

Slope and Rate of Change

Algebra 1 • Section 5.1

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. Find the slope through (1, 3) and (5, 11). _____

6. Find the slope of $y = -4x + 9$. _____

2. Find the slope through (-2, 7) and (4, -5). _____

7. Find the slope of $3x + 2y = 12$. _____

3. Find the slope of a horizontal line $y = 8$. _____

8. Find the slope between (0, -1) and (8, 3). _____

4. Find the slope of a vertical line $x = -3$. _____

9. Which is steeper: slope -5 or slope 2? _____

5. A table changes from (2, 10) to (6, 22). Find the rate. _____

10. Find the slope through (3, 3) and (9, 3). _____

◆ Word Problems

11. A runner goes from 2 miles at 10 minutes to 5 miles at 34 minutes. Find minutes per mile. _____

12. A tank drops from 90 gallons to 54 gallons in 6 hours. Find the rate of change. _____



Answer Keys

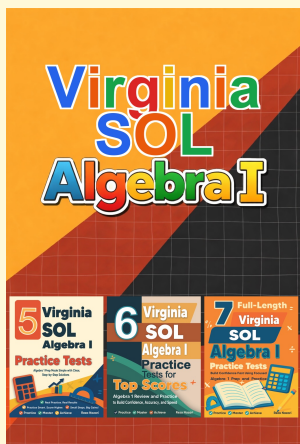
- | | |
|---|--|
| <p>1. <input type="text" value="2"/></p> <p>2. <input type="text" value="-2"/></p> <p>3. <input type="text" value="0"/></p> <p>4. <input type="text" value="Undefined"/></p> <p>5. <input type="text" value="3"/></p> <p>6. <input type="text" value="-4"/></p> | <p>7. <input type="text" value="-3/2"/></p> <p>8. <input type="text" value="1/2"/></p> <p>9. <input type="text" value="Slope -5"/></p> <p>10. <input type="text" value="0"/></p> <p>11. <input type="text" value="8"/></p> <p>12. <input type="text" value="-6 gallons per hour"/></p> |
|---|--|

Step-by-Step Explanations

1. Slope is rise over run, so stack the differences: $\frac{11-3}{5-1} = \frac{8}{4} = 2$.
2. Subtract carefully: $\frac{-5-7}{4-(-2)} = \frac{-12}{6} = -2$. The negative just means the line heads downhill.
3. Walk along this line and y never budges — zero rise means the slope is flat 0.
4. There's no run at all here, and you can't divide by zero, so we say the slope is undefined.
5. The output jumped 12 while the input only moved 4, so each step is worth $12/4 = 3$.
6. When it's already $y = mx + b$, the number riding with x is your slope — that's -4 .
7. Get y alone first: $2y = -3x + 12$ becomes $y = -\frac{3}{2}x + 6$, and the slope pops right out.
8. Climbing 4 over a run of 8 means you only rise half a unit per step: $\frac{1}{2}$.
9. Steepness ignores direction — compare sizes. Since 5 beats 2, the -5 line is steeper.
10. Both points share the same height, so there's nothing to rise — the slope is 0.
11. That's 24 extra minutes spread over 3 miles, so the pace works out to $24/3 = 8$ minutes each mile.
12. Losing 36 gallons across 6 hours means $-36/6 = -6$ — negative because the tank is emptying.



Want Even More Algebra 1 Practice?



Virginia SOL Algebra I Preparation Bundle

18 full-length practice tests across three books
Fresh test practice, detailed explanations, and
organized review



18 Tests
3 Books
One Bundle

Important: These Algebra 1 resources are made for extra practice after the worksheet. Use the QR code for the state or program bundle connected with this worksheet.

Skill Review

- ✓ Strengthens equations, functions, systems, and modeling
- ✓ Supports steady review before tests
- ✓ Good for tutoring, homework, and independent practice

Build the foundation.

Test Practice

- ✓ Full-length practice tests for realistic pacing
- ✓ Detailed answer explanations for every test
- ✓ Useful after students finish topic worksheets

Practice with purpose.

Confidence

- ✓ Turns mistakes into targeted review
- ✓ Helps students see progress over time
- ✓ Keeps preparation organized and calm

Move forward prepared.