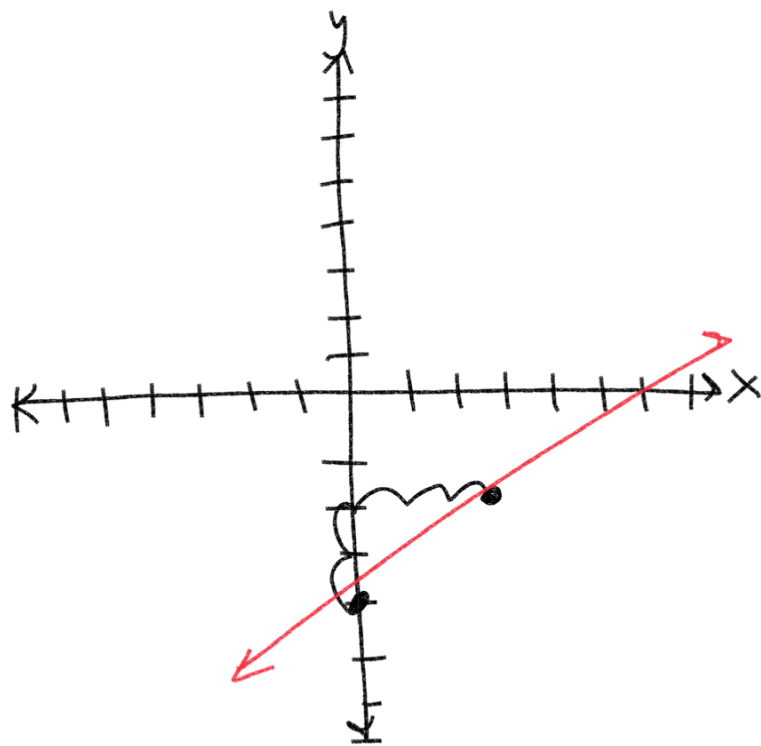


Review HW/26  
 ratio of movement  
 start  
 $y = \frac{2}{3}x - 4$



1.) Plot y-int

2.) Use slope  $\frac{\text{rise}}{\text{run}}$

$$m = \frac{2}{3} = \frac{\text{up } 2}{3 \text{ right}}$$

$$8x - 4y = 16$$

$$8x - 4y = 16$$

$$-8x \quad -8x$$

$$\frac{-4y}{-4} = \frac{-8x + 16}{-4}$$

$$y = 2x - 4$$

1.) Plot y-int

2.) Use slope  
 slope =  $\frac{2}{1} = \frac{\text{up } 2}{1 \text{ right}}$

$$x=0 \quad (0, -4)$$

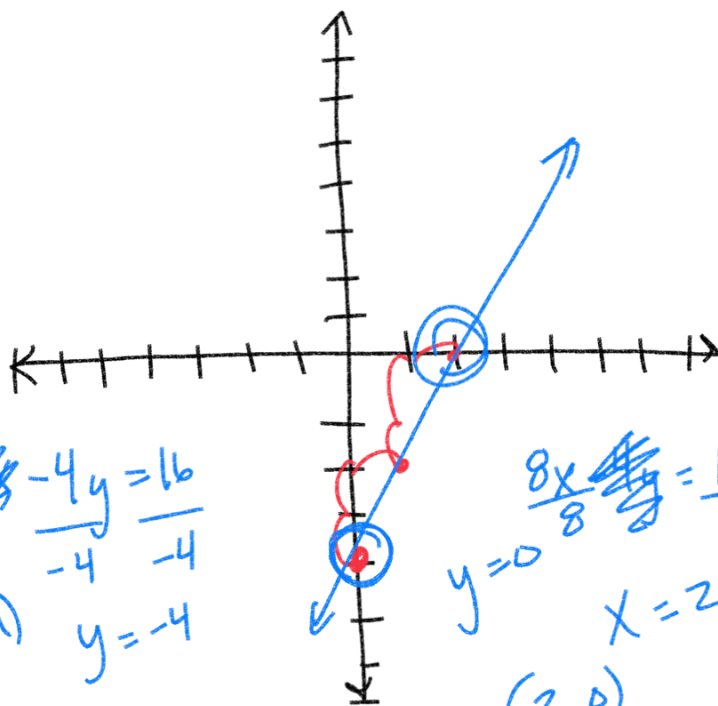
$$\frac{-4y}{-4} = \frac{16}{-4}$$

$$y = -4$$

$$\frac{8x}{8} = \frac{16}{8}$$

$$y=0 \quad x=2$$

$$(2, 0)$$



Find the slope

$(2, 8)$  and  $(-4, 12)$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{12 - 8}{-4 - 2} = \frac{4}{-6} = \boxed{-\frac{2}{3}}$$

HW/Quiz 7

Find the equation for line with the points  
 $(2, 8)$  and  $(-4, 12)$

1.) Find the slope  $\rightarrow -\frac{2}{3}$

$x = 2$   
 $y = 8$   
 $(2, 8)$

$$y = mx + b$$

↓ ↓ ↓

$$8 = \left(-\frac{2}{3}\right)(2) + b$$
$$8 = -\frac{4}{3} + b$$
$$+\frac{4}{3} \quad +\frac{4}{3}$$

$$b = 8 + \frac{4}{3}$$

↓

$$\frac{24}{3} + \frac{4}{3} = \frac{28}{3} = b$$

$$y = mx + b$$

$$\boxed{y = -\frac{2}{3}x + \frac{28}{3}}$$

Find the equation for a line perpendicular to  $y = \frac{3}{4}x + 2$  that goes through  $(-9, 3)$ .

- 1.) Find given slope  $\frac{3}{4}$   $y = mx + b$
- 2.) Find the needed slope   
 *opposite inverse*  $\frac{3}{4} \rightarrow -\frac{3}{4} \rightarrow -\frac{4}{3}$
- 3.) Use slope and point for the line.  $m = -\frac{4}{3}$   $(-9, 3)$

$y = mx + b$   
 $y = -\frac{4}{3}x + 9$

$y = mx + b$   
 $3 = (-\frac{4}{3})(-9) + b$   
 $3 = 12 + b$   $b = 9$   
 $-12 -12$

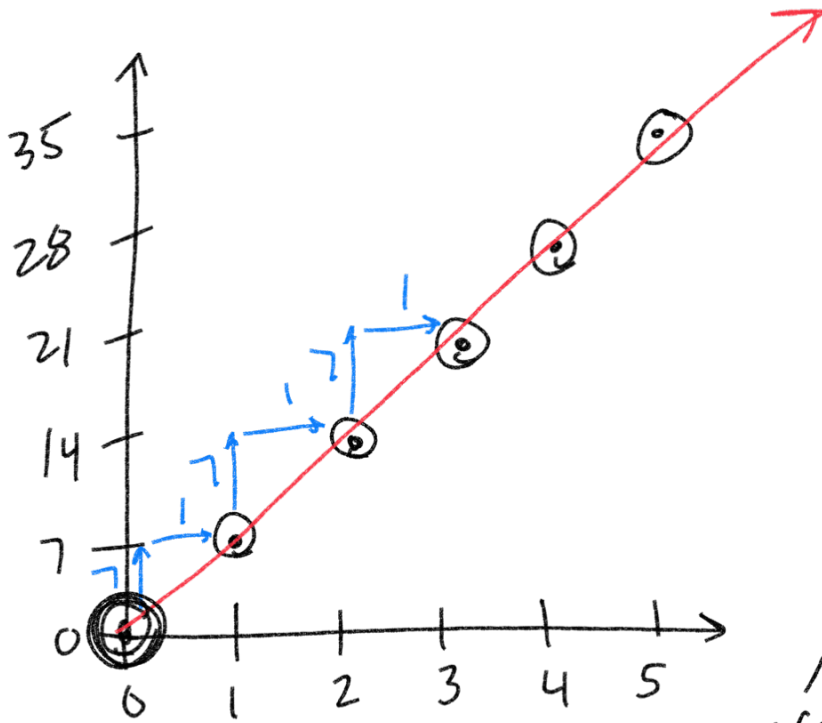
Find the equation for a line parallel to  $4x + 8y = 10$  that goes through  $(2, -4)$

- 1.) Find given slope  $-\frac{1}{2}$   $4x + 8y = 10$   $y = -\frac{1}{2}x + \frac{5}{4}$
- 2.) Find needed slope  $-\frac{1}{2}$   $8y = -4x + 10$
- 3.) Use slope to find y-int, then equation  $m = -\frac{1}{2}$

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

$y = mx + b$   
 $-4 = (-\frac{1}{2})(2) + b$   
 $-4 = -1 + b$   
 $+1 +1$   $b = -3$

# Direct Variation



proportional to  
 $y \propto x$   
 $y \uparrow \quad x \uparrow$   
 $y \downarrow \quad x \downarrow$

Linear Relationship

- 1.) Constant, linear slope
- 2.) Must go through the origin

~~$y = mx + b$~~   $b = 0$

$y = mx$

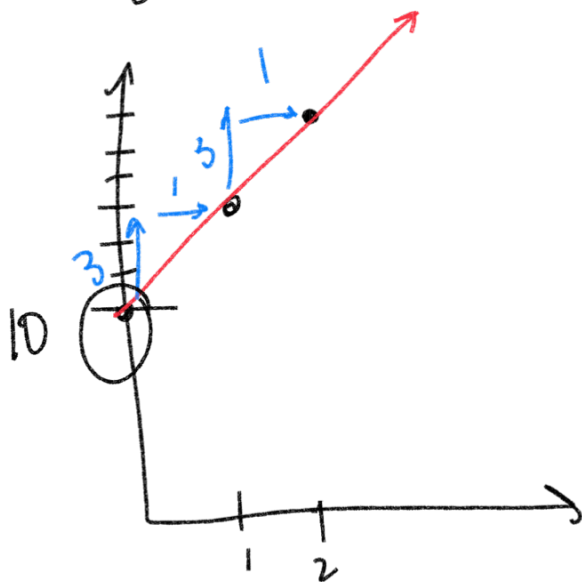
$y = kx$

$k = \text{constant of variation}$

$(0,0)$   
 $k = m$

$y = mx + b$  *not direct variation*  
 $y = 3x + 10$

Not direct variation  
 must go through the origin



Q If  $y = 8$  when  $x = 4$   
 find  $y$  when  $x = 6$

1.) Find  $k$

2.) Find  $y = kx$   
 $y = 2x$

3.) Plug in either  $x$  or  $y$

$$y = kx$$

$$\downarrow \quad \downarrow$$

$$8 = k(4)$$

$$\frac{8}{4} = \frac{4k}{4}$$

$$2 = k$$

$$y = kx$$

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

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

$$y = 2(6)$$

$$y = 12$$

If  $y = 33$  when  $x = 6$   
 Find  $y$  when  $x = 10$

1.) Find  $k$

$$y = kx$$

$$k = \frac{y}{x} = \frac{33 \div 3}{6 \div 3} = \frac{11}{2}$$

2.) Equation:  $y = kx$   
 $y = \frac{11}{2}x$

$$k = \frac{11}{2}$$

3.) Plug in  $y = \frac{11}{2}(10) = \frac{110}{2} = 55$

If  $y = 12$  when  $x = 28$   
 assume direct variation  
 Find  $x$  when  $y = 30$

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

$$\frac{7}{3}(30) = \left(\frac{3}{7}x\right) * \frac{7}{3}$$

$$x = \frac{7}{3}(30) = \boxed{70}$$

$$y = kx$$

$$k = \frac{y}{x} = \frac{12}{28} = \frac{3}{7} = k$$

1.)  $y = 4x$   yes, direct variation

2.)  $y = \frac{2}{3}x - 2$   No, not direct variation

3.)  $2x = y + 3$   not direct variation

4.)  $2x + y = 0$   
 $-2x \quad \quad -2x$

$$y = -2x$$

$$k = -2$$

	X	y	$k = \frac{y}{x}$
$(0,0)$	0	0	$\frac{0}{0}$
→	1	3	$\frac{3}{1} = 3$
→	-3	-9	$\frac{-9}{-3} = 3$
→	4	12	$\frac{12}{4} = 3$

consistent k

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

$$k = 3$$

yes, direct variation

$$y = 3x$$

