

Equations of Lines Given Slope and Point

Date Lesson Notes

RECALL:

To create an equation in the form $y = mx + b$ you need two pieces of information:

- (1) slope (m) AND (2) y-intercept (b)

REVIEW: Finding Equation When Given Slope and Y-Intercept

Create the equation of the line in the form $y = mx + b$ when given the slope and y-intercept

a) $m = 3$ $b = -4$ Equation: $y = 3x - 4$

b) $m = \frac{1}{2}$ $b = 3$ Equation: $y = \frac{1}{2}x + 3$

c) $m = -4$ $b = 1$ Equation: $y = -4x + 1$

Finding Equation When Given Slope and Point

You can also determine the equation of a line when given SLOPE and a POINT on the line.

STEPS:

1. Substitute all values into the equation $y = mx + b$.
2. Solve for b.
3. Then, rewrite the equation in $y = mx + b$ by substituting in m and b.

EXAMPLES:

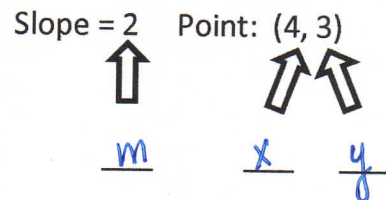
1. A line with a slope ^m 2 passes through the point ^{x y} (4, 3). Determine the equation of the line.

Step 1: $y = mx + b$
 $3 = 2(4) + b$

Step 2: $3 = 8 + b$

$3 - 8 = b$
 $-5 = b$ $m = 2$

Step 3: $y = mx + b$
 $y = 2x - 5$



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2. A line with a slope of 4, passes through point (1, 9). Determine the equation of the line.

$$y = mx + b$$

$$9 = 4(1) + b$$

$$9 = 4 + b$$

$$9 - 4 = b$$

$$5 = b \quad m = 4$$

$$y = mx + b$$

$$y = 4x + 5$$

$$m = 4$$

$$x = 1$$

$$y = 9$$

YOU TRY!

3. A line with a slope of -5, passes through point (3, 2). Determine the equation of the line.

$$y = mx + b$$

$$2 = (-5)(3) + b$$

$$2 = -15 + b$$

$$17 = b$$

$$y = mx + b$$

$$y = -5x + 17$$

$$m = -5$$

$$x = 3$$

$$y = 2$$

4. Determine the equation of the line: $m = \frac{1}{3}$ and point (6, -2).

$$y = mx + b$$

$$-2 = \left(\frac{1}{3}\right)(6) + b$$

$$-2 = \frac{6}{3} + b$$

$$-2 = 2 + b$$

$$4 = b$$

$$y = \frac{1}{3}x + 4$$