

Algebra II Curriculum Bundle #9

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| Title | Suggested Dates |
| Rational Functions | February 22 – March 12 (15 days) |

| Big Idea/Enduring Understanding | Guiding Questions |
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| Rational expressions, equations and functions can be expressed as the products and quotients of polynomials. | 1. What is a rational expression, equation or function? |
| Factoring, exponent rules, and operations with fractions are all necessary tools for simplifying rational expressions, solving rational equations, and analyzing and interpreting rational functions. | 1. How does factoring help while performing operations with rational expressions or solving rational equations? 2. How do you find the domain, range, x & y intercepts, roots, asymptotes and holes of a rational function? |
| Rational functions can be used to solve inverse variation, mixture and rate real world problems. | 1. What applications can you model with rational functions? |

The resources included here provide teaching examples and/or meaningful learning experiences to address the District Curriculum. In order to address the TEKS to the proper depth and complexity, teachers are encouraged to use resources to the degree that they are congruent with the TEKS and research-based best practices. Teaching using only the suggested resources does not guarantee student mastery of all standards. Teachers must use professional judgment to select among these and/or other resources to teach the District Curriculum.

| Knowledge & Skills with Student Expectations | District Specificity/Examples | Suggested Resources (See note above) | |
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| <p>2A.10 Rational functions. The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.</p> <p>2A.10A The student uses quotients of polynomials to describe the graphs of rational functions, predict the effects of parameter changes, describes limitations on the domains and ranges, and examines asymptotic behavior.</p> <p style="color: blue;">NOTE: polynomials should be linear, quadratic, or x^3 and factored cubics.</p> | <ul style="list-style-type: none"> • Describe verbally the locations of discontinuities—vertical and horizontal asymptotes and removable discontinuities • Write equations of vertical and horizontal asymptotes • Identify locations of removable discontinuities (holes) • Predict changes in the graph with parameter changes to the equation (transformations) • Compare domain and range of original and transformed equations. • Set denominator = to zero to determine vertical asymptotes (domain) • Calculate horizontal asymptotes (range) • How to calculate horizontal asymptotes <ul style="list-style-type: none"> ○ Degree of Numerator < Degree of Denominator: $y = 0$ ○ Degree of Numerator > Degree of Denominator: none ○ Degree of Numerator = Degree of | <p>Texas Algebra II Holt, Rinehart, & Winston Section 8-4 Lab: Explore Holes in Graphs pg. 591</p> <p>Discovering Advanced Algebra Key Curriculum Press section 9.7 Graphs of Rational Functions pg. 544 – 550</p> | <p>Laying the Foundation, Connecting Algebra 2 to Advanced Placement Mathematics “Rational Functions with Removable Discontinuities” pp. 244 -255</p> |

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| | Denominator: $y = \text{ratio of the leading coefficients}$ | | |
| <p>2A.10 Rational functions. The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.</p> <p>2A.10B The student analyzes various representations of rational functions with respect to problem situations</p> | <ul style="list-style-type: none"> • Model a problem situation using a rational function and solve using graphs, tables, verbal description, and/or equations. | <p>Discovering Advanced Algebra Key Curriculum Press Section 9.6 Introduction to Rational Functions pg. 536 – 543</p> | <p>Laying the Foundation, Connecting Algebra 2 to Advanced Placement Mathematics “Rational Function Exploration” pp. 262 – 267 “Optimizations with Rational Functions” pp. 300 – 305 “A Rational Function Optimization Problem” pp. 306 - 309</p> |
| <p>2A.10 Rational functions. The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.</p> <p>2A.10C The student determines the reasonable domain and range values of rational functions, as well as interprets and determines the reasonableness of solutions to rational equations and inequalities.</p> | <ul style="list-style-type: none"> • Use graphing calculator table values and graph to determine domain and range • Relate vertical and horizontal asymptotes to domain and range restrictions. • Check solutions in the original equation to ensure the function is defined for that value. | <p>Texas Algebra II Holt, Rinehart, & Winston Section 8-4 Rational Functions pg. 592 – 604</p> | |
| <p>2A.10 Rational functions. The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.</p> <p>2A.10D The student determines the solutions of rational equations using graphs, tables, and algebraic methods.</p> | <ul style="list-style-type: none"> • Solve using a calculator • Solve rational equations using algebraic methods <ul style="list-style-type: none"> ○ Find least common denominator (LCD), factoring if necessary ○ Add & subtract rational expressions ○ Multiply/divide rational expressions | <p>Texas Algebra II Holt, Rinehart, & Winston Section 8-2 Multiplying and Dividing Rational Expressions pg. 577 – 582 Section 8-3 Adding and Subtracting Rational Expressions pg. 583 – 590 Section 8-5 Solving Rational Equations pg. 600 – 607</p> <p>Discovering Advanced Algebra Key Curriculum Press Section 9.8 Operations With rational Expressions pg. 551 – 557</p> | <p>Laying the Foundation, Connecting Algebra 2 to Advanced Placement Mathematics “Rational Functions – Long Run Behavior” pp. 268 - 275 “Rational Functions – Short Run Behavior” pp. 276 - 289 “Piecewise and Rational Functions” pp. 290 - 299</p> |

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| <p>2A.10 Rational functions. The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.</p> <p>2A.10E The student determines solutions of rational inequalities using graphs and tables</p> | <ul style="list-style-type: none"> • Connect the solutions using graphs and tables, using algebraic and graphical methods | <p>Incorporate this TEKS in with the previous lessons.</p> | |
| <p>2A.10 Rational functions. The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.</p> <p>2A.10F The student analyzes a situation modeled by a rational function, formulates an equation or inequality composed of a linear or quadratic function, and solves the problem.</p> | <ul style="list-style-type: none"> • Write equations/inequalities from data or information given in a graph, table, or problem situation • Work with applications of rational functions composed of both linear and quadratic functions | | <p>Laying the Foundation, Connecting Algebra 2 to Advanced Placement Mathematics Advanced Placement Strategies, Inc. “A Rational function optimization Problem” pg. 306</p> |
| <p>2A.10 Rational functions. The student formulates equations and inequalities based on rational functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation.</p> <p>2A.10G The student uses functions to model and make predictions in problem situations involving direct and inverse variation.</p> | <ul style="list-style-type: none"> • Describe verbally direct and inverse variation and how they compare • Find constant of variation • Use the constant of variation to solve for the unknown • Connect direct variation to linear function and inverse variation to rational function • Solve joint variation • Apply understanding of indirect, direct and joint variation to real world scenarios; apply to science (optional) | <p>Texas Algebra II Holt, Rinehart, & Winston</p> <p>Section 8-1 lab: Model Inverse Variation pg. 568</p> <p>Section 8-1 Variation Functions pg. 569 – 576</p> | <p>A&M Curriculum</p> <p>Spring 7-5 Applications of variation</p> <p>Spring 7-4 Variation</p> |