

# Point-Slope Form

## Algebra 1 • Section 5.3

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 12

### Quick Review and Helpful Hints

Linear relationships have a constant rate of change. Use slope, intercepts, points, and context to move between equations, tables, graphs, and real-world meanings.

▷ **Example:** Write the line with slope 2 through (3, 11).

**Work:** Use  $y = 2x + b$ . Substitute the point:  $11 = 2(3) + b$ , so  $b = 5$ .

★ **Answer:**  $y = 2x + 5$

### ◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

- Write point-slope form for slope 3 through (2, 5). \_\_\_\_\_
- Write point-slope form for slope  $-2$  through  $(-1, 4)$ . \_\_\_\_\_
- Convert  $y - 6 = 4(x - 3)$  to slope-intercept form. \_\_\_\_\_
- Find an equation through (1, 7) and (3, 15). \_\_\_\_\_
- Write point-slope form through (0,  $-2$ ) with slope  $\frac{1}{2}$ . \_\_\_\_\_
- Identify the point and slope in  $y + 3 = -5(x - 8)$ . \_\_\_\_\_
- Write slope-intercept form from  $y - 1 = 2(x + 4)$ . \_\_\_\_\_
- Write an equation with slope 0 through (6,  $-4$ ). \_\_\_\_\_
- Write point-slope form through  $(-3, -8)$  with slope 7. \_\_\_\_\_
- Does  $y - 2 = 3(x - 1)$  pass through (1, 2)? \_\_\_\_\_

### ◆ Word Problems

- A plant is 12 cm tall on day 4 and grows 2 cm per day. Write a point-slope model. \_\_\_\_\_
- A car is 150 miles from home after 3 hours and moves away at 60 mph. Write a model. \_\_\_\_\_



## Answer Keys

- |  |  |
|--|--|
| <p>1. <math>y - 5 = 3(x - 2)</math></p> <p>2. <math>y - 4 = -2(x + 1)</math></p> <p>3. <math>y = 4x - 6</math></p> <p>4. <math>y - 7 = 4(x - 1)</math></p> <p>5. <math>y + 2 = \frac{1}{2}x</math></p> <p>6. Point <math>(8, -3)</math>; slope <math>-5</math></p> | <p>7. <math>y = 2x + 9</math></p> <p>8. <math>y = -4</math></p> <p>9. <math>y + 8 = 7(x + 3)</math></p> <p>10. Yes</p> <p>11. <math>y - 12 = 2(x - 4)</math></p> <p>12. <math>y - 150 = 60(x - 3)</math></p> |
|--|--|

### Step-by-Step Explanations

1. Slide your numbers into  $y - y_1 = m(x - x_1)$  — here  $m = 3$ ,  $x_1 = 2$ ,  $y_1 = 5$ , and it's built.
2. Since  $x_1 = -1$ , subtracting it gives  $x - (-1)$ , which tidies up into  $x + 1$ .
3. Spread the 4 across to get  $y - 6 = 4x - 12$ , then add 6 to set  $y$  free.
4. First the slope:  $(15 - 7)/(3 - 1) = 4$ . Then anchor it with either point —  $(1, 7)$  works fine.
5. Plug in to get  $y - (-2) = \frac{1}{2}(x - 0)$ , and the zero makes the right side simply  $\frac{1}{2}x$ .
6. Read it against  $y - y_1 = m(x - x_1)$ : the  $y + 3$  means  $y_1 = -3$ , and  $-5$  is the slope.
7. Distribute first for  $y - 1 = 2x + 8$ , then add 1 to both sides to isolate  $y$ .
8. Zero slope means perfectly flat, so the line just holds the point's height:  $y = -4$ .
9. Both coordinates are negative, and subtracting a negative turns into adding — so you get plus signs.
10. Drop the point in:  $2 - 2 = 3(1 - 1)$  gives  $0 = 0$ , a true statement, so yes it passes through.
11. You're handed the point  $(4, 12)$  and the rate 2 — point-slope form is made for exactly this.
12. Use the snapshot  $(3, 150)$  as your point and 60 as the slope, then assemble point-slope form.



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