

## Unit 5 - Rational Expressions and Functions

### Overview

In this unit students will extend their understanding of polynomials functions and their graphs to rational functions and their graphs. Students are encouraged to connect operations on rational expressions to operations on fractions learned in earlier math courses. Polynomial and rational inequalities are also explored in this unit.

**21<sup>st</sup> Century Capacities:** Analyzing

### Stage 1 - Desired Results

<p>ESTABLISHED GOALS/ STANDARDS</p> <p><b>MP 1</b> Make sense sense of problems and persevere in solving them  <b>MP4</b> Model with Mathematics  <b>MP5</b> Use appropriate tools strategically  <b>MP6</b> Attend to precision</p> <p>CCSS.MATH.CONTENT.HSA.SSE.A.2                  Use the structure of an expression to identify ways to rewrite it</p> <p>A.APR.6 Rewrite simple rational expressions in different forms; write <math>a(x)/b(x)</math> in the form <math>q(x) + r(x)/b(x)</math>, where <math>a(x)</math>, <math>b(x)</math>, <math>q(x)</math>, and <math>r(x)</math> are polynomials with the degree of <math>r(x)</math> less than the degree of <math>b(x)</math>, using inspection, long division, or, for the more complicated examples, a computer algebra system.</p> <p>CCSS.MATH.CONTENT.HSF.IF.C.7.D</p>	<p style="text-align: center;"><b>Transfer:</b></p> <p><i>Students will be able to independently use their learning in new situations to...</i></p> <ol style="list-style-type: none"> <li>1. Model relationships among quantities.</li> <li>2. Manipulate equations/expressions to create order and establish relationships.(Analyzing)</li> <li>3. Draw conclusions about graphs, equations. (Analyzing)</li> </ol> <p style="text-align: center;"><b>Meaning:</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>UNDERSTANDINGS:</b> <i>Students will understand that:</i></p> <ol style="list-style-type: none"> <li>1. Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.</li> <li>2. Mathematicians examine the impact of operations and how they relate to one another.</li> <li>3. Mathematicians examine relationships to discern a pattern, generalizations, or structure.</li> </ol> </td> <td style="width: 50%; vertical-align: top;"> <p><b>ESSENTIAL QUESTIONS:</b> <i>Students will explore &amp; address these recurring questions:</i></p> <ol style="list-style-type: none"> <li>A. What math tools/models/strategies can I use to solve the problem?</li> <li>B. How can I break a problem down into manageable parts?</li> <li>C. What have I seen in the past that might help me now?</li> </ol> </td> </tr> </table>	<p><b>UNDERSTANDINGS:</b> <i>Students will understand that:</i></p> <ol style="list-style-type: none"> <li>1. Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.</li> <li>2. Mathematicians examine the impact of operations and how they relate to one another.</li> <li>3. Mathematicians examine relationships to discern a pattern, generalizations, or structure.</li> </ol>	<p><b>ESSENTIAL QUESTIONS:</b> <i>Students will explore &amp; address these recurring questions:</i></p> <ol style="list-style-type: none"> <li>A. What math tools/models/strategies can I use to solve the problem?</li> <li>B. How can I break a problem down into manageable parts?</li> <li>C. What have I seen in the past that might help me now?</li> </ol>
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## Algebra II Level 1 Curriculum

	<b>Acquisition:</b>	
<p>(+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.</p> <p>A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.</p>	<p><i>Students will know...</i></p> <ol style="list-style-type: none"> <li>1. That a graph can be used as a quick sketch to get a broad understanding of a function</li> <li>2. Vocabulary: asymptote</li> </ol>	<p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> <li>1. Manipulating rational expressions (simplify/add/subtract/multiply/divide)</li> <li>2. Working with complex fractions</li> <li>3. Solving rational equations and inequalities</li> <li>4. Finding the restrictions on the domain</li> <li>5. Graphing (sketch) rational functions and inequalities, including x and y intercepts and vertical and horizontal asymptotes and slant asymptotes</li> <li>6. Determining the domain and range of a graph</li> </ol>