

# Algebra 2

[Implement Start Year (2013-2014)]

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## Unit #5, Radical Functions

### Stage 1 – Desired Results

#### Established Goals

**2009 NJCCC Standard(s), Strand(s)/CPI #**  
(<http://www.nj.gov/education/cccs/2009/final.htm>)

**Common Core Curriculum Standards for Math and English**  
(<http://www.corestandards.org/>)

#### **The Real Number System N-RN: 1, 2**

- Extend the properties of exponents to rational exponents.

#### **Reasoning with Equations and Inequalities A-REI: 2**

- Understand solving equations as a process of reasoning and explain the reasoning.

#### **Interpreting Functions F-IF: 8**

- Analyze functions using different representations.

#### **Building Functions F-BF: 4a, 4b, 4c, 4d**

- Build new functions from existing functions.

#### 21<sup>st</sup> Century Themes

( [www.21stcenturyskills.org](http://www.21stcenturyskills.org) )

- Global Awareness
- Financial, Economic, Business and Entrepreneurial Literacy
- Civic Literacy
- Health Literacy
- Environmental Literacy

#### 21<sup>st</sup> Century Skills

##### *Learning and Innovation Skills:*

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

##### *Information, Media and Technology Skills:*

- Information Literacy
- Media Literacy
- ICT (Information, Communications and Technology) Literacy

##### *Life and Career Skills:*

- Flexibility and Adaptability
- Initiative and Self-Direction
- Social and Cross-Cultural Skills
- Productivity and Accountability
- Leadership and Responsibility

<p><b>Enduring Understandings:</b> <i>Students will understand that . . .</i></p> <p>EU 1</p> <ul style="list-style-type: none"> <li>radical expressions can be simplified</li> </ul> <p>EU 2</p> <ul style="list-style-type: none"> <li>radical equations can be solved by manipulation</li> </ul> <p>EU3</p> <ul style="list-style-type: none"> <li>changing the exponent of a function affect the domain and the number of solutions for that function</li> </ul>	<p><b>Essential Questions:</b></p> <p>EU 1</p> <ul style="list-style-type: none"> <li>How do arithmetic properties apply to radical expressions or other expressions with rational exponents?</li> </ul> <p>EU 2</p> <ul style="list-style-type: none"> <li>How are arithmetic properties used to solve radical equations?</li> </ul> <p>EU3</p> <ul style="list-style-type: none"> <li>What effect does changing the exponent of a function have on the domain and the number of solutions for that function?</li> </ul>
<p><b>Knowledge:</b> <i>Students will know . . .</i></p> <p>EU1</p> <ul style="list-style-type: none"> <li>radical expressions can be simplified through addition, subtraction, multiplication and division</li> <li>radical expressions can be simplified using the properties of exponents</li> </ul> <p>EU2</p> <ul style="list-style-type: none"> <li>radical equations can be solved by using powers</li> </ul> <p>EU3</p> <ul style="list-style-type: none"> <li>increasing the degree of a function will increase the likelihood of extraneous solutions</li> </ul>	<p><b>Skills:</b> <i>Students will be able to . . .</i></p> <p>EU1</p> <ul style="list-style-type: none"> <li>simplify radical expressions through addition, subtraction, multiplication and division</li> <li>simplify expressions using the properties of exponents</li> </ul> <p>EU2</p> <ul style="list-style-type: none"> <li>solve radical equations by raising both sides of the equation to a power</li> </ul> <p>EU3</p> <ul style="list-style-type: none"> <li>identify solutions and eliminate extraneous solutions to radical equations</li> </ul>

## Stage 2 – Assessment Evidence

### Recommended Performance Tasks: EU2, EU3

Name \_\_\_\_\_

Radical Functions Performance Task

Determine the inflation of homes over a period of  $n$  years as a financial planner who is tasked to submit a report. The clients are government workers who need to know the current inflation rates. Calculate the inflation of homes that increases from the years provided below over a period of  $n$  years in a certain demographical area.

Product Performance and Purpose:

- Choose from one of the following areas to base the equation on:
  - Median home price
    - Southern California: Year 2002 - \$246,000; Year 2007 - \$505,000\*
    - Atlanta, Georgia: Year 2005 - \$234,876; Year 2007 - \$254,388\*\*
    - Denver, Colorado: Year 2005 - \$319,700; Year 2010 - \$293,000\*\*\*
- State which demographical area and the data that correlates with it. Find the inflation rate.
- Show all steps used to solve the equation.
- Be sure to include if the findings were a rise or a decline in the housing market.
- Using the “ $i$ ” values, find the median home price in the year 2015.

### Other Recommended Evidence:

- Quiz on simplifying and operations with radicals and rational exponents
- Quiz on radical equations

## Stage 3 – Learning Plan

**Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections:** Consider the *WHERE TO* elements. Each learning activity listed must be accompanied by a learning goal of A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.

- Activity #1: Give each student an index card with either a simplified, un-simplified, or decimal approximation for a radical. Students must find their “triplets.” (A)
- Activity #2: Given 8-10 radical equations come up with the domain and range in interval notation, then confirm graphically using your calculator. (M)
- Activity #3: Extraneous Solutions Nspire Activity (T)  
<http://education.ti.com/calculators/timathnspired/US/Activities/Detail?id=16042&sa=1010&t=1178>

The following is the suggested sequence of learning activities and number of days for the Algebra 2 L2 class. Adjustments should be made accordingly for other levels.

### Approximately 17 days for completion of unit

YWBAT simplify radical expressions (square roots and cube roots with both integers and variables) (A)

YWBAT add and subtract radical expressions(A)

- Activity #1: Give each student an index card with either a simplified, un-simplified, or decimal approximation for a radical. Students must find their “triplets.”(A)

YWBAT multiply and divide radical expressions (include rationalizing the denominator)(A)

YWBAT switch between radical form and rational exponents(A)

YWBAT simplify expressions with rational exponents(A)

YWBAT determine the domain and range in interval notation of a radical equation(A)

- Activity #2: Given 8-10 radical equations come up with the domain and range in interval notation, then confirm graphically using your calculator.(M)

YWBAT solve basic radical equations(A)

YWBAT solve radical equations that involve factoring(A)

YWBAT determine how extraneous solutions are produced from radical equations(M)

- Activity #3: Extraneous Solutions Nspire Activity(T)

YWBAT solve radical equations that are a binomial equal to a radical (include extraneous solutions)(A)

YWBAT solve equations with radicals on both sides(A)

YWBAT solve equations with rational exponents(A)

**Critical Vocabulary:**

Exponent

Power

Radicand

Root

Extraneous

Radical equation

Rational exponent

Triplet

Nth root

Radical function

Rationalizing the denominator