3.4 Writing an Equation Given Two Points

Procedure: 1. Find the slope

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

2. Substitute m, x_1, y_1 into the pt-slope formula

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

Clean up into $y = mx + b$ form

Examples: Write the slope-intercept form of the equation of a line containing the given points.

1. (3, 1) and (6, 3).

$m = \frac{y_2 - y_1}{x_2 - x_1}$

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

$m = \frac{2}{3}$

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

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

$y - 1 = \frac{2}{3}x + \frac{2}{3}(-3)$

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

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

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

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

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

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

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

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

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

2. (1, -2) and (4, 1)

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{1 - (-2)}{4 - 1}$

$m = \frac{3}{3}$

$m = 1$

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

$y - (-2) = 1(x - 1)$

$y + 2 = x - 1$

$y = x - 1 - 2$

$y = x - 3$

3. (2, 0) and (3, 2)

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{2-0}{3-2}$

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

$m = 2$

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

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

$y = 2x - 4$

4. (3, 4) and (5, -4)

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{-4-4}{5-3}$

$m = \frac{-8}{2}$

$m = -4$

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

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

$y - 4 = -4x + 12$

$y = -4x + 12 + 4$

$y = -4x + 16$

5. (-4, -2) and (-5, -5)

$m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{-5 - (-2)}{-5 - (-4)}$

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

$m = 3$

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

$y - (-2) = 3(x - (-4))$

$y + 2 = 3(x + 4)$

$y + 2 = 3x + 12$

$y = 3x + 12 - 2$

$y = 3x + 10$

HOMEWORK

Worksheet HW 3.4 - Writing the Equation Given 2 Points