Name_____ Class_____ Date_____

5-4 Reteaching

Point-Slope Form

The **point-slope form** of a nonvertical linear equation is $y - y_1 = m(x - x_1)$. In this equation, m is the slope and (x_1, y_1) is a point on the graph of the equation.

Problem

A line passes through (5, –2) and has a slope –3. What is an equation for this line in point-slope form?

$y - y_1 = m(x - x_1)$	Use point-slope form.
$y - (-2) = -3(x - 5)$	Substitute (5, – 2) for (x_1, y_1) and – 3 for m.
$y + 2 = -3(x - 5)$	Simplify.

Problem

A line passes through (1, 4) and (2, 9). What is an equation for this line in point-slope form? What is an equation for this line in slope-intercept form? First use the two given points to find the slope.

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

Use the slope and one point to write an equation in point-slope form.

$y - y_1 = m(x - x_1)$	Use point-slope form
$y - 4 = 5(x - 1)$	Substitute (1, 4) for (x_1, y_1) and 5 for m.
$y - 4 = 5x - 5$	Distributive Property
$y = 5x - 1$	Add 4 to each side.

An equation in point-slope form is $y - 4 = 5(x - 1)$. An equation in slope-intercept form is $y = 5x - 1$.

Exercises

Write an equation for the line through the given point and with the given slope m.

1. (–1, 3); $m = -\frac{1}{4}$ **2.** (7, –5); $m = 4$ **3.** (–2, –5); $m = \frac{2}{3}$

Write an equation in point-slope form of the line through the given points. Then write the equation in slope-intercept form.

4. (1, 4) and (2, 7) **5.** (2, 0) and (3, –2) **6.** (4, –5) and (–2, –2)

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5-4 Reteaching (continued)

Point-Slope Form

You can use the point-slope form of an equation to help graph the equation. The point given by the point-slope form provides a place to start on the graph. Plot a point there. Then use the slope from the point-slope form to locate another point in either direction. Then draw a line through the points you have plotted.

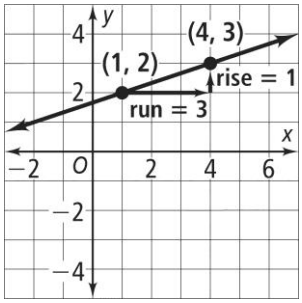
Problem

What is the graph of the equation $y - 2 = \frac{1}{3}(x - 1)$?

The equation is in point-slope form, so the line passes through (1, 2) and has a slope of $\frac{1}{3}$.

Plot the point (1, 2).

Use the slope, $\frac{1}{3}$. From (1, 2), go up 1 unit and then right 3 units. Draw a point.



Draw a line through the two points.

Because $\frac{1}{3} = \frac{-1}{-3}$, you can start at (1, 2) and go down 1 unit and to the left 3 units to locate a third point on the line.

Exercises

Graph each equation.

7. $y - 3 = 2(x + 1)$

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

9. $y - 4 = -\frac{1}{2}(x + 1)$