

Writing Linear Equations from Graphs and Tables

Algebra 1 • Section 5.5

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.

- Find a line through (1, 4) and (4, 10). _____
- Find an equation for a table with points (0, 5), (2, 11), (4, 17). _____
- Write a line with slope -1 through (3, 8). _____
- Find the equation through $(-2, 1)$ and $(2, 9)$. _____
- Find b if $y = 4x + b$ goes through (5, 17). _____
- A line has intercept 6 and slope $\frac{1}{2}$. Write the equation. _____
- Find the equation through $(0, -4)$ and $(3, 5)$. _____
- Find the slope from table changes: x increases by 5, y decreases by 15. _____
- Write an equation for y values 2, 6, 10 when $x = 0, 1, 2$. _____
- Find the missing output in $y = 7 - 2x$ when $x = 4$. _____

◆ Word Problems

- A plumber charges \$45 plus \$30 per hour. Write the linear model. _____
- A candle starts at 12 inches and burns 0.5 inch per hour. Write the model. _____



Answer Keys

1. $y = 2x + 2$

2. $y = 3x + 5$

3. $y = -x + 11$

4. $y = 2x + 5$

5. $b = -3$

6. $y = \frac{1}{2}x + 6$

7. $y = 3x - 4$

8. -3

9. $y = 4x + 2$

10. -1

11. $y = 30x + 45$

12. $y = 12 - 0.5x$

Step-by-Step Explanations

- Slope first: $6/3 = 2$. Then anchor it with a point $-4 = 2(1) + b$ gives $b = 2$.
- The y -values climb 6 for every 2 in x , so slope is 3, and $x = 0$ shows the intercept is 5.
- With the slope known, the point fills in the rest: $8 = -3 + b$, so $b = 11$.
- The slope is $8/4 = 2$; plug $(-2, 1)$ back in and you find $b = 5$.
- Substitute the point: $17 = 20 + b$, so b has to be -3 to balance it.
- You already have both pieces — just set them into $y = mx + b$ and you're finished.
- The point at $x = 0$ hands you intercept -4 , and the slope is $(5 + 4)/3 = 3$.

- Slope is the y -change over the x -change: $-15/5 = -3$, negative since y is falling.
- Each step bumps y by 4, that's the slope, and the value at $x = 0$ gives intercept 2.
- Substitute $x = 4$ and compute: $7 - 2(4) = 7 - 8 = -1$.
- The \$30 per hour repeats, making it the slope, while the flat \$45 fee is the intercept.
- Start the height at 12, and since it shrinks each hour, subtract $0.5x$ as time passes.



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