

7.3a Slope-Point Form

We have explored slope-intercept form and general form for writing linear relations. Each form is best suited to certain situations. This section introduces a third form.

Point - Slope Form

If (x_1, y_1) is a given point on a straight line graph and (x, y) represents all the other points on the line then the slope, $m = \frac{y_2 - y_1}{x_2 - x_1}$. Simplify this equation to get the point-slope form of the equation:

$y_2 - y_1 = m(x_2 - x_1)$; where x and y are the variables that represent real numbers and m is the slope of the line and (x_1, y_1) is a point on the line.

Note: This form is a tool to find the equation of a line when given the slope of a line and one point on the line.

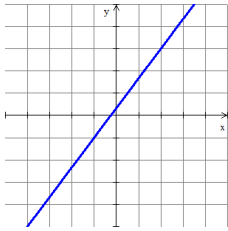
Example 1: Use slope-point form to write the equation of the line with slope 3, passing through $(2, -4)$. Write the equation in...

a) General form

b) Slope-Intercept form

Example 2: Use slope-point form to write an equation of the line through $(-3, 4)$ with slope $-\frac{2}{3}$. Then express the equation in general form.

Example 3: Find the equation of the line using point-slope form. Express in slope intercept form.



Note: When given two points on a line, first use them to find slope then use the slope and one of the two points to find the equation of the line.

Example 4: Use slope-point form to write an equation of the line through $(-5,2)$ and $(-2, 1)$. Then write the equation in general form $(Ax + By + C = 0)$

Example 5: Given $y - 2 = -(x + 7)$, determine the slope and one point.

Example 6: Given $y + 5 = .25(x - 1)$, determine the slope and one point.

In summary, **Point-slope form** is used to find an equation of a line given one point on the line and the slope of the line. The equation can then be converted into slope-intercept form or general form.