S-A2 Algebra 2 Session 7 6/29

$f(x) = 3x^2 + 6x + 12$

input → -1 output → 9

$f(-1) = 3(-1)^2 + 6(-1) + 12$

$3(1) + 6(-1) + 12$

$3 - 6 + 12 = -3 + 12 = 9$

(-1, 9)

$3x^2 + 6x + 12$

input → 4 output → 84

$f(4) = 3(4)^2 + 6(4) + 12$

$3(16) + 6(4) + 12$

$48 + 24 + 12 = 72 + 12 = 84$

(4, 84)

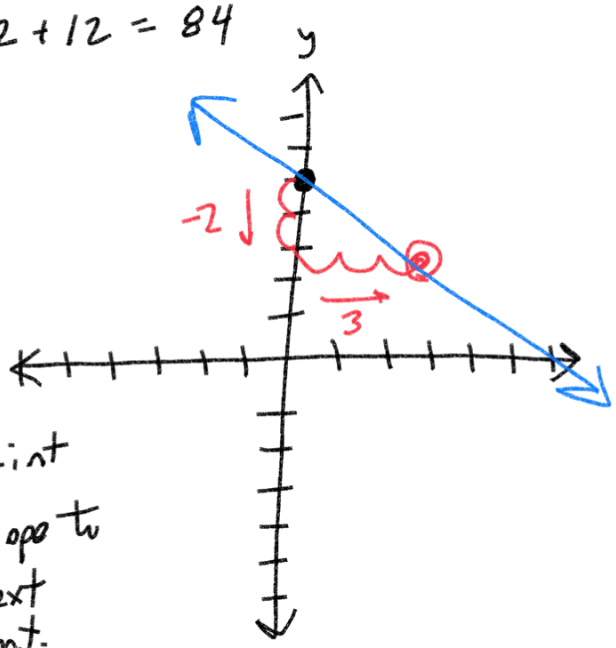
1.) $y = -\frac{2}{3}x + 5$

slope-intercept form $y = mx + b$

slope: $-\frac{2}{3} = \frac{\text{down } 2}{3 \text{ right}}$

y-intercept: 5

1.) Plot y-int
2.) Use slope to find next point.



Standard Form

2.) $2x - 5y = 10$ $Ax + By = C$

$-5y = 10$ $\frac{2x}{2} = \frac{10}{2}$

$\frac{-5y}{-5} = \frac{10}{-5}$

$x = 0$ $y = -2$

$(0, -2)$

$y = 0$ $x = 5$

$(5, 0)$

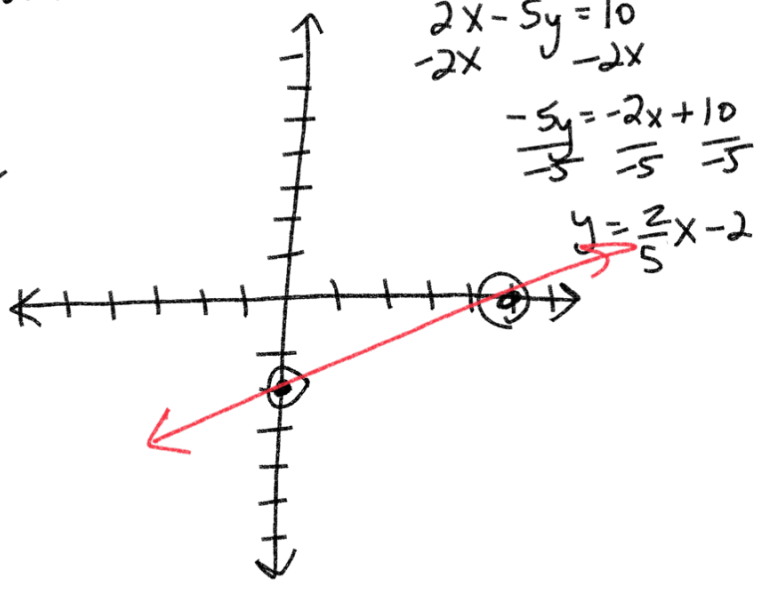
$2x - 5y = 10$

$-2x \quad -2x$

$-5y = -2x + 10$

$\frac{-5y}{-5} = \frac{-2x}{-5} + \frac{10}{-5}$

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



Find the slope between (2, 3) and (5, -6)

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-6-3}{5-2} = \frac{-9}{3} = \boxed{-3}$$

$$\frac{3-(-6)}{2-5} = \frac{3+6}{2-5} = \frac{9}{-3} = \boxed{-3}$$

Put into slope-intercept form

$m = \frac{5}{3}$ y-int: -8

$y = mx + b$

$$\boxed{y = \frac{5}{3}x - 8}$$

$m = -\frac{7}{8}$ y-int: $\frac{2}{3}$

$y = mx + b$

$$\boxed{y = -\frac{7}{8}x + \frac{2}{3}}$$

slope = 4 Includes: $(\underset{x_1}{-2}, \underset{y_1}{6})$

(1) Point-Slope form

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

$y - 6 = 4(x - (-2))$

$y - 6 = 4(x + 2)$

$y - 6 = 4x + 8$

$+6 \quad +6$

$$\boxed{y = 4x + 14}$$

or

(2) Slope-Intercept

$y = mx + b$

$6 = 4(-2) + b$

$6 = -8 + b$

$+8 \quad +8$

$14 = b$

$m = 4$

$y = mx + b$

$$\boxed{y = 4x + 14}$$

Find the equation for a line that goes through $(4,-2)$ and $(6,-8)$

1.) Find slope

2.) Use slope and a point to place into $y=mx+b$

1.) Find slope

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

$m=-3$

$(x,y)=(4,-2)$

2.) Use slope and a point to place into $y=mx+b$

$y=mx+b$

$-2=(-3)(4)+b$

$-2=-12+b$

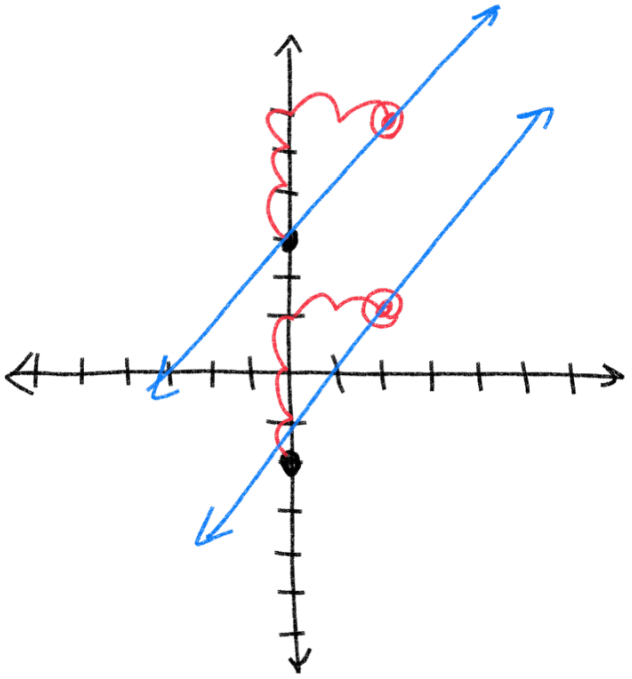
$+12 \quad +12$

$10=b$

$y=mx+b$

$\boxed{y=-3x+10}$

Parallel Lines → Never touch / Have the same slope



$m = \frac{3}{2}$ $\quad y\text{-int} = 3$

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

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

Perpendicular Lines → Intersect at Right Angle (90°)

Opposite inverse slope

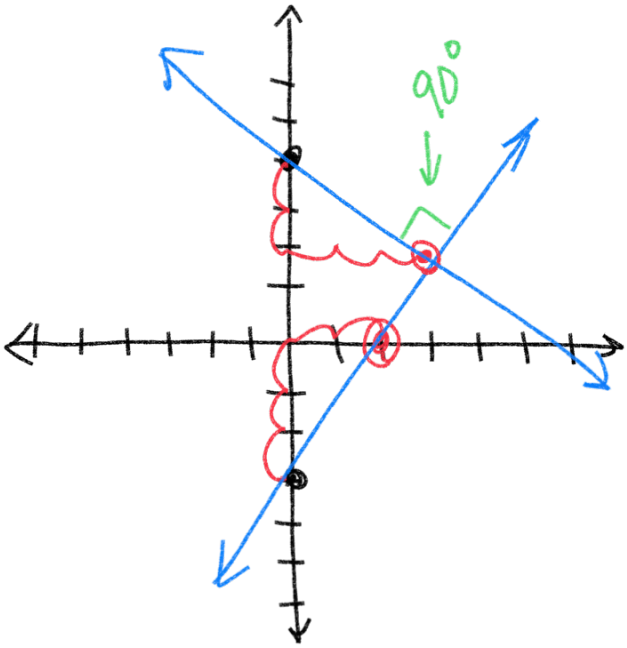
y-int

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

opposite inverse

Given slope $\frac{3}{2} \rightarrow \frac{-3}{2} \rightarrow \frac{-2}{3}$

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



Find the equation for a line parallel to

$y = \frac{4}{3}x - 2$ that contains the point $(6, 3)$

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

Given slope $= \frac{4}{3}$

Needed slope $= \frac{4}{3}$

$m = \frac{4}{3}$ $(6, 3)$ $x = 6$ $y = 3$

$y = mx + b$

$3 = \left(\frac{4}{3}\right)(6) + b$

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

$3 = 8 + b$

$-8 \quad -8$

$-5 = b$

$y = mx + b$

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

Find the equation for a line perpendicular to

$6x - 3y = 18$ that goes through $(8, 2)$

Given slope: 2

Need slope: $-\frac{1}{2}$

$6x - 3y = 18$

$-6x \quad -6x$

$\frac{-3y}{-3} = \frac{-6x}{-3} + \frac{18}{-3}$

$y = 2x - 6$

slope opposite inverse

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

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

$(8, 2)$

$y = mx + b$

$2 = \left(-\frac{1}{2}\right)(8) + b$

$2 = -4 + b$

$+4 \quad +4$

$b = 6$

$y = mx + b$

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