AA – Section 5.4 Notes – Converting from *Point Slope Form* to *Slope Intercept Form*

$$y - y_1 = m(x - x_1) \implies y = mx + b$$

As with any conversions, take one step at a time. Write a new line each step to see where you are at and how to proceed. Keep your work clean to avoid errors.

Our goal in this case is to get the y by itself.

Examples – Given a point and the slope

First, put the equation in point-slope form. Next, distribute to in order to get rid of the parentheses; then add or subtract as necessary to get the y by itself.

1. $\overset{x,\ y_1}{(3, -4)}$ $m = 6$

$y - -4 = 6(x - 3)$

$y + 4 = 6x - 18$
$ -4 -4$

$\boxed{y = 6x - 22}$

2. $\overset{x,\ y_1}{(0, 2)}$ $m = \dfrac{4}{5}$

$y - 2 = \dfrac{4}{5}(x - 0)$

$y - 2 = \dfrac{4}{5}x$
$ + 2 \phantom{= \dfrac{4}{5}x} + 2$

$\boxed{y = \dfrac{4}{5}x + 2}$

3. $\overset{x,\ y_1}{(4, 0)}$ $m = 1$

$y - 0 = 1(x - 4)$

$\boxed{y = x - 4}$

4. $\overset{x,\ y_1}{(-2, -7)}$ $m = -\dfrac{3}{2}$

$y - -7 = -\dfrac{3}{2}(x - -2)$

$y + 7 = -\dfrac{3}{2}(x + 2)$

$y + 7 = -\dfrac{3}{2}x - 3$
$ -7 \phantom{= -\dfrac{3}{2}x} - 7$

$\boxed{y = -\dfrac{3}{2}x - 10}$

5. $\overset{x,\ y_1}{(1, -8)}$ $m = -\dfrac{1}{5}$

$y - -8 = -\dfrac{1}{5}(x - 1)$

$y + 8 = -\dfrac{1}{5}x + \dfrac{1}{5}$
$ -8 \phantom{= -\dfrac{1}{5}x} -8 \ -\dfrac{40}{5}$

$\boxed{y = -\dfrac{1}{5}x - \dfrac{39}{5}}$

6. $\overset{x,\ y_1}{(-5, 2)}$ $m = 0$

$y - 2 = 0(x - -5)$

$y - 2 = 0$
$ + 2 + 2$

$\boxed{y = 2}$

Examples – Given two points

First find the slope, using the slope formula. Next, pick ONE point and put the equation in point-slope form. Then convert to slope intercept form as we did on the previous examples.

$x_1 \, y_1 \; x_2 \, y_2$

7. $(-1, 0) \, (1, 2)$

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

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

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

$x_1 \, y_1 \; x_2 \, y_2$

8. $(3, 5) \, (0, 0)$

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

$$y - 5 = \frac{5}{3}(x - 3)$$

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

$$+5 \qquad\qquad +5$$

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

$x_1 \, y_1 \, x_2 \, y_2$

9. $(-6, 6) \, (3, 3)$

$$m = \frac{3-6}{3--6} = \frac{-3}{9} = \frac{-1}{3}$$

$$y - 6 = \frac{-1}{3}(x - -6)$$

$$y - 6 = \frac{-1}{3}(x + 6)$$

$$y - 6 = \frac{-1}{3}x - 2$$

$$+6 \qquad\qquad +6$$

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

$x_1 \, y_1 \; x_2 \, y_2$

10. $(-8, 4) \, (-4, -2)$

$$m = \frac{-2-4}{-4--8} = \frac{-6}{4} = \frac{-3}{2}$$

$$y - 4 = \frac{-3}{2}(x - -8)$$

$$y - 4 = \frac{-3}{2}(x + 8)$$

$$y - 4 = \frac{-3}{2}x - 12$$

$$+4 \qquad\qquad +4$$

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