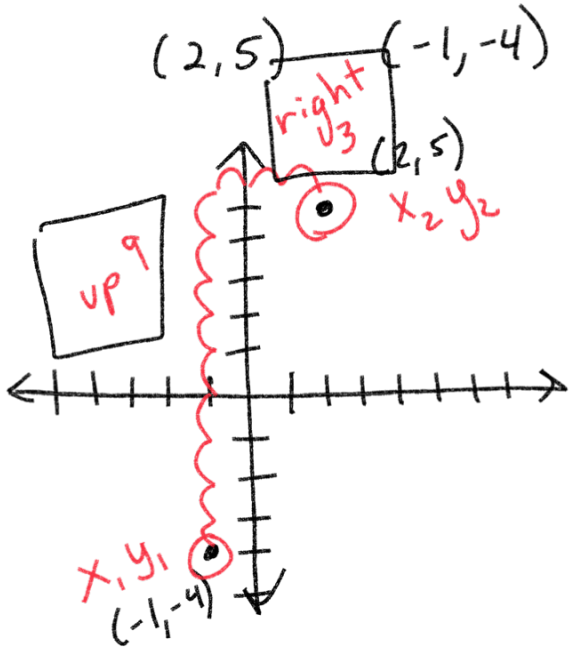
T-G Geometry 1/3 Week 15

1.) Find the slope.



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

slope = $\frac{\text{rise}}{\text{run}} = \frac{\text{up (+) / down (−)}}{\text{right}}$

$x_2\ y_2$	$x_1\ y_1$
(2, 5)	(-1, -4)

$$\frac{y_2 - y_1}{x_2 - x_1} : \frac{5 - (-4)}{2 - (-1)}$$

$$\frac{-4 - 5}{-1 - 2} : \frac{-9}{-3} = \boxed{3}$$

$$\frac{5 + 4}{2 + 1} = \frac{9}{3} = \boxed{3}$$

2.) Write in linear equation

slope = $\frac{2}{3}$ y-intercept : -5

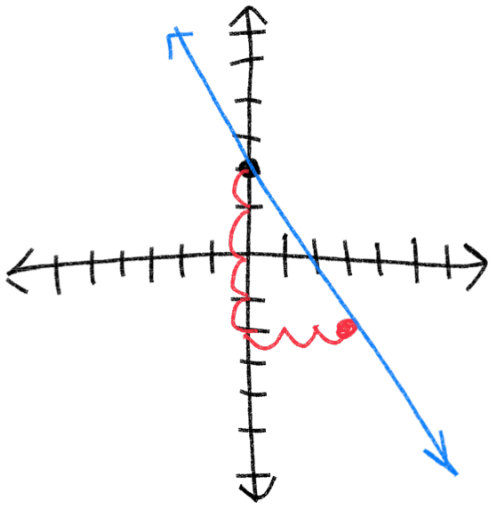
slope-intercept form: $y = mx + b$ (x, y)

slope: m y-intercept: b

$$\boxed{y = \frac{2}{3}x - 5}$$

Graph $y = \frac{-4}{3}x + 2$ ← y-int slope-intercept

slope $= \frac{-4}{3}$ → down 4 / 3 right



Graph

1.) Plot y-int

2.) Use slope

down 4 / 3 right

Find equation for a line

slope $= \frac{2}{3}$ (m) through $(-3, 9)$ (x, y)

[point-slope]

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

[slope-intercept]

$y = mx + b$

$9 = \left(\frac{2}{3}\right)(-3) + b$

$9 = -2 + b$

$+2 \quad +2$

$11 = b$

$\frac{2}{3}\left(\frac{-3}{1}\right) = -2$

$y = mx + b$

$y = \frac{2}{3}x + 11$

Linear equation $\underbrace{(1,8)}_{x_1\ y_1}$ and $\underbrace{(3,-2)}_{x_2\ y_2}$

1.) Find slope

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

$$\frac{y - y_1}{(x - x_1)} = \frac{m(x - x_1)}{(x - x_1)}$$

$$m = \frac{y - y_1}{x - x_1}$$

$$\frac{-2 - 8}{3 - 1} = \frac{-10}{2} = -5$$

$m = -5$

2.) Find y-int

$y = mx + b$

$8 = (-5)(1) + b$

$8 = -5 + b$

$+5 \quad +5$

$13 = b$

$y = mx + b$

$-2 = (-5)(3) + b$

$-2 = -15 + b$

$+15 \quad +15$

$13 = b$

$y = mx + b$

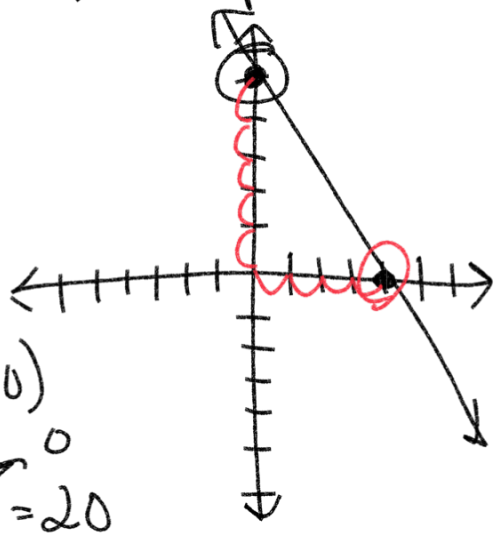
$y = -5x + 13$

Standard form

$$Ax + By = C$$

$$5x + 4y = 20$$

Graph using intercepts



kill x $(x = 0)$

$5x + 4y = 20$ (0)

$4y = 20$

$\frac{4y}{4} = \frac{20}{4}$

$y = 5$

$(0, 5)$

kill y $(y = 0)$

$5x + 4y = 20$ (0)

$5x = 20$

$\frac{5x}{5} = \frac{20}{5}$

$x = 4$

$(4, 0)$

$5x + 4y = 20$

$-5x \qquad -5x$

$\frac{4y}{4} = \frac{-5x}{4} + \frac{20}{4}$

$y = mx + b$ (y-int)

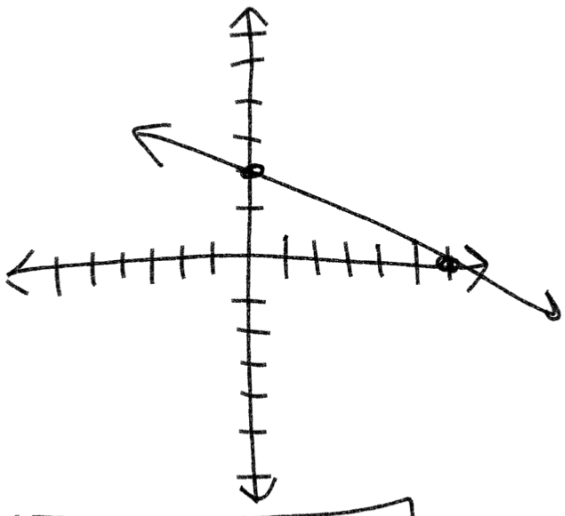
$y = \frac{-5}{4}x + 5$

$\frac{-5}{4} \rightarrow \frac{5 \text{ down}}{4 \text{ over}}$

$2x + 6y = 12$

$Ax + By = C$

$A = 2 \quad B = 6 \quad C = 12$



x-int: $\frac{C}{A} = \frac{12}{2} = 6 \quad (6, 0)$

y-int: $\frac{C}{B} = \frac{12}{6} = 2 \quad (0, 2)$

slope $= \frac{-A}{B} = -\frac{2}{6}$

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

Parallel Lines

Never touch

slopes are equal

$m = 3 \quad (4, 8) \quad (x, y)$

$y = mx + b$

$y = 3x - 4$

Find equation of a line parallel to $y = 3x + 2$ through point $(4, 8)$

$y = mx + b$

$8 = (3)(4) + b$

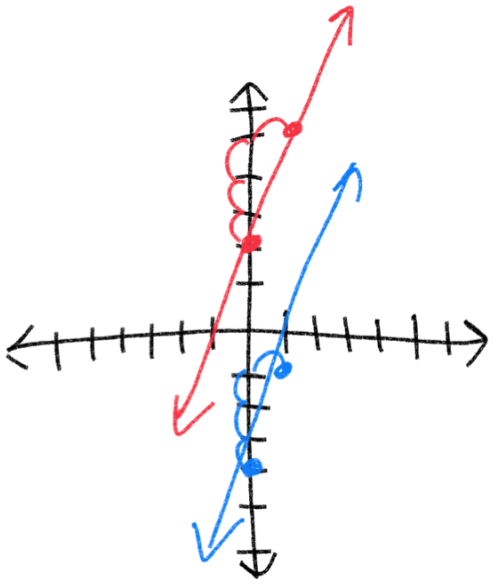
$8 = 12 + b$

$-12 \quad -12$

$b = -4$

$y = 3x + 2$

$y = 3x - 4$



Perpendicular Lines

intersect at 90° angle

Have slopes that are opposite inverses

Given

$y = 2x - 3$ slope = 2

opposite: $2 \rightarrow -\frac{2}{1} \rightarrow$ change sign

inverse: $\rightarrow -\frac{1}{2}$ flip

slope perpendicular line = $-\frac{1}{2}$