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 $(2, 5)$.

2. Write point-slope form for slope -2 through $(-1, 4)$.

3. Convert $y - 6 = 4(x - 3)$ to slope-intercept form.

4. Find an equation through $(1, 7)$ and $(3, 15)$.

5. Write point-slope form through $(0, -2)$ with slope $\frac{1}{2}$.

6. Identify the point and slope in $y + 3 = -5(x - 8)$.

7. Write slope-intercept form from $y - 1 = 2(x + 4)$.

8. Write an equation with slope 0 through $(6, -4)$.

9. Write point-slope form through $(-3, -8)$ with slope 7.

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

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

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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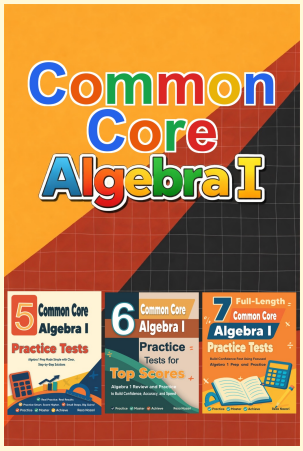

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