S-A2 Algebra 2 Session 8 7/2

Name, variable

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

input → -1

output → 9

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

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

$3 - 6 + 12 = 9$

(-1, 9)

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

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

$48 + 24 + 12 = 84$

input → 4

output → 84

(4, 84)

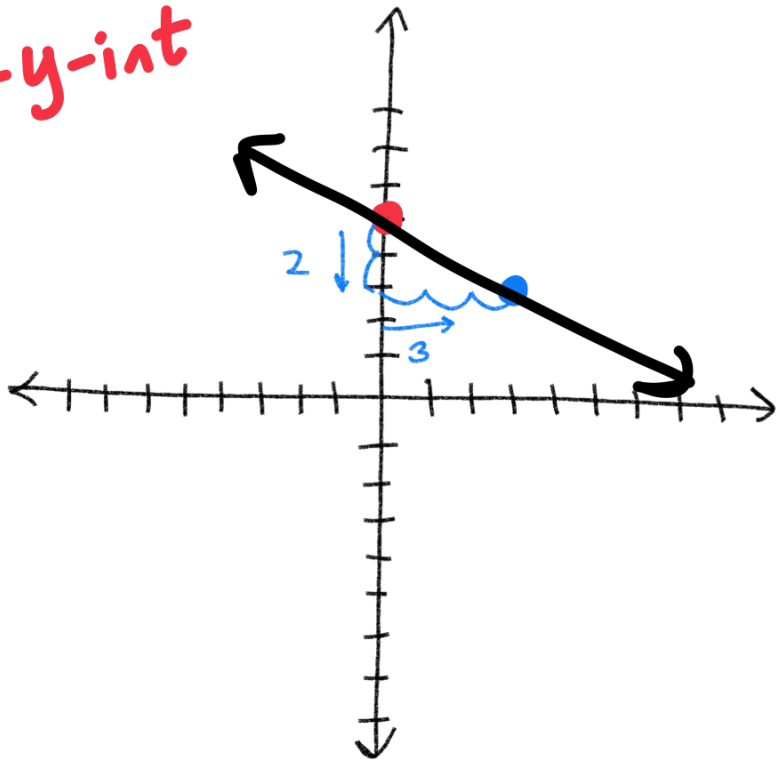
1.) $y = -\frac{2}{3}x + 5$ — y-int

$y = mx + b$

1.) Plot y-int

2.) Use slope

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



2.) $2x - 5y = 10$

Standard form

$Ax + By = C$

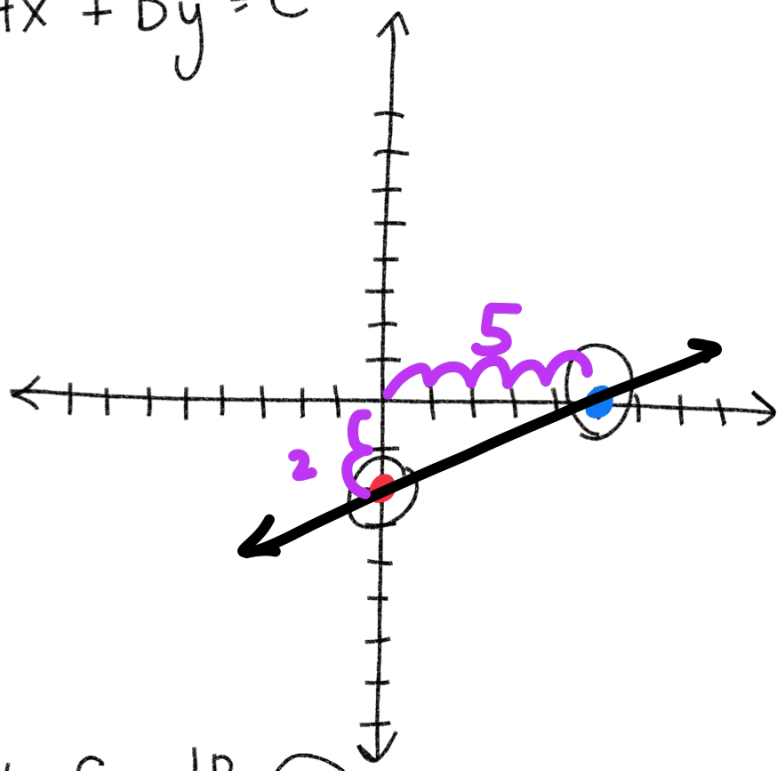
$\frac{2x}{} - \frac{5y}{-5} = \frac{10}{-5}$

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

$(0, -2)$

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

$y = 0$ $\quad x = 5$ $\quad (5, 0)$



$A = 2 \quad B = -5 \quad C = 10$

OPTIONAL

x-int: $\frac{C}{A} = \frac{10}{2} = 5$ $\quad$ y-int: $\frac{C}{B} = \frac{10}{-5} = -2$

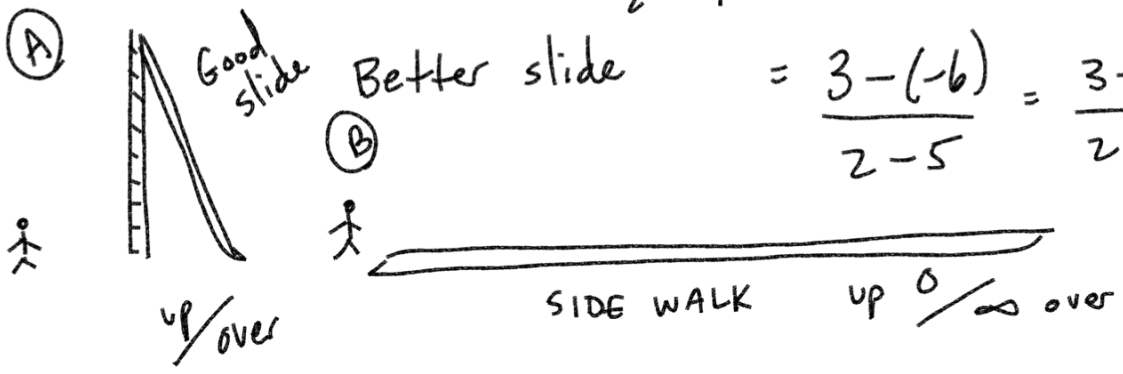
slope: $-\left(\frac{A}{B}\right) = -\frac{2}{-5} = \frac{2}{5}$

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

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

(A) Good slide

(B) Better slide $= \frac{3 - (-6)}{2 - 5} = \frac{3 + 6}{2 - 5} = \frac{9}{-3} = -3$



Put into slope-intercept form

$y = mx + b$

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

$y = mx + b$

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

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

$y = mx + b$

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

Find the equation $m = 4$ Includes: $(-2, 6)$ (x, y)

slope = 4

Point-Slope Form

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

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

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

$y - 6 = 4x + 8$

$+6 \quad +6$

$y = 4x + 14$

Slope-Intercept Form

$y = mx + b$

$6 = (4)(-2) + b$

$6 = -8 + b$

$+8 \quad +8$

$14 = b$

$y = 4x + 14$

Find the equation for a line that goes through

$(4,-2)$ and $(6,-8)$

1.) Find the slope

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

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

$(6,-8)$

$y = mx+b$

$-8 = (-3)(6)+b$

$-8 = -18+b$

$+18 \quad +18$

$10 = b$

$y = -3x+10$

$(4,-2)$

$y = mx+b$

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

$-2 = -12+b$

$+12 \quad +12$

$10 = b$

$y = -3x+10$

Find the equation for the line containing the points: $(2, -8)$ and $(6, 4)$

1.) Find slope

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-8)}{6 - 2} = \frac{4 + 8}{6 - 2} = \frac{12}{4} = \boxed{3}$$

2.) Plug into $y = mx + b$

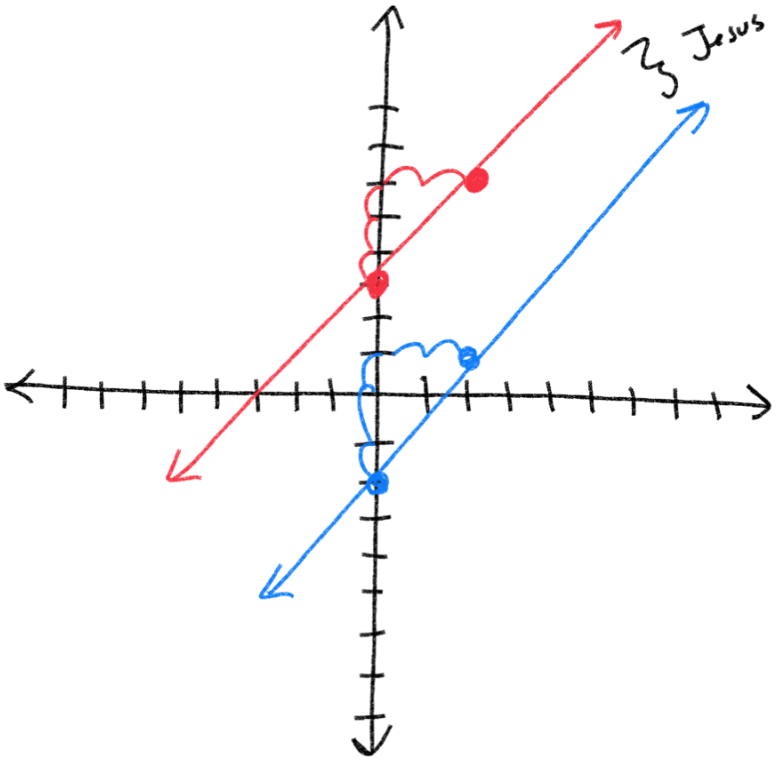
$(2, -8)$

$$y = mx + b$$
$$-8 = (3)(2) + b$$
$$-8 = 6 + b$$
$$-6 \quad -6$$
$$-14 = b$$

$$y = mx + b$$

$$\boxed{y = 3x - 14}$$

Parallel Lines → Have the same slope, but never touch



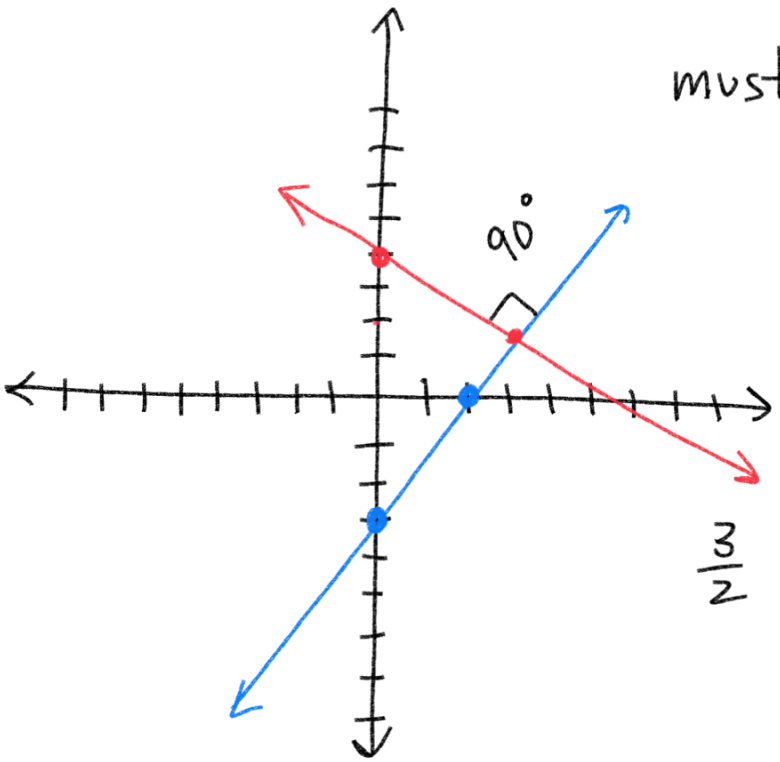
$m = \frac{3}{2}$ y-int = 3

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

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

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

Perpendicular Lines → Intersect at 90° or Right Angle must have opposite inverse slopes



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

Given slope : $\frac{3}{2}$

$\frac{3}{2}$ → opposite $-\frac{3}{2}$ → inverse $\frac{-2}{3}$

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

Find the equation for a line parallel to

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

parallel → same slope

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

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

$y = mx + b$

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

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

$3 = 8 + b$

$-8 \quad -8$

$-5 = b$

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

Find the equation for a line perpendicular to

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

Find given slope:

$6x - 3y = 18$

$-6x \quad -6x$

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

$y = 2x - 6$

given slope: 2

Needed slope

slope 2 → opposite inverse $\left(-\frac{2}{1}\right)$ → $-\frac{1}{2}$ → $m = -\frac{1}{2}$

$\left[m = -\frac{1}{2} \quad (8, 2)\right]$

$y = mx + b$

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

$2 = -4 + b$

$+4 \quad +4$

$6 = b$

$y = mx + b$

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