

Solving Quadratics by Factoring

Algebra 1 • Section 9.3

Name: _____

Date: _____

Score: _____ / 12

Quick Review and Helpful Hints

Quadratic functions can be read through their zeros, vertex, axis of symmetry, and opening direction. Choose factoring, square roots, completing the square, or the quadratic formula based on the form you see.

▷ **Example:** Solve $x^2 - 5x + 6 = 0$.

Work: Factor the quadratic: $x^2 - 5x + 6 = (x - 2)(x - 3)$. Set each factor equal to zero.

★ **Answer:** $x = 2$ or $x = 3$

◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Solve $x^2 - 7x + 10 = 0$.

6. Solve $3x^2 + 12x = 0$.

2. Solve $x^2 + 3x - 18 = 0$. _____

7. Solve $x^2 - x - 20 = 0$. _____

3. Solve $2x^2 - 5x - 3 = 0$. _____

8. Solve $4x^2 - 9 = 0$. _____

4. Solve $x^2 - 16 = 0$ by factoring. _____

9. Solve $x^2 + 2x = 15$. _____

5. Solve $x^2 + 10x + 25 = 0$. _____

10. Solve $2x^2 + 7x + 3 = 0$. _____

◆ Word Problems

11. A rectangle area is $x^2 + 8x + 12 = 0$ in a zero-product model. Find the zeros. _____

12. A profit model has break-even equation $-x^2 + 14x - 45 = 0$. Find break-even values. _____



Answer Keys

- | | |
|---|---|
| <p>1. $x = 2, 5$</p> <p>2. $x = 3, -6$</p> <p>3. $x = 3, -\frac{1}{2}$</p> <p>4. $x = \pm 4$</p> <p>5. $x = -5$</p> <p>6. $x = 0, -4$</p> | <p>7. $x = 5, -4$</p> <p>8. $x = \pm \frac{3}{2}$</p> <p>9. $x = 3, -5$</p> <p>10. $x = -3, -\frac{1}{2}$</p> <p>11. $x = -2, -6$</p> <p>12. $x = 5, 9$</p> |
|---|---|

Step-by-Step Explanations

1. Look for two numbers that multiply to 10 and add to -7 : that's -2 and -5 , giving $(x - 2)(x - 5) = 0$.
2. You need a pair multiplying to -18 and adding to 3. Once it's $(x + 6)(x - 3) = 0$, each piece can be zero.
3. With a leading 2, factoring gives $(2x + 1)(x - 3) = 0$ — then just unwrap each parenthesis on its own.
4. Notice $x^2 - 16$ is a perfect square minus a perfect square, so it splits neatly into $(x - 4)(x + 4) = 0$.
5. This trinomial is secretly $(x + 5)^2$, so both factors are the same — you get one solution, not two.
6. Both terms share a $3x$, so pull it out front: $3x(x + 4) = 0$. Don't forget $x = 0$ counts!
7. Hunt for two numbers with product -20 and sum -1 — that's -5 and 4, so $(x - 5)(x + 4) = 0$.
8. Here's another difference of squares: $4x^2 - 9 = (2x - 3)(2x + 3)$, since $2x$ and 3 square to the pieces.
9. First slide everything to one side so it equals zero, then $x^2 + 2x - 15$ factors into $(x + 5)(x - 3)$.
10. Factoring carefully with the leading 2 gives $(2x + 1)(x + 3) = 0$ — now solve each tiny equation.
11. Two numbers that multiply to 12 and add to 8 are 2 and 6, so $(x + 2)(x + 6) = 0$ does the job.
12. Flipping signs makes it friendlier: $x^2 - 14x + 45 = (x - 5)(x - 9)$, and those zeros are your break-even points.



Want Even More Algebra 1 Practice?



Montana 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.