Point-Slope Form Notes:

So far we have learned TWO different forms of linear functions:

$y = \underline{m}x + \underline{b}$ is ___Slope___ - ___Intercept___ form.

$Ax + By = C$ is ___Standard___ form.

Now we are going to learn the third **POINT-SLOPE FORM:**

$$y - y_1 = \underset{slope}{\underline{m}}(x - x_1)$$

What does x_1 and y_1 stand for in the slope formula?

(x_1, y_1) is a coordinate

Example 1: Write an equation in point-slope form given the following slope and point:

(x_1, y_1)

$m = -7$ and $(4, 2)$

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

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

Example 2: Write an equation in point-slope form given the following slope and point:

(x_1, y_1)

Slope = 2 and $(-2, -3)$

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

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

$\boxed{y + 3 = 2(x + 2)}$

Example 3: Transform the equation from point-slope form into slope-intercept form: $y + 3 = 2(x + 2)$

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

$y + 3 = 2x + 4$
$\underline{\quad -3 \qquad\quad -3}$

$\boxed{y = 2x + 1}$

① Distribute

② Inverse operations

Example 4: Write the point-slope form of a linear equation given the two points: (x_1, y_1) (x_2, y_2) (-3, 4) and (-1, 2)

$M = -1$

① Find Slope:
$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2-4}{-1-(-3)} = \frac{-2}{2} = -1$$

② Use the slope & a point!
$$y - y_1 = m(x - x_1)$$
$$y - 4 = -1(x - (-3))$$
$$y - 4 = -1(x + 3)$$

③ Transform

Example 5: Transform the last example into slope-intercept form:

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

Example 6: Graph the following line using the equation:

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

$$y - 2 = 3x + 3$$
$$+2 +2$$
$$y = 3x + 5$$

$$m = 3 \text{ or } \frac{3}{1}$$

$$b = 5$$

$m = 3$

$(-1, 2)$