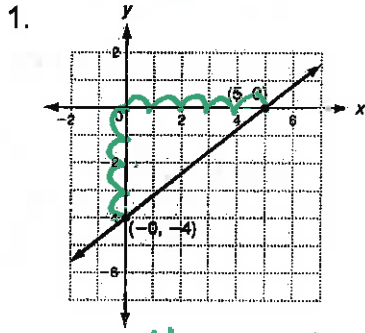
$y = 0$ (x-int)

$x - 4(0) = 4$

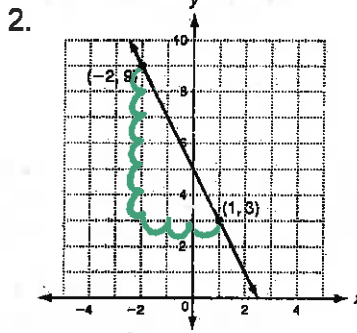
$x - 0 = 4$ (4, 0)
 $x = 4$

Section 3- Rate of Change and Slope

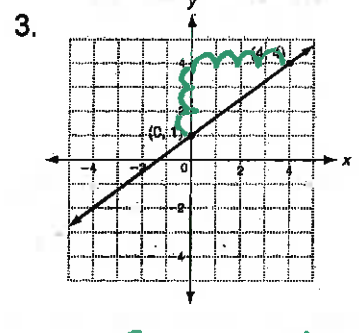
Find the rise and run between each set of points. Then, write the slope of the line.



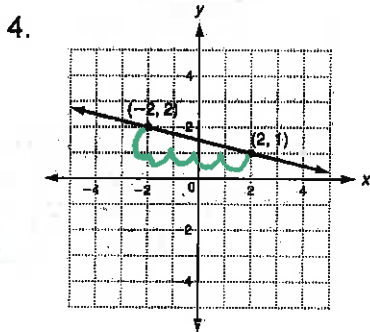
rise = 4 run = 5
 slope = $\frac{4}{5}$



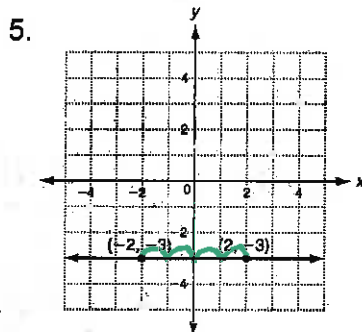
rise = -6 run = 3
 slope = $-\frac{6}{3} = -2$



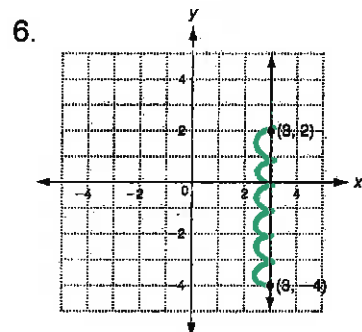
rise = 3 run = 4
 slope = $\frac{3}{4}$



rise = -1 run = 4
 slope = $-\frac{1}{4}$

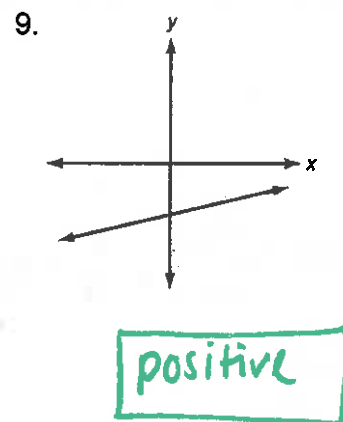
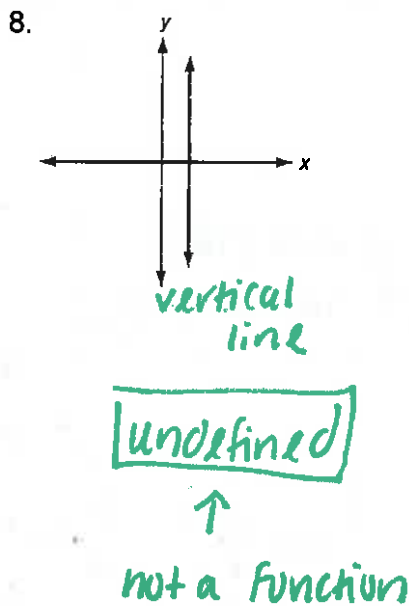
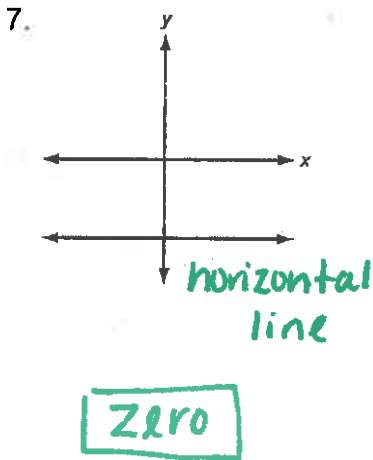


rise = 0 run = 4
 slope = $\frac{0}{4} = 0$



rise = 6 run = 0
 slope = $\frac{6}{0} = \text{undefined}$
can't divide by zero!

Tell whether the slope of each line is positive, negative, zero, or undefined.



Section 4 - The Slope Formula

Find the slope of the line that contains each pair of points.

1. $(2, 8)$ and $(1, -3)$

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

$$m = \frac{-3 - 8}{1 - 2} = \frac{-11}{-1} = \boxed{11}$$

2. $(-4, 0)$ and $(-6, -2)$

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

$$m = \frac{-2 - 0}{-6 - (-4)} = \frac{-2}{-2} = \boxed{1}$$

↓ $-6 + 4 = -2$

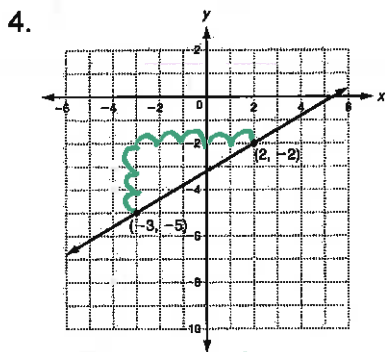
3. $(0, -2)$ and $(4, -7)$

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

$$m = \frac{-7 - (-2)}{4 - 0} = \frac{-7 + 2}{4} = \frac{-5}{4}$$

↓ $-7 + 2 = -5$

Each graph or table shows a linear relationship. Find the slope.

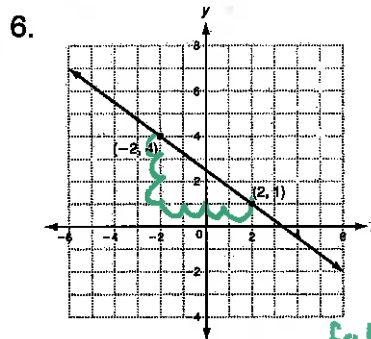


$$m = \frac{\text{rise}}{\text{run}} = \boxed{\frac{3}{5}}$$

5.

x	y
1	3.75
2	5
3	6.25
4	7.50
5	8.75

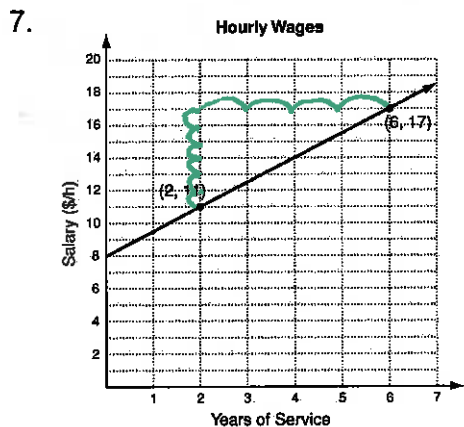
$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 3.75}{2 - 1} = \frac{1.25}{1} = \boxed{1.25}$$



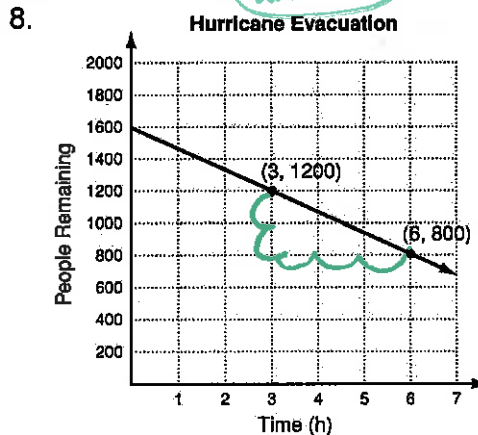
$$m = \frac{\text{rise}}{\text{run}} = \frac{-3}{4}$$

↓ fall

Find the slope of each line. Then tell what the slope represents.



$$m = \frac{\text{rise}}{\text{run}} = \frac{6}{4} = \frac{3 \text{ salary (\$/hr)}}{2 \text{ years of service}}$$



$$m = \frac{\text{rise}}{\text{run}} = \frac{-2(200)}{3} = \frac{-400 \text{ ppl remain}}{3 \text{ time (h)}}$$

units of y
↓

Find the slope of the line described by each equation. $y = mx + b$

9. $3x + 4y = 24$

$$\underline{-3x} \quad \underline{-3x}$$

$$\frac{4y}{4} = \frac{-3x + 24}{4}$$

$$y = -\frac{3}{4}x + 6$$

$$m = \boxed{-\frac{3}{4}}$$

10. $8x + 48 = 3y$

$$\frac{8}{3}x + 16 = y$$

$$\frac{8}{3}x + 16 = y$$

or

$$y = \frac{8}{3}x + 16$$

$$m = \boxed{\frac{8}{3}}$$