## DEVELOPING THE EQUATION OF A LINE

In this section we are going to rely greatly on the slope-intercept form of a linear equation. For example, if a line has a slope of $m = \frac{3}{8}$, then that means that we can replace $m$ with $\frac{3}{8}$:

$$y = mx + b \quad \text{becomes} \quad y = \frac{3}{8}x + b$$

**Example 1:** For each given value of $m$, replace $m$ in the $y = mx + b$ equation.

a) $m = \frac{6}{5}$ b) $m = -\frac{1}{4}$ c) $m = -3$ d) $m = 1$

**Answer:**

a) $y = \frac{6}{5}x + b$ b) $y = -\frac{1}{4}x + b$ c) $y = -3x + b$ d) $y = 1x + b$

**You Try It 1** For each given value of $m$, replace $m$ in the $y = mx + b$ equation. Use Example 1 as a guide.

a) $m = 4$ b) $m = \frac{2}{7}$ c) $m = -1$ d) $m = -\frac{2}{5}$

Likewise, if a different line passes through the point (-2, 3), then the values $x = -2$ and $y = 3$ are, together, a single solution to the equation. This means that we can replace $x$ and $y$ with -2 and 3, respectively, and still have a true equation:

$$y = mx + b \quad \text{becomes} \quad 3 = m \cdot (-2) + b$$

**Example 2:** For the given ordered pair $(x, y)$, and the given value of $m$, replace $y$, $m$, and $x$ in the $y = mx + b$ equation. **Do not solve at this time**.

a) $(-10, 3)$; $m = \frac{6}{5}$ *b*) $(8, -2)$; $m = -\frac{1}{4}$ c) $(-5, -4)$; $m = -3$ d) $(2, 0)$; $m = 1$

**Procedure:** It might be helpful to place a little $(x, y)$ over each ordered pair to identify the $x$- and $y$-values with certainty.

**Answers:**

a) $3 = \frac{6}{5}(-10) + b$ b) $-2 = -\frac{1}{4}(8) + b$ c) $-4 = -3(-5) + b$ d) $0 = 1(2) + b$