Name _____ Class _____ Date _____

Reteaching 5-4

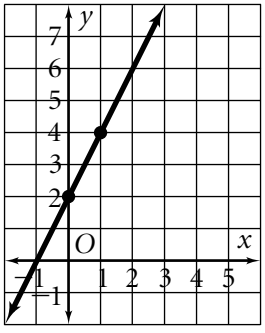
Point-Slope Form and Writing Linear Equations

OBJECTIVE: Writing an equation given the graph of a line or two points on a line

MATERIALS: Graph paper

Example

Write an equation for the line shown in point-slope form.



a. Select any two points on the line. It is a good idea to select points whose coordinates are integers.
$(0, 2)$ and $(1, 4)$ lie on the line.

b. Use slope $= \frac{\text{rise}}{\text{run}}$ to find the slope.
From $(0, 2)$, move up 2 units (rise = +2) and right 1 unit (run = +1) to get to $(1, 4)$. So, $\frac{\text{rise}}{\text{run}} = \frac{+2}{+1} = 2$.
or
Use $m = \frac{y_2 - y_1}{x_2 - x_1}$ to find the slope.
If $(x_1, y_1) = (0, 2)$ and $(x_2, y_2) = (1, 4)$, then $m = \frac{4 - 2}{1 - 0} = \frac{2}{1} = 2$.

c. Use the point-slope form to write the equation.

Substitute $m = 2$ and $(x_1, y_1) = (0, 2)$.
$y - y_1 = m(x - x_1)$
$y - 2 = 2(x - 0)$
$y - 2 = 2x$

or

Substitute $m = 2$ and $(x_1, y_1) = (1, 4)$.
$y - y_1 = m(x - x_1)$
$y - 4 = 2(x - 1)$

Note: If you rewrite $y - 2 = 2x$ and $y - 4 = 2(x - 1)$ in slope-intercept form, you get $y = 2x + 2$. Although the two equations look different, they do represent the same line.

Exercises

Graph the line through the given points. Then follow steps a–c from the Example to write the equation of the line passing through the given points in point-slope form.

1. $(6, 4), (4, 3)$ **2.** $(0, -18), (5, 2)$ **3.** $(-2, -2), (-4, 2)$ **4.** $(-4, 5), (2, 5)$

Write an equation for the line through the given points in point-slope form.

5. $(2, -5), (0, -7)$ **6.** $(4, 3), (3, -2)$ **7.** $(2, -1), (-1, 8)$

8. $(-3, 4), (3, 8)$ **9.** $(4, -1), (-8, 2)$ **10.** $(5, -2), (-4, -2)$

11. $(-2, -6), (8, 4)$ **12.** $(-4, 1), (-2, 2)$ **13.** $(6, -6), (-3, -12)$

14. $(0, 0), (8, 7)$ **15.** $(0, -2), (8, -6)$ **16.** $(2, 7), (-6, -5)$

17. $(-1, -10), (5, 2)$ **18.** $(0, 7), (-5, 12)$ **19.** $(0, 1), (4, -7)$

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