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 2 (m) passes through the point (4, 3) (x, y). Determine the equation of the line.

Step 1: $y = mx + b$

$3 = 2(4) + b$

Step 2:

$3 = 8 + b$

$3 - 8 = b$

$\boxed{-5 = b}$ $m = 2$

Step 3: $y = mx + b$

$\boxed{y = 2x - 5}$

Slope = 2 Point: (4, 3)

m x y

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

$y = mx + b$

$9 = 4(1) + b$

$9 = 4 + b$

$9 - 4 = b$

$5 = b \quad m = 4$

$y = mx + b$

$\boxed{y = 4x + 5}$

$m = 4$
$x = 1$
$y = 9$

YOU TRY!

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

$y = mx + b$

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

$2 = -15 + b$

$17 = b$

$y = mx + b$

$\boxed{y = -5x + 17}$

$m = -5$
$x = 3$
$y = 2$

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

$y = mx + b$

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

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

$-2 = 2 + b$

$4 = b$

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