

Finding Equations of Lines

Use Point Slope

Need to know 2 things, the slope and a point

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

Parallel lines have the *same* slope

Perpendicular lines have *negative reciprocal* slopes

Example Find an equation of a line that passes through (2, -5) and has slope 4.

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

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

$$y + 5 = 4x - 8$$

$$y = 4x - 13$$

Example Find an equation of a line that passes through (3, 6) and (5, 16).

$$\text{Finding the slope, } m = \frac{\Delta y}{\Delta x} = \frac{16-6}{5-3} = \frac{10}{2} = 5$$

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

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

$$y - 6 = 5x - 15$$

$$y = 5x - 9$$

Example Find an equation of a line that passes through (4, 5) and is perpendicular to $y = \frac{2}{3}x + 1$

Slope of perpendicular line is $-\frac{3}{2}$

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

$$y - 5 = -\frac{3}{2} (x - 4)$$

$$y - 5 = -\frac{3}{2}x + 6$$

$$y = -\frac{3}{2}x + 11$$