

T-A2 Algebra 2 Week 11 11/15

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

$m = \frac{3}{4}$ slope of needed line $\frac{3}{4} \xrightarrow{\text{opposite}} -\frac{3}{4} \xrightarrow{\text{inverse}} \frac{-4}{3} = m$

slope-intercept: $y = mx + b$
 $3 = (-\frac{4}{3})(-9) + b$
 $3 = 12 + b$
 $-12 \quad -12$
 $b = -9$
 $y = -\frac{4}{3}x - 9$

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

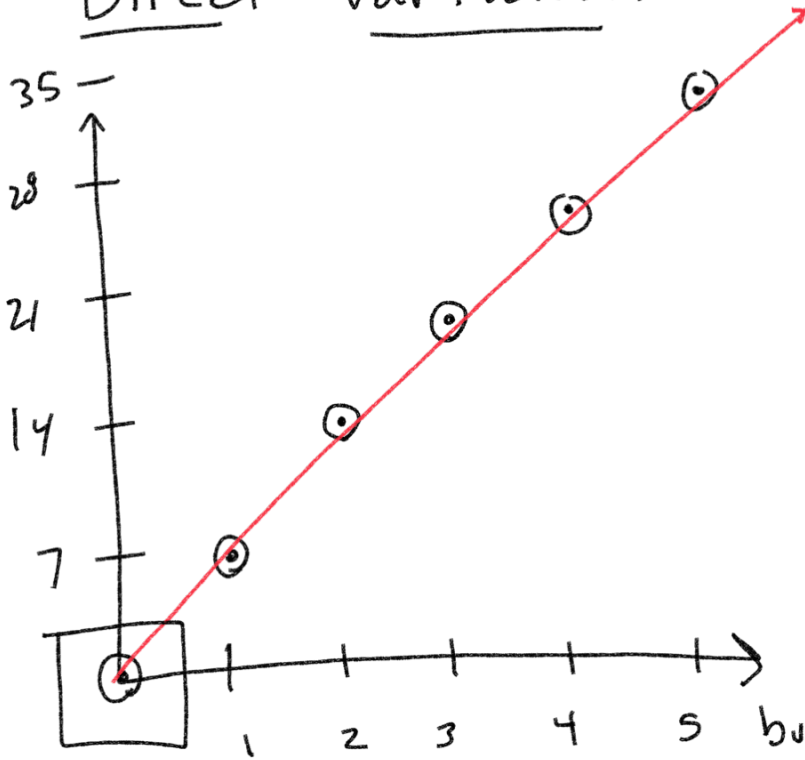
$y = mx + b$
 slope $m = -\frac{1}{2}$

$4x + 8y = 10$
 $-4x \quad -4x$
 $\frac{8y}{8} = \frac{-4x + 10}{8}$
 $y = \frac{-4}{8}x + \frac{10}{8}$
 $y = -\frac{1}{2}x + \frac{5}{4}$

parallel lines have same slope
 $y - y_1 = m(x - x_1)$
 $y - (-4) = -\frac{1}{2}(x - 2)$
 $y + 4 = -\frac{1}{2}(x - 2)$

$y + 4 = -\frac{1}{2}x + 1$
 $-4 \quad -4$
 $y = -\frac{1}{2}x - 3$

Direct Variation



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

Linear Relationship

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

burger
Combo

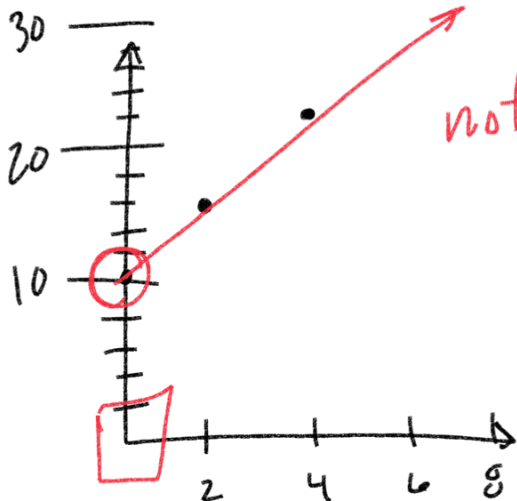
$$y = mx + b \quad b = 0$$

$$y = mx$$

$$y = kx$$

$\{ (0,0) \}$
 $\wedge \wedge$
 $\swarrow \searrow$
 ~~y~~ ~~x~~

$k =$ constant of variation (slope)



not direct variation

$$y = 3x + 10$$

If $y = 8$ when $x = 4$,
*1.5

find y when $x = 6$

1.) Find k .
12

2.) Plug k into $y = kx$

3.) Plug in x or y .

$$y = 2x$$
$$y = 2(6)$$
$$y = 12$$

$$y = kx$$

$$8 = k4$$

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

$$2 = k$$

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

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

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

Find y when $x = 10$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\frac{33 - 0}{6 - 0} = \frac{33}{6}$$

$$y = kx$$

$$y = \frac{11}{2}x$$

$$y = \frac{11}{2} \left(\frac{10}{1} \right) = \frac{110}{2} = 55$$

$$y = kx$$

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

$$\frac{33}{6} = \frac{6k}{6}$$

$$k = \frac{33}{6} = \frac{11}{2}$$

$$\frac{33}{6}$$

If $y=12$ when $x=28$

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

Find x when $y=30$

$$k = \frac{12 \div 4}{28 \div 4} = \frac{3}{7}$$

$$y = kx$$

↓

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

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

↓

$$\frac{7}{3} \cdot \frac{30}{1} = \frac{3}{7}x \cdot \frac{7}{3}$$

$$\frac{210}{3} = x$$

$$\boxed{70 = x}$$

$$y = kx \quad \square$$

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

3.) $y = \frac{2}{3}x$ $\textcircled{-2}$
No

2.) $2x = y + 3$
No

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

$$y = kx$$

x	y
$\textcircled{0}$	$\textcircled{0}$

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

$\cancel{0} (0,0)$ is direct variation

yes, direct variation

$$\Rightarrow 1 \quad 3 \quad \frac{3}{1} = \textcircled{3}$$

$$\Rightarrow -3 \quad -9 \quad \frac{-9}{-3} = \textcircled{3}$$

$$\Rightarrow 4 \quad 12 \quad \frac{12}{4} = \textcircled{3}$$

