

# 5-2: Direct Variation

Direct Variation:

Any linear data that can be written as a function in the form " $y = kx$ "  
(Hint: Same as " $y = mx + b$ " where there is no " $b$ " or " $b = 0$ ")

" $k$ " is called the constant of variation  
(Hint:  $k$  is the slope of the line; same as " $m$ ")

All direct variation equations represent a proportional relationship

The graph of all direct variations go through the origin  $(0,0)$

To find an equation that is a Direct Variation through any given point, substitute the values of any ordered pair  $(x,y)$  into the equation " $y = kx$ " and solve for " $k$ ". Then rewrite the equation " $y = kx$ " substituting in the value found for " $k$ ".

You can also use this equation to solve for other values on the line.

To determine if a list of values define a Direct Variation:

1. Graph the ordered pairs: The graph must appear linear and pass through the origin (0,0)
2. Use any one of the ordered pairs to write the direct variation for that pair: " $y = kx$ " then see if it works for all the other ordered pairs (can do this manually or on the calculator using "y=" and "TABLE")
2. For all the ordered pairs in the table calculate " $y/x$ " for each. If the value is constant through out, then the table constitutes a direct variation, and this value of " $y/x$ " is the constant of variation, "k"

16.  $y = 7\frac{1}{2}$  when  $x = 3$ .

$$\frac{3}{7\frac{1}{2}} = \frac{x}{y}$$

$$\frac{3y}{3} = \frac{7.5x}{3}$$

$$y = 2.5x$$

$$(12, 30)$$

18.  $y = 125$  when  $x = -5$ .

$$\frac{-5}{125} = \frac{x}{5}$$

$$\frac{-5}{-5} y = \frac{125x}{-5}$$

$$y = -25x$$

$(12, -300)$

$$20. y = 9\frac{1}{3} \text{ when } x = -\frac{1}{2}.$$

$$\frac{x}{y} = \frac{-\frac{1}{2}}{9\frac{1}{3}}$$

$$(-2) 9\frac{1}{3} x = -\frac{1}{2} y \quad (-2)$$

$$-18\frac{2}{3} x = y$$

$$(12, -22\frac{2}{3})$$

12 muffins uses 1c. flour

What # muffins for 2.5 flour

$$\frac{12}{1} = \frac{x}{2.5}$$

x -- 20

$$\begin{array}{ccc} y & 12 & x \\ \uparrow & & \downarrow \\ 3 & & ? \end{array}$$

