learning focus:
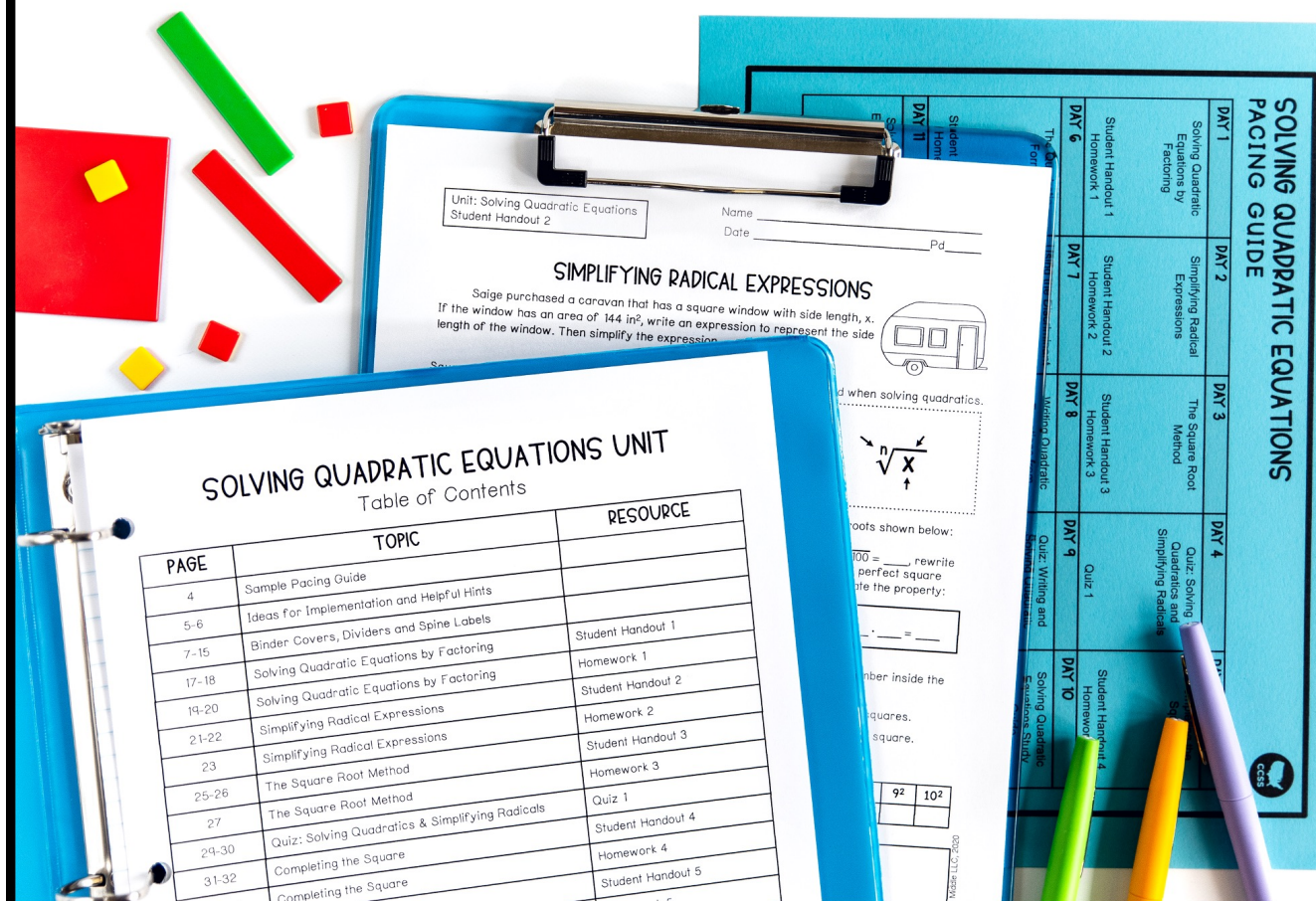
✓ simplify numerical radical expressions

✓ solve quadratic equations using various methods and write equations from solutions

✓ use the discriminant to find the number of solutions to quadratic equations

SOLVING QUADRATIC EQUATIONS UNIT

ALG 1

10 DAY CCSS-ALIGNED UNIT

Unit: Solving Quadratic Equations
Student Handout 2

Name _____
Date _____ Pd ____

SIMPLIFYING RADICAL EXPRESSIONS

Saige purchased a caravan that has a square window with side length, x. If the window has an area of 144 in², write an expression to represent the side length of the window. Then simplify the expression.

SOLVING QUADRATIC EQUATIONS UNIT
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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 and Simplifying Radicals
DAY 6	**DAY 7**	**DAY 8**	**DAY 9**
Student Handout 1 Homework 1	Student Handout 2 Homework 2	Student Handout 3 Homework 3	Quiz 1
DAY 11		Writing Quadratic	Solving Quadratic Equations Study
Student Homework			Student Handout 4 Homework

DAY 10

SOLVING QUADRATIC EQUATIONS

ALG 1

ready-to-go, scaffolded student materials

SOLVING QUADRATIC EQUATIONS UNIT
Table of Contents

SOLVING QUADRATIC EQUATIONS

ALG 1

student friendly + real-world application

scaffolded concepts

Unit: Solving Quadratic Equations
Student Handout 2

Name _____
Date _____ Pd _____

SIMPLIFYING RADICAL EXPRESSIONS

Saige purchased a caravan that has a square window with side length, x. If the window has an area of 144 in², write an expression to represent the side length of the window. Then simplify the expression.

Square roots are examples of _____

RADICAL EXPRESSIONS	• An expression w_____ • If no root index _____ is assumed to be _____ • When simplifying _____ principal, or _____

To simplify radical expressions, we can u_____

PRODUCT PROPERTY OF SQUARE R

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

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

A square root radical expression is simpli_____ radical sign, has no _____ _____

• $\sqrt{15}$ is in simplest form becaus_____
• $\sqrt{12}$ is not in simplest form beca_____

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:	a. Facto_____
b. Simplified?	b. Simp_____

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 $\sqrt{24}$

$$\sqrt{} \cdot 6$$

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

Use the steps above to simplify each e_____

4. $\sqrt{48}$	5. $\sqrt{3}$_____

7. Joe and Audrey believe that their ex_____ name of the student who is correct an_____

J_____

$3\sqrt{15}$_____

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

Summarize today's lesson:

Unit: Solving Quadratic Equations
Homework 2

Name _____
Date _____ Pd _____

SIMPLIFYING RADICAL EXPRESSIONS

Simplify each radical expression below. Circle the names of the students whose expression is already in simplest form. Then unscramble the underlined letters of the circled names to answer the riddle.

TIANA	ANTOINETTE	MARQUES
$\sqrt{60}$	$\sqrt{128}$	$\sqrt{85}$

ENRIQUE	CEDERIC	SASHA
$\sqrt{147}$	$2\sqrt{43}$	$7\sqrt{63}$

GREGORY	ASIA	ERIC
$\sqrt{150}$	$5\sqrt{151}$	$3\sqrt{80}$

Q: WHERE IS A MATHEMATICIAN'S FAVORITE PLACE TO TRAVEL?

A: TIMES _____!

interactive practice

SOLVING QUADRATIC EQUATIONS

ALG 1

a 10 day CCSS-aligned unit
CCSS: A.SSE.3, A.CED.1, A.REI.4, A.REI.7, F.IF.8a

streamline your planning process with unit overviews

✓ key vocabulary

✓ vertical alignment

sample pacing calendar

teaching ideas

SOLVING QUADRATIC EQUATIONS
OVERVIEW

CCSS

STANDARD

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
a. Factor a quadratic expression to reveal the zeros of the function it defines.
b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

A.REI.4 Solve quadratic equations in one variable.
a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions.

A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

F.IF.8a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extrem... ... context.

BIG IDEAS

- Similar to linear equations, ... equation true.
- There are several methods t...
- The discriminant can be use...
- The equation of a graphed c... on the graph.

ESSENTIAL QUESTION

- How can a numerical radica...
- Why is it helpful to have mo...
- How can solutions to quadr...
- If given the graph of a quadr...

SOLVING QUADRATIC EQUATIONS
PACING GUIDE

CCSS

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	Using the Discriminant
Student Handout 5 Homework 5	Student Handout 6 Homework 6

DAY 11	
Solving Quadratic Equations Unit Test	• It may be necessary and throughout the unit.
Test	

SOLVING QUADRATIC EQUATIONS
OVERVIEW

CCSS

TOPIC	TEACHING TIPS
Simplifying Radical Expressions	• If students are struggling to simplify radicals by identifying the largest perfect square factor, consider having them use the prime factorization method.
Solving Quadratic Equations	• 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. • 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. • 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. • Search "Quadratic Formula Pop Goes the Weasel" on YouTube for a "catchy" song to help students memorize the formula!
Using the Discriminant	• As you introduce the concept of imaginary numbers, be sure to make the distinction to students that "no real solutions" is different than stating there are "no solutions." • This lesson introduces the concept of the complex number system and imaginary numbers but does not require students to write complex solutions at this level. If you are teaching advanced students, consider extending the lesson to finding complex solutions when the discriminant is negative.
Writing Quadratic Equations	• 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 $y = a(x - r)(x - s)$. • Allow students to discover the necessity of solving for "a" by asking several students to draw different parabolas that all have the same zeros. • 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.

A MANEUVERING THE MIDDLE® RESOURCE

SOLVING QUADRATIC EQUATIONS

ALG 1

a 10 day CCSS-aligned unit
CCSS: A.SSE.3, A.CED.1, A.REI.4, A.REI.7, F.IF.8a

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.

Answers

1. _____

2. _____

3.

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 NO___
   $y = x^2 + 11x - 26$?

a. The equation has (x + 13) as one of its
b. The graph of the equation has an x-int
c. The equation has (x − 2) as one of its
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 re___
   acorn in meters after t seconds. Write a___
   acorn to hit the ground.

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.

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 equa___

   i. (x − b)   ii. (x

I CAN SIMPLIFY NUMERICAL RADICAL EX___

6. Simplify each expression in a-d. If

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

ALGEBRA 1 CURRICULUM

SOLVING QUADRATIC EQUATIONS

UNIT NINE: ANSWER KEY

answer keys included

A MANEUVERING THE MIDDLE® RESOURCE