

Unit 5 - Rational Functions

Overview

The main goals of this unit include improving students' fluency with rational expressions - understanding difference between expressions and equations and the strategies/approaches we can use to simplify each. Students will build confidence to handle more complex math problems they will encounter in future math classes. Students will make connections between equations and graphs in terms of asymptotes and domain and limits.

21st Century Capacities: Analyzing, Collective Intelligence

Stage 1 - Desired Results

<p>ESTABLISHED GOALS/ STANDARDS</p> <p>MP 1 Make sense of problems and persevere in solving them</p> <p>MP2 Reason abstractly and quantitatively</p> <p>MP3 Construct viable arguments and critique the reasoning of others</p> <p>MP6 Attend to precision</p> <p>MP7 Look for and make use of structure</p> <p>Rewrite rational expressions.</p> <p>CCSS.MATH.CONTENT.HSA.APR.D.6 Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division.</p> <p>CCSS.MATH.CONTENT.HSA.APR.D.7 (+) Understand that rational expressions form a system analogous to the rational numbers, closed</p>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center; background-color: #D3D3D3; padding: 5px;">Transfer:</td> </tr> <tr> <td colspan="2" style="padding: 5px;"><i>Students will be able to independently use their learning in new situations to...</i></td> </tr> <tr> <td colspan="2" style="padding: 5px;"> <ol style="list-style-type: none"> 1. Manipulate equations/expressions or objects to create order and establish relationships.(Analyzing) 2. Draw conclusions about graphs, shapes, equations, or objects. (Analyzing and Collective Intelligence) 3. Demonstrate fluency with math facts, computation and concepts. 4. Use appropriate tools to make reaching solutions more efficient, accessible and accurate. (Analyzing) </td> </tr> <tr> <td colspan="2" style="text-align: center; background-color: #D3D3D3; padding: 5px;">Meaning:</td> </tr> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p>UNDERSTANDINGS: <i>Students will understand that:</i></p> <ol style="list-style-type: none"> 1. Mathematicians represent and analyze mathematical situations and structures using algebraic symbols to communicate thinking. 2. Mathematicians use numbers, ways of representing numbers, relationships among numbers, and number systems to build meaning. 3. Mathematicians flexibly use different tools, strategies, and operations to build conceptual knowledge or solve problems. 4. Mathematicians continually evaluate their </td> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p>ESSENTIAL QUESTIONS: <i>Students will explore & address these recurring questions:</i></p> <ol style="list-style-type: none"> A. How can I break a problem down into manageable parts? B. What is another way that this problem could be solved? C. What math tools/models/strategies can I use to solve the problem? D. How do I think about what is equal and not equal? </td> </tr> </table>	Transfer:		<i>Students will be able to independently use their learning in new situations to...</i>		<ol style="list-style-type: none"> 1. Manipulate equations/expressions or objects to create order and establish relationships.(Analyzing) 2. Draw conclusions about graphs, shapes, equations, or objects. (Analyzing and Collective Intelligence) 3. Demonstrate fluency with math facts, computation and concepts. 4. Use appropriate tools to make reaching solutions more efficient, accessible and accurate. (Analyzing) 		Meaning:		<p>UNDERSTANDINGS: <i>Students will understand that:</i></p> <ol style="list-style-type: none"> 1. Mathematicians represent and analyze mathematical situations and structures using algebraic symbols to communicate thinking. 2. Mathematicians use numbers, ways of representing numbers, relationships among numbers, and number systems to build meaning. 3. Mathematicians flexibly use different tools, strategies, and operations to build conceptual knowledge or solve problems. 4. Mathematicians continually evaluate their 	<p>ESSENTIAL QUESTIONS: <i>Students will explore & address these recurring questions:</i></p> <ol style="list-style-type: none"> A. How can I break a problem down into manageable parts? B. What is another way that this problem could be solved? C. What math tools/models/strategies can I use to solve the problem? D. How do I think about what is equal and not equal?
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PreCollege Algebra & Trigonometry Curriculum

<p>under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.</p> <p>CCSS.MATH.CONTENT.HSF.IF.C.7.D (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.</p>	<p>process and the reasonableness of the intermediate results.</p>	
	Acquisition:	
	<p><i>Students will know...</i></p> <ol style="list-style-type: none"> 1. The only thing you can do to a fraction (and not change its value) is to multiply by ONE 2. Only FACTORS can divide out to one 3. Addition/Subtraction requires common denominator because different order of operation 4. Vertical asymptotes arise from domain restrictions 5. Other asymptotes arise from quotient of long division 6. Vocabulary: factor, term, cancel, complex fraction, extraneous solution, domain, asymptote 	<p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> 1. Simplifying rational expressions 2. Solving rational equations 3. Finding the domain of a function 4. Determining asymptotes of rational functions 5. Graphing rational functions