If you know the slope of a line (m) and one point that is on a line (x_1, y_1), then you can put that information into the point-slope form equation.

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

Example 1

Find the equation (in standard form) of a line has a slope of $\frac{3}{5}$ and goes through the point $(6, 4)$.

Step 1 – Fill in the blanks for m, x_1, and y_1.

It looks like $m = \frac{3}{5}$, $x_1 = 6$, and $y_1 = 4$, so we have…

$$y - 4 = \frac{3}{5}(x - 6)$$

Step 2 – Wipe out the fraction(s).

If we multiply everything by 5, then the fractions will be gone- we'll have only integers.

$$y - 4 = \frac{3}{5}(x - 6)$$
$$5[y - 4 = \frac{3}{5}(x - 6)]$$
$$5y - 20 = 3(x - 6)$$

Step 3 – Use the distributive property on the right side.

We have to distribute the 3.

$$5y - 20 = 3(x - 6)$$
$$5y - 20 = 3x - 18$$

Step 4 – Get the equation in standard form ($Ax + By = C$).

$$5y - 20 = 3x - 18$$
$$-20 = 3x - 5y - 18$$
$$-2 = 3x - 5y$$

$$\mathbf{3x - 5y = -2}$$

Example 2

Find the equation (in standard form) of a line has a slope of $-\frac{5}{4}$ and goes through the point $(-2, -9)$.

Step 1 – Fill in the blanks for m, x_1, and y_1.

It looks like $m = -\frac{5}{4}$, $x_1 = -2$, and $y_1 = -9$, so we have…

$$y - (-9) = -\frac{5}{4}(x - (-2))$$

$$y + 9 = -\frac{5}{4}(x + 2)$$

Step 2 – Wipe out the fraction(s).

If we multiply everything by 4, then the fractions will be gone- we'll have only integers.

$$y + 9 = -\frac{5}{4}(x + 2)$$

$$4[y + 9 = -\frac{5}{4}(x + 2)]$$

$$4y + 36 = -5(x + 2)$$

Step 3 – Use the distributive property on the right side.

We have to distribute the –5 .

$$4y + 36 = -5(x + 2)$$

$$4y + 36 = -5x - 10$$

Step 4 – Get the equation in standard form ($Ax + By = C$).

$$4y + 36 = -5x - 10$$

$$5x + 4y + 36 = -10$$

$$5x + 4y = -46$$

$$\mathbf{5x + 4y = -46}$$