

# The Quadratic Formula

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 24

## Q Quick Review

The **quadratic formula** solves any quadratic equation in standard form  $ax^2 + bx + c = 0$ :  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ . First identify  $a$ ,  $b$ , and  $c$  carefully, including signs. Then compute the discriminant, substitute into the formula, and simplify. The formula is especially useful when factoring is not quick or when answers are irrational.

## PRACTICE

Solve each quadratic using the quadratic formula.

1.  $x^2 - 5x + 6 = 0$  \_\_\_\_\_

2.  $x^2 + 4x + 4 = 0$  \_\_\_\_\_

3.  $x^2 + x - 6 = 0$  \_\_\_\_\_

4.  $2x^2 - 3x - 2 = 0$  \_\_\_\_\_

5.  $x^2 - 2x - 1 = 0$  \_\_\_\_\_

6.  $3x^2 + 2x - 1 = 0$  \_\_\_\_\_

7.  $x^2 - 9 = 0$  \_\_\_\_\_

8.  $2x^2 + 7x + 3 = 0$  \_\_\_\_\_

9.  $x^2 + 6x + 5 = 0$  \_\_\_\_\_

10.  $x^2 + 2x - 3 = 0$  \_\_\_\_\_

11.  $4x^2 + 4x + 1 = 0$  \_\_\_\_\_

12.  $3x^2 - 10x + 2 = 0$  \_\_\_\_\_

13.  $7x^2 + 2x - 1 = 0$  \_\_\_\_\_

14.  $x^2 + 5x + 8 = 0$  \_\_\_\_\_

15.  $5x^2 - x - 1 = 0$  \_\_\_\_\_

16.  $2x^2 + 4x + 7 = 0$  \_\_\_\_\_

17.  $x^2 - 8x + 16 = 0$  \_\_\_\_\_

18.  $6x^2 + x - 2 = 0$  \_\_\_\_\_

19.  $9x^2 - 6x + 1 = 0$  \_\_\_\_\_

20.  $x^2 + 3x + 1 = 0$  \_\_\_\_\_

## ◆ Word Problems

21. A rectangle has area 45 square feet and length 4 feet more than its width. Use the quadratic formula to find the width.

\_\_\_\_\_

22. A ball's height is  $h(t) = -16t^2 + 40t + 6$ . Use the quadratic formula to estimate when it hits the ground.

\_\_\_\_\_

23. A business models profit by  $P(x) = -2x^2 + 30x - 90$ . Use the quadratic formula to find the break-even values.

\_\_\_\_\_

24. A square patio is enlarged so each side is 3 feet longer. The new area is 100 square feet. Use a quadratic equation to find the original side length.

\_\_\_\_\_



## Answer Keys

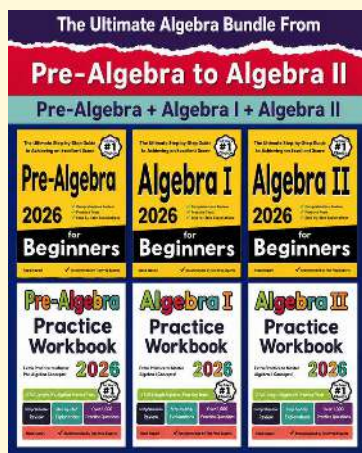
- |  |   |
|--|---|
| <p>1. <math>x = 2, 3</math></p> <p>2. <math>x = -2</math></p> <p>3. <math>x = 2, -3</math></p> <p>4. <math>x = 2, -\frac{1}{2}</math></p> <p>5. <math>x = 1 \pm \sqrt{2}</math></p> <p>6. <math>x = \frac{1}{3}, -1</math></p> <p>7. <math>x = \pm 3</math></p> <p>8. <math>x = -\frac{1}{2}, -3</math></p> <p>9. <math>x = -1, -5</math></p> <p>10. <math>x = 1, -3</math></p> <p>11. <math>x = -\frac{1}{2}</math></p> <p>12. <math>x = \frac{5 \pm \sqrt{19}}{3}</math></p> | <p>13. <math>x = \frac{-1 \pm 2\sqrt{2}}{7}</math></p> <p>14. no real solution</p> <p>15. <math>x = \frac{1 \pm \sqrt{21}}{10}</math></p> <p>16. no real solution</p> <p>17. <math>x = 4</math></p> <p>18. <math>x = \frac{1}{2}, -\frac{2}{3}</math></p> <p>19. <math>x = \frac{1}{3}</math></p> <p>20. <math>x = \frac{-3 \pm \sqrt{5}}{2}</math></p> <p>21. 5 ft</p> <p>22. <math>t \approx 2.64</math> sec</p> <p>23. <math>x = \frac{15 \pm 3\sqrt{5}}{2}</math></p> <p>24. 7 ft</p> |
|--|---|

### Step-by-Step Tutor Notes

1. Take it one clear step at a time and keep the original question in mind. Here  $a = 1, b = -5, c = 6$ ; the formula gives  $\frac{5 \pm 1}{2}$ . So the answer is  $x = 2, 3$ .
2. Take it one clear step at a time and keep the original question in mind. The discriminant is 0, so the formula gives one solution. So the answer is  $x = -2$ .
3. Start with the definition the problem is testing, then apply it directly. Use  $a = 1, b = 1, c = -6$ ; the square root part is 5. So the answer is  $x = 2, -3$ .
4. Focus on the main idea of the problem, then simplify carefully. The formula gives  $\frac{3 \pm 5}{4}$ . So the answer is  $x = 2, -\frac{1}{2}$ .
5. This is a good place to slow down, check the notation, and simplify cleanly. The formula gives  $\frac{2 \pm \sqrt{8}}{2} = 1 \pm \sqrt{2}$ . So the answer is  $x = 1 \pm \sqrt{2}$ .
6. Focus on the main idea of the problem, then simplify carefully. The formula gives  $\frac{-2 \pm 4}{6}$ . So the answer is  $x = \frac{1}{3}, -1$ .
7. This is a good place to slow down, check the notation, and simplify cleanly. With  $b = 0$ , the formula gives  $\pm 6/2$ . So the answer is  $x = \pm 3$ .
8. Focus on the main idea of the problem, then simplify carefully. The formula gives  $\frac{-7 \pm 5}{4}$ . So the answer is  $x = -\frac{1}{2}, -3$ .
9. Start with the definition the problem is testing, then apply it directly. The formula gives  $\frac{-6 \pm 4}{2}$ . So the answer is  $x = -1, -5$ .
10. This is a good place to slow down, check the notation, and simplify cleanly. The formula gives  $\frac{-2 \pm 4}{2}$ . So the answer is  $x = 1, -3$ .
11. Focus on the main idea of the problem, then simplify carefully. The discriminant is 0, so there is one repeated solution. So the answer is  $x = -\frac{1}{2}$ .
12. Focus on the main idea of the problem, then simplify carefully. Use  $D = 76 = 4 \cdot 19$  and simplify. So the answer is  $x = \frac{5 \pm \sqrt{19}}{3}$ .
13. This is a good place to slow down, check the notation, and simplify cleanly. Use  $D = 32$  and simplify the square root. So the answer is  $x = \frac{-1 \pm 2\sqrt{2}}{7}$ .
14. Focus on the main idea of the problem, then simplify carefully. The discriminant is negative, so there are no real roots. So the answer is no real solution.
15. The safest move is to replace the variable, keep the arithmetic organized, and simplify one step at a time. Substitute  $a = 5, b = -1, c = -1$ . That confirms the final answer is  $x = \frac{1 \pm \sqrt{21}}{10}$ .
16. Focus on the main idea of the problem, then simplify carefully. The discriminant is  $-40$ , which is negative. So the answer is no real solution.
17. Take it one clear step at a time and keep the original question in mind. The formula gives  $\frac{8}{2} = 4$ . So the answer is  $x = 4$ .
18. Start with the definition the problem is testing, then apply it directly. The formula gives  $\frac{-1 \pm 7}{12}$ . So the answer is  $x = \frac{1}{2}, -\frac{2}{3}$ .
19. Focus on the main idea of the problem, then simplify carefully. The discriminant is 0, giving one solution. So the answer is  $x = \frac{1}{3}$ .
20. Use the clue in the question first, then let the arithmetic finish the job. The discriminant is 5, so leave the radical simplified. So the answer is  $x = \frac{-3 \pm \sqrt{5}}{2}$ .
21. Let width be  $w$ . Then  $w(w + 4) = 45$ , so  $w^2 + 4w - 45 = 0$ . The formula gives  $w = 5$  or  $-9$ , and only 5 fits the context.
22. Set  $h = 0$  and use  $a = -16, b = 40, c = 6$ . The positive solution is about 2.64 seconds.
23. Set  $P(x) = 0$ . Dividing by  $-2$  gives  $x^2 - 15x + 45 = 0$ , then apply the formula.
24. If the original side is  $s$ , then  $(s + 3)^2 = 100$ . Written as  $s^2 + 6s - 91 = 0$ , the positive formula solution is 7.



## Build Algebra Confidence From Pre-Algebra Through Algebra II



### The Complete Algebra Success Bundle

Pre-Algebra, Algebra I, and Algebra II in one clear path

Friendly lessons, focused practice, and full-review support for every stage.



Scan for the Bundle

**6 Books**  
**3 Courses**  
**1 Path**

**Bundle Value:** Six coordinated books help students review missing skills, learn new algebra topics, and practice until the steps feel natural.

#### Complete Course Path

- ✓ Starts with Pre-Algebra foundations
- ✓ Moves smoothly into Algebra I skills
- ✓ Extends learning through Algebra II topics
- ✓ Great for review, tutoring, and summer study

**One bundle, one steady path.**

#### Step-by-Step Lessons

- ✓ Plain-English explanations students can follow
- ✓ Worked examples that show every important step
- ✓ Common mistakes called out before they stick
- ✓ Skill-building practice after each lesson
- ✓ Helpful for independent study or class support

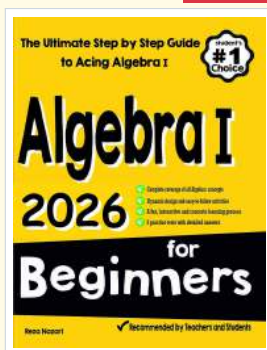
**Less guessing. More understanding.**

#### Practice That Sticks

- ✓ Matching practice workbooks for extra repetition
- ✓ Review sets to keep older skills fresh
- ✓ Answer explanations for checking thinking
- ✓ Strong support before tests and final exams
- ✓ Designed to build fluency and confidence

**Practice today. Remember tomorrow.**

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



- ✓ 100% Guaranteed
- ✓ Lifetime Support
- ✓ Trusted by Teachers

Start Your Algebra  
Journey Today! →

### 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

★ **STUDENT'S #1 CHOICE** ★

Teacher-recommended • 12,000+ Happy Students

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](https://EffortlessMath.com/product/algebra-i-for-beginners)