

CC Algebra 2 - Regents Review

Unit #8: Radicals and the Quadratic Formula

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Based on Kirk Weiler's
emathinstruction lessons

Unit 8 Video Overview

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Unit 8: Lesson Overview

- 8.1 Square Root Functions
- 8.2 Solving Square Root Equations
- 8.3 The Basic Exponent Properties
- 8.4 Fractional Exponents Revisited
- 8.5 More Exponent Practice
- 8.6 The Quadratic Formula
- 8.7 More Work with the Quadratic Formula

CCLS Associated with Unit 8 (Slide 1/2)

- ❖ N.RN.1 – Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
- ❖ N.RN.2 – Rewrite expressions involving radicals and rational exponents using the properties of exponents.
- ❖ F.IF.4 – For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.* Tasks may involve polynomial, exponential, logarithmic, and trigonometric functions.

CCLS Associated with Unit 8 (Slide 2/2)

- ❖ A.REI.2 – Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. Tasks are limited to simple rational or radical equations.
- ❖ A.REI.4b – Solve quadratic equations in one variable.

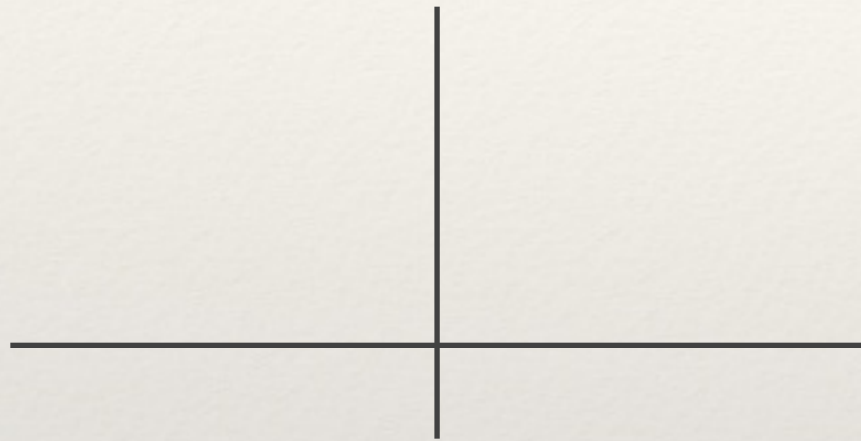
Solve quadratic equations by inspection (e.g., for $x^2 = p$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .

Formulas

- ❖ Rational Exponent Property
- ❖ The Quadratic Formula

Basics of Square Root Functions

Parent Graph:



Domain:

Range:

Find the domain and range of the following functions:

$$f(x) = 3\sqrt{x-2} + 7$$

$$g(x) = -7\sqrt{x^2 - 4x + 3} - 5$$

Solving Radical Equations (Slide 1/2)

- ❖ Isolate the radical, then square both sides.
- ❖ Recall that squaring both sides introduces the possibility for extraneous roots!

Solve the following equation for all values of x :

$$4 + \sqrt{2 + x} = x$$

Solving Radical Equations (Slide 2/2)

- ❖ Some radical equations have two different radicals. In this case, isolate one of the radicals to reduce the equation to having only one radical. Then continue solving by squaring both sides. Check for extraneous roots!

Solve the following equation for all values of x :

$$\sqrt{2x+1} + \sqrt{x-3} = 2$$

Rational Exponents

Rational Exponent Property:

Evaluate the following expressions.

$$32^{-\frac{4}{5}}$$

$$f(x) = 6x^{\frac{2}{3}} - 12^{-1} \quad \text{Find } f(8)$$

Completely simplify the following expressions involving rational exponents.

$$(8x^4y^6)^{\frac{1}{3}}$$

$$\frac{3y^{\frac{1}{4}}}{4x^{-\frac{2}{3}}y^{\frac{3}{2}} \cdot 3y^{\frac{1}{2}}}$$

Simplifying Radicals

Completely simplify the following radicals.

$$\sqrt{72a^3b^8c^5}$$

$$\sqrt[3]{54x^8}$$

$$\sqrt[5]{96x^{11}y^6}$$

The Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Apply the Quadratic Formula to find the zeroes of the following functions.

$$f(x) = x^2 + 6x - 12$$

$$g(x) = 10x^2 - 9x - 91$$

Summary of Most Important Information

- ❖ Students should be able to:
 - ❖ Graph a square root function and identify the domain and range of a square root function given its equation.
 - ❖ Apply the rational property of exponents to convert expressions between radical form and exponential form.
 - ❖ Solve radical equations and eliminating any extraneous roots.
 - ❖ Simplify a radical completely.
 - ❖ Apply the Quadratic Formula to solve a quadratic equation.