Sec. 5.2 Direct Variation

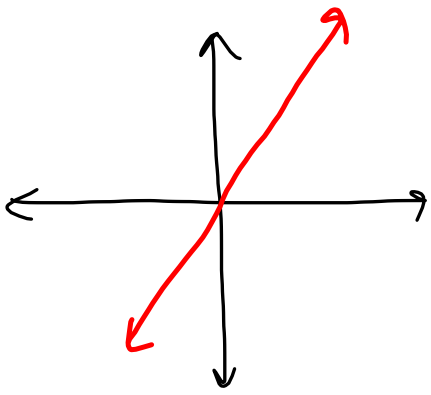
Vocabulary

- direct variation: a relationship that can be represented by a function in the form $y = kx$, where $k \neq 0$.
- constant of variation for direct variation: k, the coefficient of x

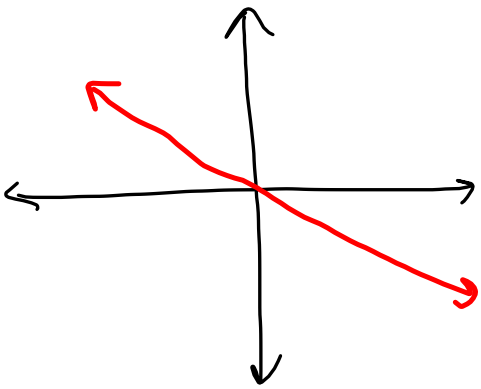
$$\frac{y}{x} = \frac{kx}{x}$$

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

- graphs of direct variation
  * goes through (0, 0) * m = slope = k



$k > 0$



$k < 0$

Problem 1: Is the equation a direct variation? If it is, find the constant of variation. → $y = kx$

a. $\frac{4y}{4} = \frac{5x}{4}$

$y = \frac{5}{4}x \rightarrow k = \frac{5}{4}$

$(0,0)$
$4(0) = 5(0)$
$0 = 0$
True

b. $2x + 3y = 6$ → $y = kx$ ☐ → Solve for y.

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

$-2x \quad -2x$

$\frac{3y}{3} = \frac{-2x}{3} + \frac{6}{3}$

$y = -\frac{2}{3}x + 2$ not direct variation

Problem 2: Suppose y varies directly with x and $y = 40$ when $x = 8$. What direct variation equation relates x and y? What is the value of y when $x = 12$?

$y = kx$

$\frac{40}{8} = \frac{k(8)}{8}$

$5 = k$

$y = 5x$

$y = 5(12)$

$y = 60$

Problem 3: Does y vary directly with x? If so, write an equation.

a.

x	y	$\frac{y}{x}$
2	5	$\frac{5}{2}$
6	15	$\frac{15}{6} = \frac{5}{2}$
10	25	$\frac{25}{10} = \frac{5}{2}$

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

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

yes → $y = \frac{5}{2}x$