

Point-Slope Form

Algebra 1 • Section 5.3

Name: _____

Date: _____

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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

- $y - 5 = 3(x - 2)$
- $y - 4 = -2(x + 1)$
- $y = 4x - 6$
- $y - 7 = 4(x - 1)$
- $y + 2 = \frac{1}{2}x$
- Point $(8, -3)$; slope -5
- $y = 2x + 9$
- $y = -4$
- $y + 8 = 7(x + 3)$
- Yes
- $y - 12 = 2(x - 4)$
- $y - 150 = 60(x - 3)$

Step-by-Step Explanations

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



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