Direct variation

$y = kx \qquad k = \dfrac{y}{x}$

## Direct Variation

**For each function, determine whether $y$ varies directly with $x$. If so, find the constant of variation and write the function rule.**

1)

| x | y |
|----|----|
| -6 | -2 |
| 9 | 3 |
| 21 | 7 |

$$k = \frac{y}{x}$$

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

$$\frac{3}{9} = \frac{1}{3}$$

$$\frac{7}{21} = \frac{1}{3}$$

$$yes, \quad k = \frac{1}{3}, \quad y = \frac{1}{3}x$$

Determine whether $y$ varies directly with $x$. If so, find the constant of variation.

$$y = kx$$

2) $y = -1.2x$

yes

$K = -1.2$

3) $y - 3x = 1$

$y = 3x + 1$

no

*y* **varies directly with** *x*.

$$k = \frac{y}{x}$$

4) If *y* = –14 when *x* = –7, find *x* when *y* = 22.

$$\frac{-14}{-7} = \frac{22}{x}$$

$$-14x = -154$$

$$x = 11$$

5) The amount of lemon juice in a lemonade recipe varies directly with the amount of water. The recipe calls for 8 oz of lemon juice and 32 oz of water. How much lemon juice should you use if you start with 28 oz of water?

$$\frac{8}{32} = \frac{x}{28}$$

$$\frac{32}{8} = \frac{28}{x}$$

$$32x = 224$$

$$x = 7$$

Write and graph a direct variation equation that passes through each point.

6) $(-1.5, 9)$

$$K = \frac{y}{x} = \frac{9}{-1.5} = -6$$

$$y = -6x$$

| x | y |
|---|---|
| -1 | 6 |
| 0 | 0 |
| 1 | -6 |