

# Point-Slope Form

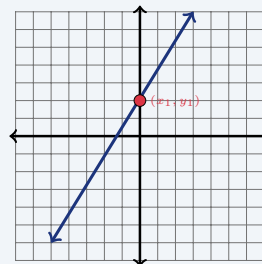
Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 18

## Quick Review and Helpful Hints

Point-slope form is  $y - y_1 = m(x - x_1)$ , where  $m$  is the slope and  $(x_1, y_1)$  is a known point. Substitute the slope and point, then distribute and simplify to slope-intercept form  $y = mx + b$  if needed.

▶ **Example:** Write the line through  $(2, 5)$  with slope 3. **Work:** Point-slope:  $y - 5 = 3(x - 2)$ . Distribute:  $y - 5 = 3x - 6$ . Add 5:  $y = 3x - 1$ .

★ **Answer:**  $y = 3x - 1$



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

### Practice Problems

Write each line in slope-intercept form  $y = mx + b$ .

- |                                |       |  |       |
|--------------------------------|-------|--|-------|
| 1. slope 2 through $(1, 4)$    | _____ | 8. slope $-3$ through $(1, 4)$           | _____ |
| 2. slope 3 through $(2, 5)$    | _____ | 9. slope 2 through $(-1, 3)$             | _____ |
| 3. slope $-1$ through $(0, 3)$ | _____ | 10. slope $\frac{1}{2}$ through $(4, 5)$ | _____ |
| 4. slope 4 through $(1, 1)$    | _____ | 11. slope $-1$ through $(5, 2)$          | _____ |
| 5. slope $-2$ through $(3, 0)$ | _____ | 12. slope 3 through $(-2, -1)$           | _____ |
| 6. slope 1 through $(2, 5)$    | _____ | 13. slope 2 through $(0, 0)$             | _____ |
| 7. slope 5 through $(0, -2)$   | _____ | 14. slope $-4$ through $(1, -2)$         | _____ |

### Word Problems

15. A line has slope 2 and passes through  $(3, 7)$ . Write its equation in slope-intercept form. \_\_\_\_\_
16. A delivery fee is linear. The cost is \$2 for 1 mile and \$6 for 3 miles. Write the equation of the line through these points. \_\_\_\_\_
17. A line passes through  $(2, -3)$  with slope  $-1$ . Write its equation. \_\_\_\_\_
18. A plumber charges a base fee of \$5 and then \$4 per hour. Write the linear equation with slope 4 and point  $(0, 5)$ . \_\_\_\_\_



## Answer Keys

1.  $y = 2x + 2$

2.  $y = 3x - 1$

3.  $y = -x + 3$

4.  $y = 4x - 3$

5.  $y = -2x + 6$

6.  $y = x + 3$

7.  $y = 5x - 2$

8.  $y = -3x + 7$

9.  $y = 2x + 5$

10.  $y = \frac{1}{2}x + 3$

11.  $y = -x + 7$

12.  $y = 3x + 5$

13.  $y = 2x$

14.  $y = -4x + 2$

15.  $y = 2x + 1$

16.  $y = 2x$

17.  $y = -x - 1$

18.  $y = 4x + 5$

### Step-by-Step Explanations

1. Start by naming the process: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 4 = 2(x - 1) = 2x - 2$ , so  $y = 2x + 2$ . So the final answer is  $y = 2x + 2$ .

2. A good way to think about this is: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 5 = 3(x - 2) = 3x - 6$ , so  $y = 3x - 1$ . So the final answer is  $y = 3x - 1$ .

3. Step by step: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 3 = -1(x - 0) = -x$ , so  $y = -x + 3$ . So the final answer is  $y = -x + 3$ .

4. Take it one move at a time: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 1 = 4(x - 1) = 4x - 4$ , so  $y = 4x - 3$ . So the final answer is  $y = 4x - 3$ .

5. Start by naming the process: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 0 = -2(x - 3) = -2x + 6$ , so  $y = -2x + 6$ . So the final answer is  $y = -2x + 6$ .

6. A good way to think about this is: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 5 = 1(x - 2) = x - 2$ , so  $y = x + 3$ . So the final answer is  $y = x + 3$ .

7. Step by step: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y + 2 = 5(x - 0) = 5x$ , so  $y = 5x - 2$ . So the final answer is  $y = 5x - 2$ .

8. Take it one move at a time: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 4 = -3(x - 1) = -3x + 3$ , so  $y = -3x + 7$ . So the final answer is  $y = -3x + 7$ .

9. Start by naming the process: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 3 = 2(x + 1) = 2x + 2$ , so  $y = 2x + 5$ . So the final answer is  $y = 2x + 5$ .

10. A good way to think about this is: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 5 = \frac{1}{2}(x - 4) = \frac{1}{2}x - 2$ , so  $y = \frac{1}{2}x + 3$ . So the final answer is  $y = \frac{1}{2}x + 3$ .

11. Step by step: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 2 = -1(x - 5) = -x + 5$ , so  $y = -x + 7$ . So the final answer is  $y = -x + 7$ .

12. Take it one move at a time: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y + 1 = 3(x + 2) = 3x + 6$ , so  $y = 3x + 5$ . So the final answer is  $y = 3x + 5$ .

13. Start by naming the process: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 0 = 2(x - 0) = 2x$ , so  $y = 2x$ . So the final answer is  $y = 2x$ .

14. A good way to think about this is: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y + 2 = -4(x - 1) = -4x + 4$ , so  $y = -4x + 2$ . So the final answer is  $y = -4x + 2$ .

15. Step by step: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 7 = 2(x - 3) = 2x - 6$ , so  $y = 2x + 1$ . So the final answer is  $y = 2x + 1$ .

16. Take it one move at a time: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is Slope =  $\frac{6-2}{3-1} = 2$ . Then  $y - 2 = 2(x - 1)$ , so  $y = 2x$ . So the final answer is  $y = 2x$ .

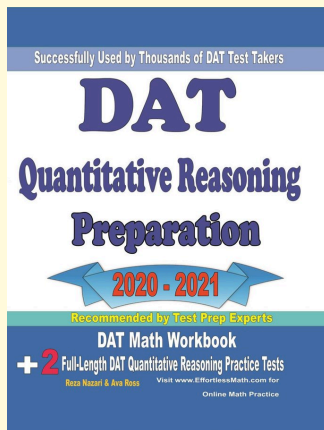
17. Start by naming the process: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y + 3 = -1(x - 2) = -x + 2$ , so  $y = -x - 1$ . So the final answer is  $y = -x - 1$ .

18. A good way to think about this is: Start with point-slope form, distribute if needed, and isolate  $y$  to write the final equation. The setup/work is  $y - 5 = 4(x - 0) = 4x$ , so  $y = 4x + 5$ . So the final answer is  $y = 4x + 5$ .



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