

# Algebra 2

[Implement Start Year (2013-2014)]

## Revision Committee Members, email, extension

Amy Gersbach [agersbach@lrhsd.org](mailto:agersbach@lrhsd.org) ext. 8387

Jeanie Isopi [jisopi@lrhsd.org](mailto:jisopi@lrhsd.org) ext. 2244

Megan Laffey [mlaffey@lrhsd.org](mailto:mlaffey@lrhsd.org) ext. 4437

Kim New [knew@lrhsd.org](mailto:knew@lrhsd.org) ext. 8792

## Unit #4, Rational 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/>)

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

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

#### **Interpreting Functions F-IF: 4, 5, 7d**

- Interpret functions that arise in applications in terms of the context.
- Analyze functions using different representations.

#### **Building Functions F-BF: 3**

- Build new functions from existing functions.

#### **Arithmetic with Polynomials and Rational Expressions A-APR: 6, 7**

- Rewrite rational expressions.

#### 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>EU1</p> <ul style="list-style-type: none"> <li>• a simplified version of an expression may be more useful</li> </ul> <p>EU2</p> <ul style="list-style-type: none"> <li>• a solution can be interpreted in the context of a function</li> <li>• interpretation of a solution is necessary in terms of its context</li> <li>• the number and type of solutions vary predictably based on the type of equation</li> </ul>	<p><b>Essential Questions:</b></p> <p>EU1</p> <ul style="list-style-type: none"> <li>• Why can simplifying mathematical expressions be useful?</li> <li>• Why are domain restrictions necessary for rational functions?</li> </ul> <p>EU2</p> <ul style="list-style-type: none"> <li>• What process is used to solve a rational equation?</li> </ul>
<p><b>Knowledge:</b> <i>Students will know . . .</i></p> <p>EU1</p> <ul style="list-style-type: none"> <li>• basic operations with fractions can be applied to algebraic rational expressions</li> <li>• the denominator of a rational expression cannot equal zero.</li> </ul> <p>EU2</p> <ul style="list-style-type: none"> <li>• the properties of solving polynomial functions can be extended to include rational functions.</li> <li>• restrictions on a rational function coincide with the 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>• add, subtract, multiply and divide rational expressions, both simple and complex</li> <li>• state restrictions on the variable in a rational expression.</li> </ul> <p>EU2</p> <ul style="list-style-type: none"> <li>• solve rational equations by cross multiplying, simplifying, or multiplying through by the least common denominator.</li> <li>• recognize solutions that are extraneous</li> </ul>

## Stage 2 – Assessment Evidence

### Recommended Performance Tasks: EU1, EU2

Name \_\_\_\_\_

Rational Functions Performance Task

The effect of the Earth's gravity diminishes as the distance from the Earth increases. A person's weight at a given height above sea level is described by the function  $W(h) = \frac{rw}{h+r}$  where  $r$  is the Earth's radius (3,963 miles),  $h$  is the height above sea level, and  $w$  is the person's weight at sea level. Show all work and explain your answers in context.

1. How much lighter is a person in a town that has an altitude of 2,000 feet than you are at sea level? Round your answer to the nearest thousandth of an ounce.
  
  
  
  
  
  
  
  
  
  
2. A mountain that has an elevation of 14,409 feet, how much lighter will the backpack be when the summit is reached? Round your answer to the nearest thousandth of an ounce.
  
  
  
  
  
  
  
  
  
  
3. What elevation (to the nearest mile) would the person have to be in order for the backpack to weigh 35 pounds?

### Other Recommended Evidence:

- Mini Quiz on simplifying, multiplying, and dividing rational expressions
- Quiz on complex fractions, adding and subtracting rational expressions
- Test on rational expressions

## 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 – Matching Activity (A)

Activity #2 – Ticket to Leave – Write a rational function with the given restrictions on the domain. (M)

Activity #3 – Goldfish Activity (M)

Activity #4 – TI-Nspire Airport Impact Activity <http://education.ti.com/calculators/timath/US/Activities/Detail?sa=1010&id=9320> (T)

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 16 days for completion of unit

YWBAT determine domain restrictions of rational functions and their graphs(A)

YWBAT complete Warm Up Activity #1 – Match equations of rational functions to their graphs, domain restrictions on prior functions, and graphs of rational functions.(A)

YWBAT discuss the graphs and how they relate to the domain, vertical asymptotes, and restrictions when solving.(M)

Homework – factoring review, simplify by canceling when given rational expressions already factored

YWBAT simplify rational expressions(A)

YWBAT multiply and divide rational expressions(A)

YWBAT Activity # 2 - complete the Ticket to Leave – Write a rational function with the given restrictions on the domain.(A)

YWBAT simplify complex fractions(A)

YWBAT add and subtract rational expressions (with like denominators or easy LCDs) (A)

YWBAT add and subtract rational expressions (with unlike denominators)(A)

YWBAT simplify complex fractions with adding and subtracting in the numerator and/or denominator(A)

YWBAT Activity # 3 - Goldfish(M)

YWBAT solve rational expressions (include extraneous solutions)(M)

YWBAT Activity # 4 - TI-Nspire Airport Impact Activity(M)

**Critical Vocabulary:**

Asymptote

Extraneous

Numerator

Rational Expression

Solution

Complex

Factor

Polynomial

Rational Equation

Denominator

Least Common Denominator

Proportion

Reciprocal