

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.



Scan Me

Answer Keys

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



Scan Me

Want a Full Algebra 1 Textbook? Try Our New Jersey NJSLA Made Simple Book!



New Jersey NJSLA 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 NJSLA 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

Start Your Algebra
Journey Today! →

★ 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