



Algebra 2 Level 1 - Unit 5 - Rational Expressions and Functions

Unit Focus

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.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Common Core Mathematics: 9-12 - Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$. (CCSS.MATH.CONTENT.HSA.SSE.A.2) - 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, or, for the more complicated examples, a computer algebra system. (CCSS.MATH.CONTENT.HSA.APR.D.6) - Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. (CCSS.MATH.CONTENT.HSA.REI.A.2) - Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. (CCSS.MATH.CONTENT.HSF.IF.C.7.D) - Make sense of problems and persevere in solving them. (CCSS.MATH.MP.1) - Model with mathematics. (CCSS.MATH.MP.4) - Use appropriate tools strategically. (CCSS.MATH.MP.5) - Attend to precision. (CCSS.MATH.MP.6) Madison Public Schools Profile of a Graduate - Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)	<i>Students will be able to independently use their learning to...</i> T1 model relationships among quantities. T2 manipulate equations/expressions or objects to create order and establish relationships. T3 draw conclusions about graphs, shapes, equations, or objects.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions. U2 Mathematicians examine the impact of operations and how they relate to one another. U3 Mathematicians examine relationships to discern a pattern, generalizations, or structure.	<i>Students will keep considering...</i> Q1 What math tools/models/ strategies can I use to solve the problem? Q2 How can I break a problem down into manageable parts? Q3 What have I seen in the past that might help me now?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 that a graph can be used as a quick sketch to get a broad understanding of a function K2 Vocabulary: asymptote	<i>Students will be skilled at...</i> S1 manipulating rational expressions (simplify/add/subtract/multiply/divide) S2 working with complex fractions S3 solving rational equations and inequalities S4 finding the restrictions on the domain S5 graphing (sketch) rational functions and inequalities, including x and y intercepts and vertical and horizontal asymptotes and slant asymptotes S6 determining the domain and range of a graph