Finding Equations of Line Using the
Point Slope form of a Line

Example 1   Find an equation of a line that passes through (1, 4) and has slope 5.

Using $y - y_1 = m(x - x_1)$, substitute values for x, y and slope

$y - 4 = 5(x - 1)$

That is an equation of a line passing through (1, 4) with slope 5.

If I solved that equation for y, we have $y - 4 = 5x - 5$

$y = 5x - 1$

Example 2 Find an equation of a line that passes through $(5, -2)$ and has slope 3.

Using $y - y_1 = m(x - x_1)$ and substituting values.

$$y - (-2) = 3(x - 5)$$

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

That is an equation of a line passing through $(5, -2)$ with slope 3.

Solving for y, $y + 2 = 3(x - 5)$

$$y + 2 = 3x - 15$$

$$y = 3x - 17$$