W-A1 Algebra 1 Week 29 4/24

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{\Delta y}{\Delta x}$$

Δ = change "delta"

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

(x_1, y_1) (x_2, y_2)

$(-2, -4)$ $(3, 6)$

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \left[\frac{y_2 - y_1}{x_2 - x_1}\right] = \frac{6 - (-4)}{3 - (-2)} = \frac{6+4}{3+2} = \frac{10}{5}$$

$\boxed{2}$

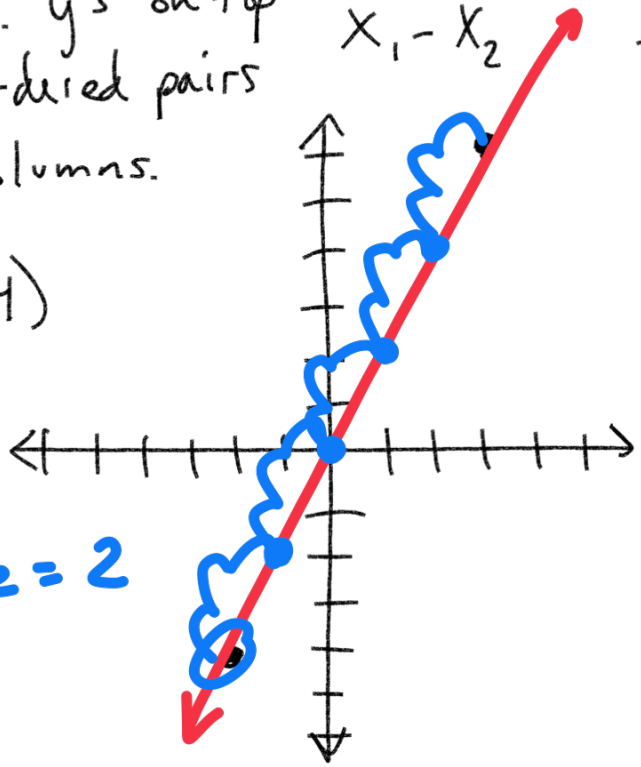
Order does not matter —

But ... y's on top and ordered pairs in columns.

$$\frac{y_1 - y_2}{x_1 - x_2} = \frac{-4 - 6}{-2 - 3} = \frac{-10}{-5} = \boxed{2}$$

$(-2, -4)$

$(3, 6)$



slope = 2

$$\frac{\text{rise}}{\text{run}} = \frac{2}{1} = \frac{\text{up } 2}{1 \text{ right}}$$

Find the slope: $\underbrace{(-1,-3)}_{(x,y)}$ and $\underbrace{(5,7)}_{(x,y)}$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7-(-3)}{5-(-1)} = \frac{7+3}{5+1} = \frac{10}{6} \div 2 = \boxed{\frac{5}{3}}$$

Find the slope: $(6,9)$ and $(-2,-7)$

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9-(-7)}{6-(-2)} = \frac{9+7}{6+2} = \frac{16}{8} = \boxed{2}$$

Linear Equations

Slope - Intercept form

$$y = mx + b$$

m: slope; b: y-intercept

slope = $\frac{2}{3}$ $\quad m = \frac{2}{3}$

y-int = 4 $\quad b = 4$

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

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

y-int = -11

$$y = mx + b$$

$$\boxed{y = -\frac{4}{3}x - 11}$$

$(-4, 2)$ and $(0, 8)$

Find the equation with these two points.

$y = mx + b$

1.) Find the slope

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 2}{0 - (-4)} = \frac{6 \div 2}{4 \div 2} = \boxed{\frac{3}{2} = m}$$

2.) Use $y = mx + b$ to find y-intercept $\quad m = \frac{3}{2}$

$y = \frac{3}{2}x + b$ $\qquad$ solve for b.

Choose pt: $(0, 8)$

$\boxed{x = 0}$ $\quad$ $\boxed{y = 8}$

$8 = \frac{3}{2}(0) + b$

$8 = 0 + b$

$\boxed{8 = b}$

Plug into $y = mx + b$

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

Find the linear equation with the points:

$(1, 7)$ and $(-2, 1)$

1.) Find the slope

$$\text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1-7}{-2-1} = \frac{-6}{-3} = \boxed{2 = m}$$

2.) Find y-intercept by choosing point

$y = mx + b$

$(1, 7)$

$y = mx + b$

$7 = (2)(1) + b$

$7 = 2 + b$

$-2 \quad -2$

$\boxed{5 = b}$

$(-2, 1)$

$y = mx + b$

$1 = (2)(-2) + b$

$1 = -4 + b$

$+4 \quad +4$

$\boxed{5 = b}$

3.) $y = mx + b$

$\boxed{m = 2}$ $\boxed{b = 5}$

$$\boxed{y = 2x + 5}$$

Slope-Intercept $y = mx + b$

or... use point-slope form.

$$(m) = \left(\frac{y_2 - y_1}{x_2 - x_1}\right)$$ $x_2 - x_1$

$$y_2 - y_1 = m(x_2 - x_1)$$

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

Point-slope form

From previous problem...

(1, 7) and (-2, 1)

slope = 2

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

$$y - 7 = 2(x - 1)$$

$$y - 7 = 2x - 2$$

$+7 \quad +7$

$$\boxed{y = 2x + 5}$$

Find the equation for a line with points

(2,6) (4,-8)

1.) Find slope (m)

2.) Use $y = mx + b$ to find b

or

1.) Find slope

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-8-6}{4-2} = \frac{-14}{2} = -7 = m$$

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

slope-intecept form

$y = mx + b$

(4,-8)

$-8 = (-7)(4) + b$

$-8 = -28 + b$

$+28 \quad +28$

$20 = b$

$m = -7$

$y = mx + b$

$y = -7x + 20$

point-slope form

x y

(2,6)

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

$y - 6 = -7(x - 2)$

$y - 6 = -7x + 14$

$+6 \quad +6$

$y = -7x + 20$