

3-4 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 $y = 5x - 1$.

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Point-Slope Form $(y - y_1) = m(x - x_1)$

Note: A useful form of Linear Equations is Point-Slope form. This is used when we know (or can derive) a slope and also have a point. From this form, we rewrite the equation in $y = mx + b$

Point-slope Form: Given a point (x_1, y_1) and a slope (m) , the equation is: $y - y_1 = m(x - x_1)$

1. Given $m = -3$ and $(-3, -2)$ we substitute these values into our equation:
2. $y - (-2) = -3(x - (-3))$; $y + 2 = -3(x + 3)$; This is proper point-slope form.
3. Rewrite in slope-intercept form ($y = mx + b$): $y = -3(x + 3) - 2$; $y = -3x - 11$
4. Rewrite in standard form ($Ax + By = C$): $3x + y = -11$

Generate an equation in point-slope form given the following information:

1) $m = 3$, containing $(2, 3)$

2) $m = 3$, containing $(-4, 7)$

5) $m = \frac{2}{3}$, containing $(3, 2)$

6) $m = -\frac{3}{2}$, containing $(2, -3)$

9.) $(2, -2)$ and $(-6, 1)$

10.) $(3, 4)$ and $(-7, 4)$

Find the equation of the line with the given slope that passes through the given point. Write the equation of the line in point-slope form.

1. $m = 2$ and $(-1, -3)$

2. $m = -7$ and $(1, -1)$

5. $m = 3$ and $(0, 10)$

6. $m = -9$ and $(8, 9)$

Find the equation of the line that passes through the given points. Write the equation in point-slope form.

9. $(-1, 3)$ and $(-2, 5)$

10. $(-7, 7)$ and $(5, -6)$

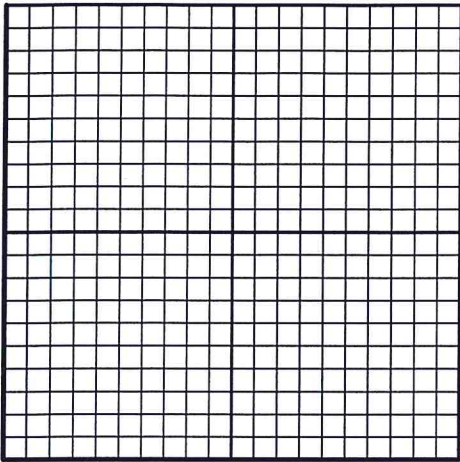
13. $(-6, 10)$ and $(2, -5)$

14. $(-8, 7)$ and $(-3, -5)$

Graph each of the following lines by first giving the point and the slope.

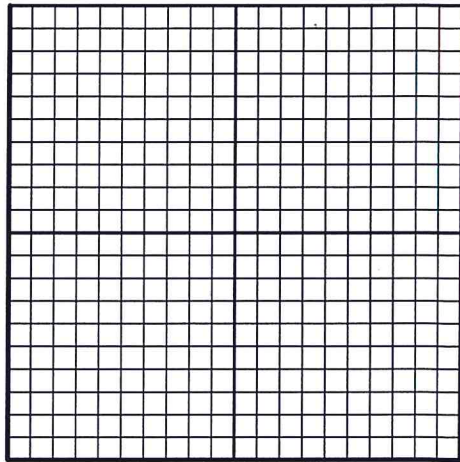
13. $y + 2 = \frac{1}{3}(x + 1)$

Point _____ Slope _____



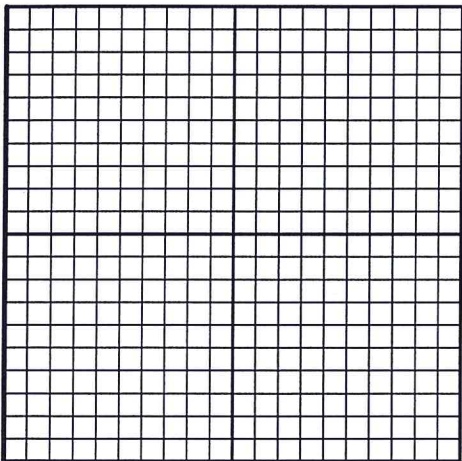
14. $y + 1 = -\frac{1}{2}(x - 3)$

Point _____ Slope _____



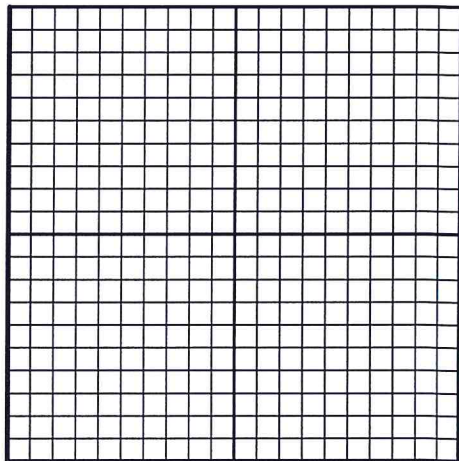
15. $y - 3 = -2(x - 4)$

Point _____ Slope _____



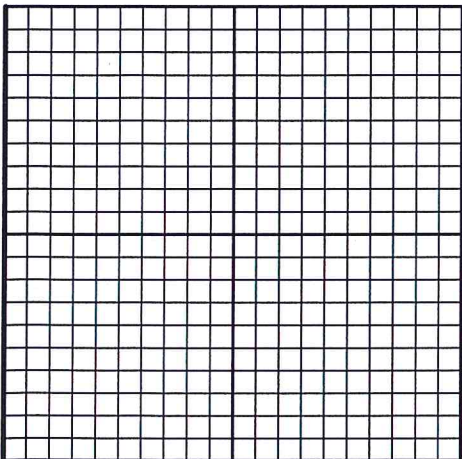
16. $y - 5 = 3x$

Point _____ Slope _____



17. $y + 3 = 0(x - 3)$

Point _____ Slope _____



18. $y - 1 = -\frac{5}{2}(x + 2)$

Point _____ Slope _____

