Warm Up October 19, 2018

1. Identify the slope from the points:
(-2, 4) and (-2, 1).

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1-4}{-2-(-2)} = \frac{-3}{0} = \text{undefined}$$

2. Write the equation of a line in slope-intercept form that has a slope of 1/2 and passes through (-6, 4).

$m = 1/2$

$y = mx + b$

$y - y_1 = m(x - x_1)$

$y - 4 = \frac{1}{2}(x + 6)$

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

$+4 \quad +4$

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

3.) Write the equation of the line that passes through (2, 3) and (6, 4).

$$m = \frac{4-3}{6-2} = \frac{1}{4}$$

$y = \frac{1}{2}x + \frac{5}{2}$

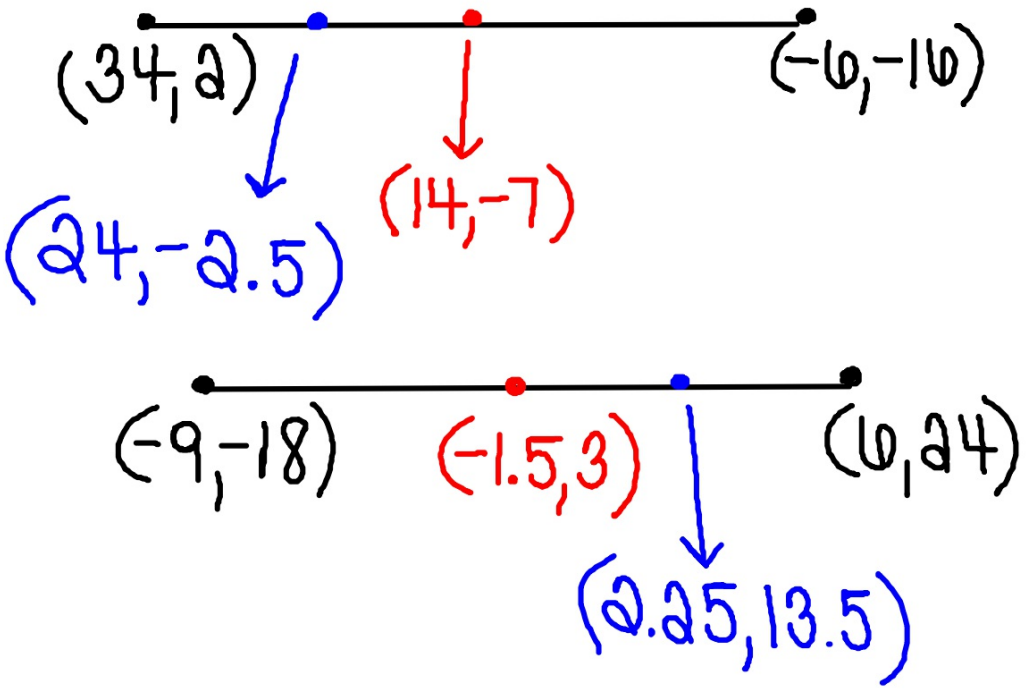
$y = mx + b$

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

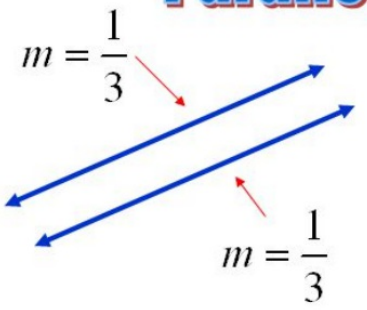
$3 = \frac{1}{2} + b$

$-\frac{1}{2} \quad -\frac{1}{2}$

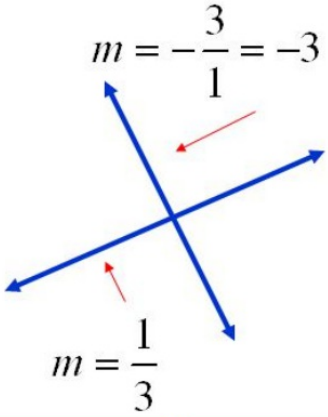
$\frac{5}{2} = b$


(34, 2)
(-6, -16)
(14, -7)
(24, -2.5)
(-9, -18)
(-1.5, 3)
(6, 24)
(0.25, 13.5)

Parallel and Perpendicular



Remember parallel lines have the same slopes so if you need the slope of a line parallel to a given line, simply find the slope of the given line and the slope you want for a parallel line will be the same.



Perpendicular lines have negative reciprocal slopes so if you need the slope of a line perpendicular to a given line, simply find the slope of the given line, take its reciprocal (flip it over) and make it negative.

$$-3 \cdot \frac{1}{3} = \frac{-3}{3} = -1$$

WRITING PARALLEL & PERPENDICULAR EQUATIONS

What is this? Given an equation, you must create ANOTHER equation that is either parallel or perpendicular to this line, passing through a certain point.

Keep in mind the following points:

- Parallel equations have equal slopes!
- Perpendicular equations have opposite Reciprocal slopes!

Parallel Lines

EXAMPLE 1:
Write the equation of the line that passes through the point **(-2, 7)** and is **PARALLEL** to the line **y = -4x + 1**

same slope

$m = -4 \quad (-2, 7)$

$y - y_1 = m(x - x_1)$

$y - 7 = -4(x + 2)$

$y - 7 = -4x - 8$

$+7 \qquad +7$

$y = -4x - 1$

EXAMPLE 2:
Write the equation of the line that passes through the point **(3, -1)** and is **PARALLEL** to the line **x – 3y = 9**

same slope

$x - 3y = 9 \qquad m = \frac{1}{3} \quad (3, -1)$

$-x \quad -x$

$-3y = -x + 9$

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

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

$y + 1 = \frac{1}{3}(x - 3)$

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

$-1 \qquad -1$

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

Perependicular Lines

$$y - y_1 = m(x - x_1)$$

EXAMPLE 3:
Write the equation of the line that passes through the point **(4, 3)** and is **PERPENDICULAR** to the line **y = 2x – 4**

$m = \frac{2}{1}$ ⊥ $m = -\frac{1}{2}$

$$y - 3 = -\frac{1}{2}(x - 4)$$

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

$$+3 \qquad +3$$

$$y = -\frac{1}{2}x + 5$$

EXAMPLE 4:
Write the equation of the line that passes through the point **(-5, 1)** and is **PERPENICULAR** to the line **5x + 3y = -21**

$$5x + 3y = -21$$

$$-5x \qquad -5x$$

$$\frac{3y}{3} = \frac{-5x}{3} - \frac{21}{3}$$

$$y = -\frac{5}{3}x - 7$$

$-\frac{5}{3}$ ⊥ $* \frac{3}{5}$

$$y - 1 = \frac{3}{5}(x + 5)$$

$$y - 1 = \frac{3}{5}x + 3$$

$$+1 \qquad +1$$

$$y = \frac{3}{5}x + 4$$