Direct Variation

10/2/2017

2 variables can be described as having a direct variation relationship if:

- the variables are related by a constant of variation

Direct variation can be modeled as an equation:

$$y = kx$$

k ↑ constant

Direct variation can be determined by using:

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

Ex. 1 y varies directly as x with a constant of variation of $\frac{2}{3}$. Write an equation.

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

Find y when $x = 15$.

$$y = \frac{2}{3}(15)$$

$$\boxed{y = 10}$$

$$y = \frac{2}{3} \cdot \frac{15}{1}$$

$$y = \frac{30}{3}$$

$$y = 10$$

Find x when $y = 22$.

$$22 = \frac{2}{3}x$$

$$\boxed{x = 33}$$

$$\frac{3}{2}(22) = \left(\frac{2}{3}x\right)\frac{3}{2}$$

$$\frac{66}{2} = x$$

$$33 = x$$

Ex. 2 y and x vary directly. If $x = 7$ when $y = 84$, what is the constant of variation? Write the equation.

$k = \frac{84}{7}$

$\boxed{k = 12}$

$\boxed{y = 12x}$

Find x when $y = 132$.

$132 = 12x$

$\boxed{x = 11}$

Find y when $x = 21$.

$y = 12(21)$

$\boxed{y = 252}$

Ex. 3 Determine whether the tables show a direct variation relationship. If so, find the missing values

x	y
4	-12
	-21
8	
10	-30
13	-39

$\frac{-12}{4} = -3$ ✓

$\frac{-30}{10} = -3$ ✓

$\frac{-39}{13} = -3$ ✓

$\boxed{y = -3x}$

$-21 = -3x$

$\boxed{x = 7}$

$\boxed{k = -3}$

$y = -3(8)$

$\boxed{y = -24}$

x	y
2	7.2
5	18
7	
8	28.6
	39.6

$\frac{7.2}{2} = 3.6$ ✓

$\frac{18}{5} = 3.6$ ✓

$\frac{28.6}{8} = 3.575$ ×

x and y are <u>not</u> directly varying