Warm Up

What's the Rule?

For each of the following tables, tell what must be done to x to get y.

$\dfrac{x}{3}$

$\dfrac{1}{3}x$

X	Y
0	0
3	1
6	2
9	3

X	Y
0	0
2	-4
4	-8
6	-12

$-2x$

Clear Learning Target

*You will be able to solve, graph, and write direct variation equations.*

Words Worth Knowin

direct variation - an equation that expresses a constant rate of change written in the form $y = kx,$ where k is not zero

constant of variation/proportionality - constant rate of change, represented by the variable k

Characteristics of a Direct Variation:

- Slope is the same as the constant of variation. *Why?*

  both rates of change, $k=m$

- The graph always passes through the origin. *Why?*

  $y=kx \rightarrow y=k(0)$ $(0,0)$
  $y=0$

- The x- and y-intercepts are both (0,0). *Why?*
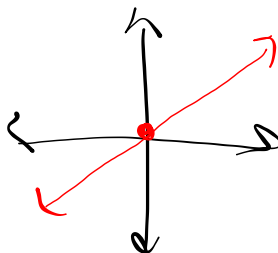
Example #1 Name the constant of variation for the following equation: $y = -4x$
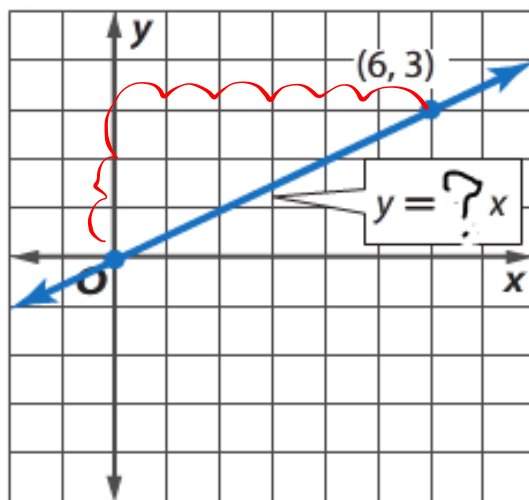
$$y = \underline{k}x.$$

$$\boxed{k = -4}$$

$$\uparrow k$$

You Try! Name the constant of variation of the following equation:

$$\uparrow k$$

$$m = k$$

$$6$$

$$(6, 3)$$

$$y = \,? \, x$$

$$3$$

$$\frac{3}{6} = \frac{1}{2}$$

$$\boxed{k = \frac{1}{2}}$$

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

Example #2 Graph y = -6x.

$$\frac{-6}{1} = K = m = \frac{6}{-1}$$
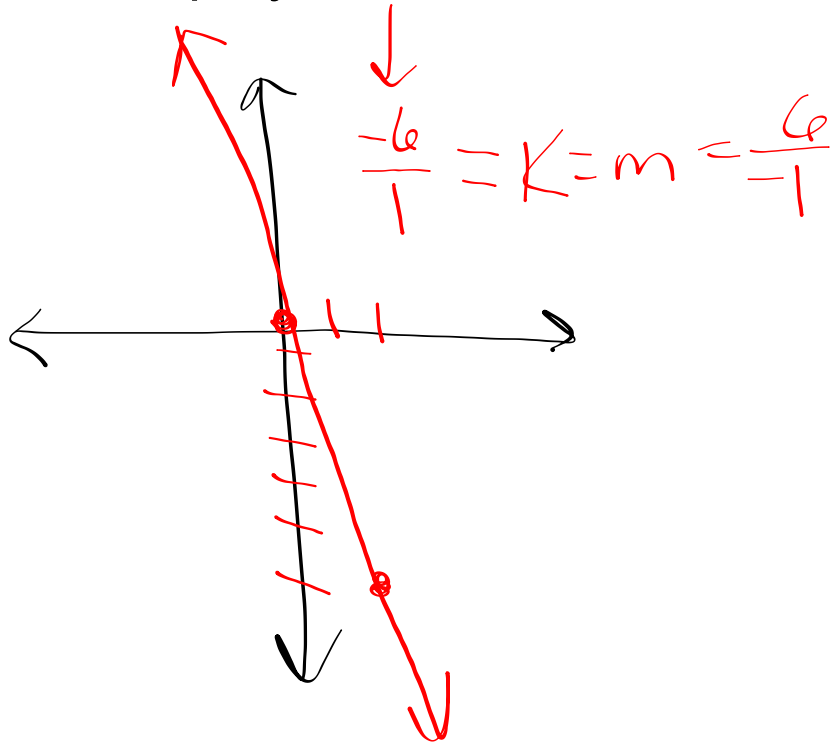
You Try! Graph y = ²/₃ x
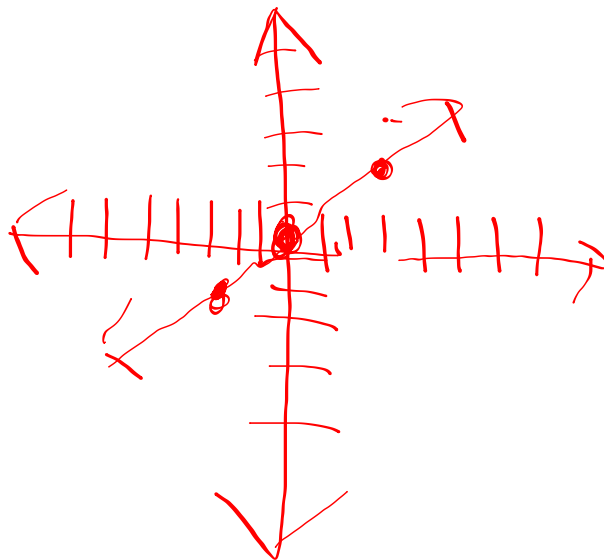
Example #3

Suppose y varies directly as x, and y = 72 and x = 8. Write a direct variation equation that relates x and y. The use the direct variation equation to find x when y = 63.

$$y = kx$$

$$y = kx$$
$$72 = k \cdot 8$$
$$\frac{72}{8} = \frac{k \cdot 8}{8}$$
$$k = 9 \longrightarrow \boxed{y = 9x}$$

$$\frac{63}{9} = \frac{9x}{9}$$
$$\boxed{x = 7}$$

You Try!

Suppose y varies directly as x, and y = 98 when x = 14. Write a direct variation equation that relates x and y. Then find the value for y when x = -4.

$$\frac{98}{14} = \frac{k \cdot 14}{14}$$
$$k = 7$$
$$\boxed{y = 7x}$$

$$y = 7(-4)$$
$$\boxed{y = -28}$$