

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.

- | | |
|--|---|
| 1. Write point-slope form for slope 3 through (2, 5).
_____ | 6. Identify the point and slope in $y + 3 = -5(x - 8)$.
_____ |
| 2. Write point-slope form for slope -2 through $(-1, 4)$.
_____ | 7. Write slope-intercept form from $y - 1 = 2(x + 4)$.
_____ |
| 3. Convert $y - 6 = 4(x - 3)$ to slope-intercept form.
_____ | 8. Write an equation with slope 0 through (6, -4).
_____ |
| 4. Find an equation through (1, 7) and (3, 15).
_____ | 9. Write point-slope form through $(-3, -8)$ with slope 7.
_____ |
| 5. Write point-slope form through (0, -2) with slope $\frac{1}{2}$.
_____ | 10. Does $y - 2 = 3(x - 1)$ pass through (1, 2)?
_____ |

◆ Word Problems

11. A plant is 12 cm tall on day 4 and grows 2 cm per day. Write a point-slope model.

12. A car is 150 miles from home after 3 hours and moves away at 60 mph. Write a model.



Answer Keys

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