

Point-Slope Form Guided Notes

Point-Slope Form

The point-slope form of a non-vertical linear equation is given by:

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

Where:

m = Slope of the line

(x_1, y_1) = point on the line

Problem 1: A line passes through $(1, -1)$ and has a slope 3. What is an equation for this line in point-slope form?

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

Here $m = 3$ and $(x_1, y_1) = (1, -1)$

$$y - (-1) = 3(x - 1)$$



$$y + 1 = 3(x - 1)$$

Problem 2: A line passes through two points $(1, 4)$ and $(2, 9)$. Write an equation of this line in slope-intercept form.

First find the slope m :

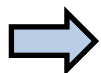
$$\text{Slope } m = \frac{9 - 4}{2 - 1} = 5$$

Now put $(1, 4)$ in $y - y_1 = m(x - x_1)$:

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

Now simplify it to re-write as $y = mx + b$:

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



$$y = 5x - 1$$

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Graphing an Equation Using Point-Slope Form

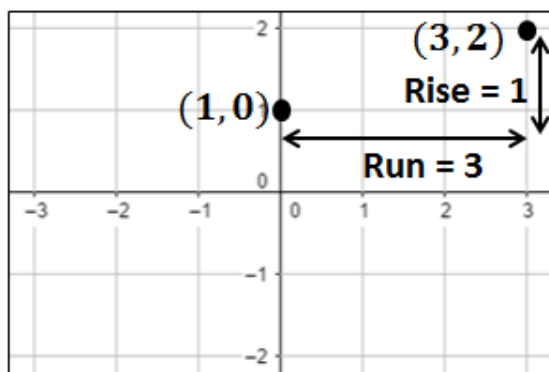
If we are given the point-slope form of a line, we can graph it by following these steps:

- Using the point-slope form, identify the point and plot it on the graph.
- Using the slope given, locate another point in either direction.
- Connect these points to plot the graph of the required line.

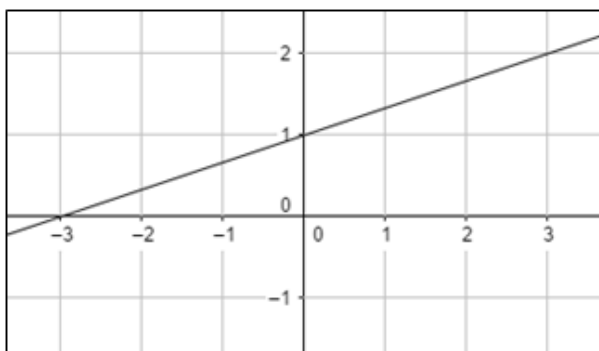
Problem 3: Graph the equation $y = \frac{1}{3}(x + 1)$.

Compare with $y - y_1 = m(x - x_1)$, we get the point:

$$(x_1, y_1) = (1, 0)$$



Using the Slope, second point is $(3, 2)$:



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