Writing Linear Equations from Graphs and Tables

Name: _____	Date: _____	Score: _____ / 26

Quick Review

To write a linear equation, you need two pieces of information: the **slope** (m) and a **point** (or the y-intercept). **From a graph**: read the y-intercept directly off the y-axis, then count rise/run to a clean grid intersection for slope. **From a table**: pick any two rows and use $m = \frac{\Delta y}{\Delta x}$, then use any one point to find b. **From two points**: compute slope first, then substitute one point into $y = mx + b$ to solve for b. A common mistake: using rise/run in the wrong order. Pick a direction and stay consistent — if you go right by Δx, your y change goes *from* the left point to the right point.

PRACTICE

Write the equation of each line.

1. A line has slope 2 and crosses the y-axis at 3. Write its equation. _____

2. Through $(1, 5), (3, 11)$ _____

3. Through $(0, 4), (2, 0)$ _____

4. Table: $(1, 2), (2, 4), (3, 6), (4, 8)$ _____

5. A table shows $(0, 5)$, $(1, 8)$, and $(2, 11)$. Write the linear equation. _____

6. Through $(-1, -3), (2, 3)$ _____

7. Through $(0, -7), (5, 3)$ _____

8. Table: $(1, 10), (2, 8), (3, 6)$ _____

9. Write the equation of the horizontal line through $(3, 5)$. _____

10. Vertical through $(4, 7)$ _____

11. Through $(2, 6), m = \frac{1}{2}$ _____

12. Through $(4, -2), (8, -6)$ _____

13. A line goes through the origin and has slope -3. Write its equation. _____

14. Table: $(0, 0), (1, 4), (2, 8), (3, 12)$ _____

15. Write the equation of the line through $(1, -1)$ and $(4, 5)$. _____

16. A line has y-intercept -4 and slope $\frac{1}{3}$. Write its equation. _____

17. Write the equation of the line through $(6, 2)$ and $(6, 9)$. _____

18. Write the equation of the line through $(3, 1)$ and $(7, 1)$. _____

19. A line passes through $(-2, 5)$ and has slope -1. Write its equation. _____

20. Table: $(5, 12), (10, 17), (15, 22)$ _____

VISUAL PRACTICE

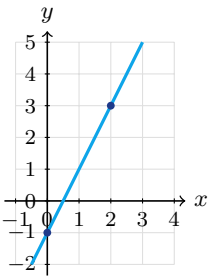
Use the graph, table, chart, or diagram to answer the question.

21. Use the table to write the linear equation.

x	0	1	2	3
y	3	7	11	15

Answer: _____

22. Write the equation of the graphed line.



Answer: _____

Scan Me

Word Problems

23. A gym costs \$30 to join and \$10 a month. Write the equation for total cost after m months.

Model: _____ **Answer:** _____

24. At $t = 0$, a young tree is 3 feet tall. After 5 years, it is 13 feet tall. Write a linear equation for the tree's height.

Model: _____ **Answer:** _____

25. A printer costs \$80 to buy plus \$0.05 per page. Write total cost after printing p pages.

Model: _____ **Answer:** _____

26. A scooter rental: 30 min costs \$10, 90 min costs \$22. Write the cost equation.

Model: _____ **Answer:** _____

Answer Keys

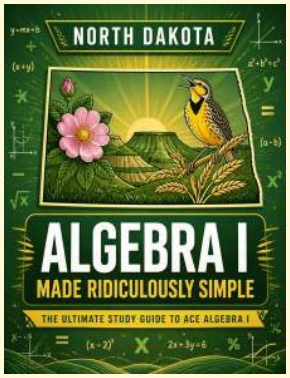
1. $y = 2x + 3$
2. $y = 3x + 2$
3. $y = -2x + 4$
4. $y = 2x$
5. $y = 3x + 5$
6. $y = 2x - 1$
7. $y = 2x - 7$
8. $y = -2x + 12$
9. $y = 5$
10. $x = 4$
11. $y = \frac{1}{2}x + 5$
12. $y = -x + 2$
13. $y = -3x$
14. $y = 4x$
15. $y = 2x - 3$
16. $y = \frac{1}{3}x - 4$
17. $x = 6$
18. $y = 1$
19. $y = -x + 3$
20. $y = x + 7$
21. $y = 4x + 3$
22. $y = 2x - 1$
23. $C = 10m + 30$
24. $h = 2t + 3$
25. $C = 0.05p + 80$
26. $C = 0.20t + 4$

Step-by-Step Tutor Notes

1. In $y = mx + b$, the slope is m and the y-intercept is b. Here $m = 2$ and $b = 3$, so $y = 2x + 3$.
2. Use the labels on the display first; they tell you which count or total belongs in the answer. $m = \frac{11-5}{3-1} = 3$. $5 = 3 + b \Rightarrow b = 2$. This gives $y = 3x + 2$.
3. Line up the two changes first; that keeps the rate from getting mixed up. $b = 4$. Slope: $\frac{0-4}{2-0} = -2$. So the requested value is $y = -2x + 4$.
4. For a table question, slow down and locate the exact row, column, or cell before calculating. Slope 2. $(1, 2)$: $2 = 2 + b \Rightarrow b = 0$. Line through origin. This gives $y = 2x$.
5. The outputs increase by 3 each time x increases by 1, so the slope is 3. The row with $x = 0$ gives $b = 5$.
6. Read the table by matching the correct row and column first, then use the count or total that fits the question. $m = \frac{3-(-3)}{2-(-1)} = 2$. $3 = 2(2) + b \Rightarrow b = -1$. This gives $y = 2x - 1$.
7. Think of slope as the amount the output changes for each 1-unit change in the input. $b = -7$. Slope: $\frac{3-(-7)}{5} = 2$. So the requested value is $y = 2x - 7$.
8. For a table question, slow down and locate the exact row, column, or cell before calculating. Slope -2. $10 = -2 + b \Rightarrow b = 12$. This gives $y = -2x + 12$.
9. A horizontal line keeps one constant y-value. Since this line passes through $y = 5$, its equation is $y = 5$.
10. Take it one clear step at a time and keep the original question in mind. Vertical means x is constant. Not a function. So the answer is $x = 4$.
11. Use the labels on the display first; they tell you which count or total belongs in the answer. $6 = \frac{1}{2}(2) + b \Rightarrow 6 = 1 + b \Rightarrow b = 5$. This gives $y = \frac{1}{2}x + 5$.
12. For a table question, slow down and locate the exact row, column, or cell before calculating. $m = \frac{-6-(-2)}{8-4} = -1$. $-2 = -4 + b \Rightarrow b = 2$. This gives $y = -x + 2$.
13. The origin gives a y-intercept of 0. With slope -3, the equation is $y = -3x$.
14. Take it one clear step at a time and keep the original question in mind. Constant ratio $\frac{y}{x} = 4$. Through origin. So the answer is $y = 4x$.
15. The slope is $\frac{5-(-1)}{4-1} = 2$. Use $(1, -1)$ in $y = 2x + b$: $-1 = 2 + b$, so $b = -3$.
16. The slope becomes the coefficient of x, and the intercept is the constant term. That gives $y = \frac{1}{3}x - 4$.
17. Both points have $x = 6$, so this is a vertical line. Vertical lines are written $x =$ constant.
18. Both points have $y = 1$, so this is a horizontal line. Horizontal lines are written $y =$ constant.
19. Use $y = mx+b$ with $m = -1$. Substituting $(-2, 5)$ gives $5 = -(-2)+b = 2 + b$, so $b = 3$.
20. Use the labels on the display first; they tell you which count or total belongs in the answer. Slope 1. $12 = 5 + b \Rightarrow b = 7$. This gives $y = x + 7$.
21. The y-intercept is 3 and the rate of change is 4, so $y = 4x + 3$.
22. Compare the change in output to the change in input, because slope is a rate of change. The slope is 2 and the y-intercept is -1. So the requested value is $y = 2x - 1$.
23. The joining fee is the starting value, so it is the y-intercept 30. The monthly charge is the slope 10, giving $C = 10m + 30$.
24. The starting height is 3 ft, so $b = 3$. The tree grows $\frac{13-3}{5-0} = 2$ ft per year, so the model is $h = 2t + 3$.
25. The printer purchase is the starting cost, so $b = 80$. Each page adds \$0.05, so the cost model is $C = 0.05p + 80$.
26. Slope: $\frac{22-10}{90-30} = \frac{12}{60} = 0.20$. $10 = 0.20(30) + b = 6 + b \Rightarrow b = 4$. So $C = 0.20t + 4$ (a \$4 base + \$0.20/min).

Scan Me

Want a Full Algebra 1 Textbook? Try Our North Dakota NDSA Made Simple Book!



North Dakota NDSA Algebra I Made Ridiculously Simple

The friendly, step-by-step Algebra 1 textbook
Plain-English explanations, guided practice, and review support.

Scan Me

Full Lessons Inside

Concepts
Practice
Mastery

Important: All our test books contain **unique, completely different tests** from each other! Each book offers fresh practice questions—no repeats!

5 Practice Tests

- ✓ 5 complete practice tests with detailed explanations
- ✓ Perfect foundation for NDSA test preparation
- ✓ Builds confidence and test-taking skills
- ✓ High-quality questions aligned with state standards

Start your practice journey!

6 Practice Tests

- ✓ 6 complete practice tests with detailed explanations
- ✓ **Unique tests**—different from the 5 tests book
- ✓ Perfect for more practice after mastering 5 tests
- ✓ Builds even more confidence and test-taking skills
- ✓ Same high-quality questions aligned with standards

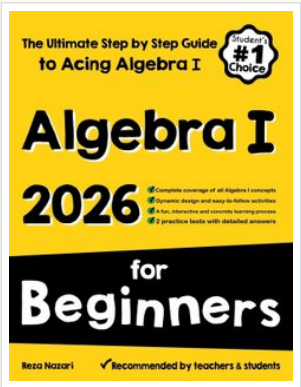
Take your practice to the next level!

7 Practice Tests

- ✓ 7 complete practice tests for maximum preparation
- ✓ **Unique tests**—different from 5 and 6 tests books
- ✓ The most comprehensive practice for Algebra 1
- ✓ Ideal for students aiming for top scores
- ✓ Extensive practice builds mastery and confidence

Go all the way with comprehensive practice!

☐ STUDENT FAVORITE • Master Algebra I From the Ground Up ☐



Algebra I for Beginners

Written by a top math teacher & aligned with national and state Algebra I courses. From linear equations to graphing quadratics — explained the easy way.

- ✓ **Complete coverage** of every Algebra I concept — perfect companion to these worksheets
- ✓ **Step-by-step explanations** with worked examples on every topic
- ✓ **QR codes in every chapter** for free video lessons & bonus practice
- ✓ **2 full-length practice tests** with detailed answer keys

✓ 100% Guaranteed
✓ Lifetime Support
✓ Trusted by Teachers

⋆ STUDENT'S #1 CHOICE ⋆

Teacher-recommended • 12,000+ Happy Students

Start Your Algebra Journey Today! →

↓PDF EDITION

Scan Me

Instant download • any device

☐ PAPERBACK

Scan Me

Paperback on Amazon

Hold it in your hands

Pair these free worksheets with *Algebra I for Beginners* and you have a complete self-paced course — concept lessons, daily practice, and full exam-style reviews, all in one path. →
EffortlessMath.com/product/algebra-i-for-beginners