

Point -Slope Form Classwork

The **point-slope form** of an equation of a line with slope m passing through (x_1, y_1) is $y - y_1 = m(x - x_1)$.

Point on the line

$$(x_1, y_1)$$

Point-slope form

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

Slope \nearrow

I Using Point-Slope Form to Identify Information About a Line

Use the point-slope form of each equation to identify a point the line passes through and the slope of the line.

A $y - 9 = -\frac{2}{3}(x - 21)$

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

$$y - 9 = -\frac{2}{3}(x - 21)$$

The equation is in point-slope form.

$$m = -\frac{2}{3}$$

Read the value of m from the equation.

$$(x_1, y_1) = (21, 9)$$

Read the point from the equation.

The line defined by $y - 9 = -\frac{2}{3}(x - 21)$ has slope $-\frac{2}{3}$, and passes through the point $(21, 9)$.

B $y - 2 = 3(x + 8)$

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

$$y - 2 = 3(x + 8)$$

$$y - 2 = 3[x - (-8)]$$

Rewrite using subtraction instead of addition.

$$m = 3$$

$$(x_1, y_1) = (-8, 2)$$

The line defined by $y - 2 = 3(x + 8)$ has slope 3, and passes through the point $(-8, 2)$.

Use the point-slope form of each equation to identify a point the line passes through and the slope of the line.

1) $y - 2 = -3(x + 6)$

slope:

point:

2) $y - 8 = 7(x - 14)$

slope:

point:

3) $y + 3.7 = 3.2(x - 1.7)$

slope:

point:

4) $y + 1 = 11(x - 1)$

slope:

point:

5) $y + 6 = -4(x - 8)$

slope:

point:

6) $y - 7 = 4(x + 3)$

slope:

point:

II. Writing the Point-Slope Form of an Equation

Write the point-slope form of the equation with the given slope that passes through the indicated point.

A the line with slope -2 passing through $(4, 1)$

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

$$y - 1 = -2(x - 4) \quad \text{Substitute 4 for } x, 1 \text{ for } y, \text{ and } -2 \text{ for } m.$$

The equation of the line with slope -2 that passes through $(4, 1)$ in point-slope form is $y - 1 = -2(x - 4)$.

B the line with slope 5 passing through $(-2, 4)$

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

$$y - 4 = 5[x - (-2)] \quad \text{Substitute } -2 \text{ for } x, 4 \text{ for } y, \text{ and } 5 \text{ for } m.$$

$$y - 4 = 5(x + 2)$$

The equation of the line with slope 5 that passes through $(-2, 4)$ in point-slope form is $y - 4 = 5(x + 2)$.

Write the point-slope form of the equation with the given slope that passes through the indicated point.

| | |
|--|---|
| 7) A line with slope 5 passing through (-2, 6) | 8) A line with the slope -8 passing through (7,5) |
|--|---|

Write the point-slope form of the equation with the given slope that passes through the indicated point. Then take your equation and turn it into slope - intercept form.

| | |
|---|---|
| 9) A line with slope 7 passing through (3, 4) | 10) A line with the slope $\frac{1}{2}$ passing through (-6,-8) |
|---|---|

Given the following points, write the point-slope form of the equation Then, take your equation and turn it into slope - intercept form and identify the state the coordinates of the y - intercept.

| | |
|-----------------------|---------------------|
| 11) (-2, 7) and (0,3) | 12) (2,3) and (1,4) |
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Write the point-slope form of the equation with the given conditions.

13) A line containing the point (2, -1) and parallel to the line $3y = 2x - 9$

14) A line containing the point (3,5) and perpendicular to the line $4y = 9x - 18$

15) What is the equation of a line that passes through the points (2,7) and (-1,3)?

a) $y - 2 = \frac{3}{4}(x - 7)$

b) $y - 2 = \frac{4}{3}(x - 7)$

c) $y - 7 = \frac{3}{4}(x - 2)$

d) $y - 7 = \frac{4}{3}(x - 2)$

16) What is the equation of a line that passes through the point (4, -6) and has a slope of -3?

a) $y = -3x + 6$

b) $y = -3x - 6$

c) $y = -3x + 10$

d) $y = -3x + 14$

17) Which equation represents a line that has a slope of $\frac{3}{4}$ and passes through the point (2, 1)?

a) $3y = 4x - 5$

b) $3y = 4x + 2$

c) $4y = 3x - 2$

d) $4y = 3x + 5$