

# learning focus:

- ✓ simplify numerical radical expressions
- ✓ solve quadratic equations using various methods
- ✓ write quadratic equations from solutions

## SOLVING QUADRATIC EQUATIONS UNIT

### 10 DAY TEKS-ALIGNED UNIT



**SOLVING QUADRATIC EQUATIONS UNIT**  
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**SOLVING QUADRATIC EQUATIONS STUDY GUIDE**  
Name \_\_\_\_\_ Pd \_\_\_\_\_  
Date \_\_\_\_\_  
Questions if you need more help with a topic.

**Factoring:** A.8A, A.7D

2. Solve the equation by factoring.  
 $2x^2 + 22x = 0$

4. Solve the equation by factoring.  
 $x^2 + 8x - 41 = 7$

2. circle the two linear factors of the equation:

**SOLVING QUADRATIC EQUATIONS PACING GUIDE**

DAY 1	DAY 2	DAY 3	DAY 4
Solving Quadratic Equations by Factoring	Simplifying Radical Expressions	The Square Root Method	Quiz: Solving Quadratics & Simplifying Radicals

**A MANEUVERING THE MIDDLE® RESOURCE**

# SOLVING QUADRATIC EQUATIONS



a 10 day TEKS-aligned unit  
TEKS: A.6C, A.7B, A.8A, A.11A

ready-to-go, scaffolded  
student materials

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# SOLVING QUADRATIC EQUATIONS



a 10 day TEKS-aligned unit  
TEKS: A.6C, A.7B, A.8A, A.11A


## student friendly + real-world application

Unit: Solving Quadratic Equations  
Student Handout 2

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

### SIMPLIFYING RADICAL EXPRESSIONS

Salge purchased a caravan that has a square window with side length,  $x$ . If the window has an area of  $144 \text{ in}^2$ , write an expression to represent the side length of the window. Then simplify the expression.



scaffolded  
concepts

Square roots are examples of \_\_\_\_\_

#### RADICAL EXPRESSIONS

- An expression with a square root symbol
- If no root index is assumed to be 2
- When simplifying a radical expression, the radicand must be a perfect square factor, or \_\_\_\_\_

To simplify radical expressions, we can use the product property of square roots.

#### PRODUCT PROPERTY OF SQUARE ROOTS

Assuming "a" and "b" are positive real numbers, the following is true:

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

A square root radical expression is simplest form if the radicand has no perfect square factor, has no \_\_\_\_\_

- $\sqrt{15}$  is in simplest form because 15 has no perfect square factors
- $\sqrt{12}$  is not in simplest form because 12 has a perfect square factor of 4

Complete the table of perfect squares as a reference. Then, list the factors of each radicand in 1-3 and determine if the radical expression is simplified.

1.  $\sqrt{27}$  2.  $\sqrt{38}$

a. Factors: \_\_\_\_\_  
b. Simplified? \_\_\_\_\_

We can use the product property of square roots and our knowledge of perfect square factors to simplify radical expressions with the steps below:

#### SIMPLIFYING RADICAL EXPRESSIONS

1. Find the largest \_\_\_\_\_ square factor of the radicand
2. Rewrite the radicand as a product using the perfect square factor and the \_\_\_\_\_ property
3. Take the square root of any \_\_\_\_\_ square

Ex: Simplify  $\sqrt{24}$

$$\sqrt{4 \cdot 6}$$

$$\sqrt{4} \cdot \sqrt{6}$$

Use the steps above to simplify each expression.

4.  $\sqrt{48}$

5.  $\sqrt{3}$

7. Joe and Audrey believe that their expression is in simplest form. Write the name of the student who is correct and explain why.

JOE

$3\sqrt{15}$

8. Tamika is baking cupcakes. The square potholder she is using has an area of 4 square inches. Write an expression to represent one side length of the potholder. Simplify.



Summarize today's lesson:

Unit: Solving Quadratic Equations  
Homework 2

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

interactive  
practice



# SOLVING QUADRATIC EQUATIONS



a 10 day TEKS-aligned unit  
TEKS: A.6C, A.7B, A.8A, A.11A

streamline your planning  
process with unit overviews

## SOLVING QUADRATIC EQUATIONS OVERVIEW



### STANDARD

READINESS	SUPPORTING
<b>A.8A</b> solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula	<b>A.6C</b> write quadratic functions when given real solutions and graphs of their related equations <b>A.7B</b> describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions <b>A.11A</b> simplify numerical radical expressions involving square roots

### DIG IDEAS

- Similar to linear equations, the equation true.
- There are several methods
- Solutions to a quadratic eq graph.
- The equation of a graphed shown on the graph.

### ESSENTIAL QUESTIONS

- How can a numerical radic
- Why is it helpful to have m
- How can solutions to quad
- If given the graph of a quac

## SOLVING QUADRATIC EQUATIONS PACING GUIDE



DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Solving Quadratic Equations by Factoring	Simplifying Radical Expressions	The Square Root Method	Quiz: Solving Quadratics and Simplifying Radicals	Completing the Square
Student Handout 1 Homework 1	Student Handout 2 Homework 2	Student Handout 3		Student Handout 4
DAY 6	DAY 7			
The Quadratic Formula	Writing Quadratic Equations from Solutions			
Student Handout 5 Homework 5	Student Handout 6 Homework 6			
It may be necessary and/or helpful to add in extra				

## SOLVING QUADRATIC EQUATIONS OVERVIEW



TOPIC	TEACHING TIPS
Simplifying Radical Expressions	<ul style="list-style-type: none"><li>• If students are struggling to simplify radicals by identifying the largest perfect square factor, consider having them use the prime factorization method.</li></ul>
Solving Quadratic Equations	<ul style="list-style-type: none"><li>• Up to this point, students have typically focused on solving linear equations. Build on this prior knowledge and help make solving quadratics less abstract by letting students know they're still finding values for "x" that make the equation true.</li><li>• When teaching the different methods to solve quadratic equations, try to build in conversations where students pause to observe the structure of the equations they are solving and why particular methods either work well or don't work well to solve the given equation. While students often naturally prefer a certain method, it's necessary for them to see that not all methods will always work.</li><li>• Allow students opportunities to check their solution by either plugging the solution back into the original equation or graphing the equation on their calculator and tracing the zeros.</li><li>• Search "Quadratic Formula Pop Goes the Weasel" on YouTube for a "catchy" song to help students memorize the formula!</li></ul>
Writing Quadratic Equations	<ul style="list-style-type: none"><li>• Be sure that students have plenty of practice writing linear factors from the solutions of a graph before moving on to the next step to calculate the value of "a" in <math>y = a(x - r)(x - s)</math>.</li><li>• Allow students to discover the necessity of solving for "a" by asking several students to draw different parabolas that all have the same zeros.</li><li>• Consider connecting this lesson to using vertex form to write equations from graphs. Discuss when this method is beneficial versus when vertex form is beneficial.</li></ul>

teaching  
ideas

✓ key vocabulary  
✓ vertical alignment

sample  
pacing  
calendar

# SOLVING QUADRATIC EQUATIONS



a 10 day TEKS-aligned unit  
TEKS: A.6C, A.7B, A.8A, A.11A

## unit study guide + assessments



quizzes



editable unit test

Unit: Solving Quadratic Equations  
Quiz 1

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

**QUIZ: SOLVING QUADRATICS & SIMPLIFYING RADICALS**

Show all work and record your solutions in the box at the right.

For 1-2, solve the quadratic equation by factoring.

1.  $x^2 + 2x - 63 = 0$       2.  $x^2 + 10x = 11$

3. Which of the following statements is NOT true for the equation  $y = x^2 + 11x - 26$ ?

a. The equation has  $(x + 13)$  as one of its factors.  
b. The graph of the equation has an x-intercept at  $(-13, 0)$ .  
c. The equation has  $(x - 2)$  as one of its factors.  
d. The function has a zero of  $-13$ .

4. Simplify the radical expression.

$3\sqrt{176}$

6. The height of a falling acorn can be represented by the equation  $h = -5t^2 + 10t$ , where  $h$  is the height in meters after  $t$  seconds. Write a quadratic equation that represents the height of the acorn to hit the ground.

Answers

1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_

Unit: Solving Quadratic Equations  
Review

Name \_\_\_\_\_  
Date \_\_\_\_\_ Pd \_\_\_\_\_

**SOLVING QUADRATIC EQUATIONS STUDY GUIDE**

Solve each problem below. Be sure to ask questions if you need more help with a topic.

**I CAN SOLVE QUADRATIC EQUATIONS BY FACTORING.** A.8A, A.7D

1. Hunter found the factors of a quadratic function  $g$  to be  $(x + 15)$  and  $(x - 4)$ . Give the zeros of  $g(x)$ .

2. Solve the equation by factoring.

3. Solve the equation by factoring.

$x^2 + 16x - 17 = 0$

5. If the zeros of a quadratic equation are  $a$  and  $b$ , write the equation in factored form.

i.  $(x - b)$       ii.  $(x - a)$

**I CAN SIMPLIFY NUMERICAL RADICALS.**

6. Simplify each expression in a-d. If the expression is already simplified, write "Simplified".

a.  $\sqrt{96}$       b.  $\sqrt{144}$

ALGEBRA 1 CURRICULUM

**SOLVING QUADRATIC EQUATIONS**

UNIT NINE: ANSWER KEY

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answer keys  
included

