Objective: To write equations in point-slope form and convert to slope-intercept form.

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

- y_1: y-coordinate of point
- m: slope: $\frac{\text{rise}}{\text{run}}$
- x_1: x-coordinate of point

point: (x_1, y_1) m = slope

I.) Write an equation in point-slope form given a point and a slope.

example: $(-2, 1)$ $m = \frac{9}{2}$

$y - 1 = \frac{9}{2}(x - (-2))$

so

$$\boxed{y - 1 = \frac{9}{2}(x + 2)}$$

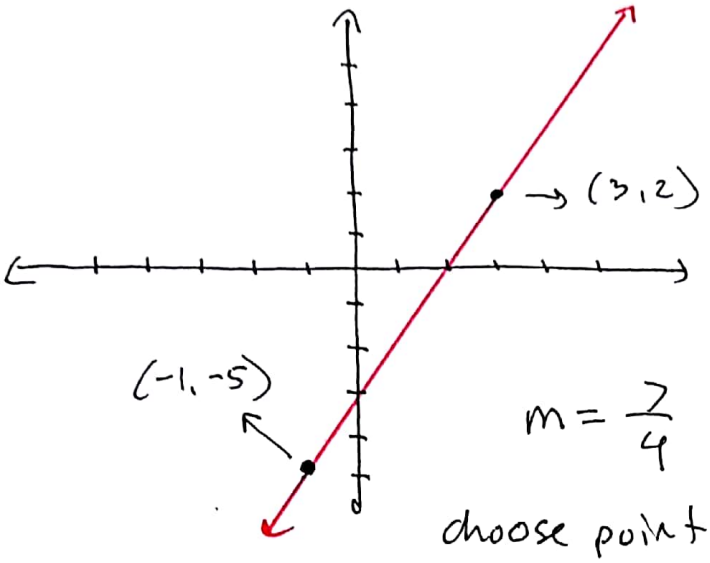
steps

1.) plug in x-coordinate where x_1 belongs $y - y_1 = m(x - x_1)$ and y-coordinate where y_1 belongs.

2.) plug in slope where slope belongs (m)

☆ Remember to use keep-change-change if a coordinate is negative.

II. Write an equation of a line in point-slope form given a graph



choose point: (3, 2)

$$\boxed{y - 2 = \frac{7}{4}(x - 3)}$$

steps:

1.) Find slope from 1 point to the 2nd point using $\frac{\text{rise}}{\text{run}}$. and plug that number in for m.

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

2.) choose a point that is on the line and plug in for x_1 and y_1

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

III. Write an equation in point-slope form given two points

$(5, 0)$, $(2, -3)$

x_1 y_1 x_2 y_2

$$m = \frac{-3 - 0}{2 - 5} = \frac{-3}{-3} = 1$$

$m = 1$

choose point: (5, 0)

$y - 0 = 1(x - 5)$

so

$$\boxed{y = 1x - 5}$$

steps:

1.) Find the slope using

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

2.) choose 1 of the given points to plug in for x_1 and y_1

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

IV: convert from point-slope form to slope-intercept form

$y - y_1 = m(x - x_1)$ ⟶ $y = mx + b$

point-slope form → slope-intercept form

a.) easy example: when slope is not a fraction

$y - 2 = 4(x + 3)$

$y - 2 = 4x + 12$

$+2 \qquad +2$

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

steps:

1.) distribute slope.

2.) Add/subtract to isolate y.

b.) harder example: when slope is a fraction.

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

$3y + 3 = 2x - 8$

$-3 \qquad -3$

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

$\boxed{y = \frac{2}{3}x - \frac{11}{3}}$

steps:

1.) Multiply the denominator of the slope to both sides of the equation (distribute)

2.) distribute the numerator of the slope

3.) Add/subtract to isolate y.

4.) Multiply/divide to isolate y.

* keep as fractions if need be.