WAUCONDA SCHOOL DISTRICT 118
UNIT PLANNING ORGANIZER

Subject: Algebra IIB

Unit: 3 Rational Functions

Pacing: 17 days

STAGE 1 – DESIRED RESULTS

Essential Questions:

- **How do we add/subtract fractions?**
- **How do the rules of algebraic operations apply to rational functions?**
- **How is factoring used to simplify a rational expression?**
- **How are reciprocals used to divide rational expressions?**
- **How do you determine asymptotes and holes in graphs of rational functions?**
- **Why do we need to simplify before we graph? What happens if we don't?**
- **Why do we need to set restrictions?**

Big Ideas:

- **A rational function is a ratio of polynomial functions.**
- **There is a process required to obtain a rational function in simplest form in order to represent it graphically.**
- **If a rational function is in simplified form and the polynomial in the denominator is not a constant, the graph of the rational function features asymptotic behavior.**
- **You can use much of what you know about multiplying and dividing fractions to multiply and divide rational expressions.**
- **To operate (+, -, x, ÷, exponents, etc.) with rational expressions, you can use much of what you know about operating with fractions.**
- **When solving an equation involving rational expressions multiplying by the common denominator can result in extraneous solutions.**

CCSS (Priority Standards):

- **A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. (★)**
- **A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (★)**
- **A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's lawV = IR to highlight resistance R. (★)**
- **A.SSE.1 Interpret expressions that represent a quantity in terms of its context. (★) a. Interpret parts of an expression, such as terms, factors, and coefficients.**
- **A.SSE.2 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 $(x^2–y^2)(x^2+ y^2)$.**

- **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.**
- **A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.**
- **F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (★) d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.**
- **F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the functions is increasing, decreasing, positive, or negative; relative maxima and minima; symmetries; end behavior; and periodicity. (★)**

STAGE 2 – EVIDENCE

Concepts (What students need to know)	Performance Tasks (What students will be able to do)	21st Century Skills
• Graphing Simple Rational Functions • Graphing General Rational Functions • Multiplying and Dividing Rational Expressions • Adding, Subtracting, and Simplifying Complex Rational Expressions • Solving Rational Equations	Simplify rational expressions • Add and subtract rational expressions • Solve rational expressions • Check for extraneous solutions • Find asymptotes and holes of rational functions • Find domain and range of rational functions	

Common Formative/Summative Assessments:

- ➢ Unit 3 Quiz
- ➢ Unit 3 Journal
- ➢ Unit 3 Test

Interim Assessments (Informal Progress Monitoring checks):

- ➢

Modified Common Assessments:

Modified Interim Assessments:

STAGE 3 – LEARNING PLAN
(INSTRUCTIONAL PLANNING)

Suggested Resources/Materials/Informational Texts

Suggested Research-based Effective Instructional Strategies

Identifying Similarities and Differences - The ability to break a concept into its similar and dissimilar characteristics allows students to understand (and often solve) complex problems by analyzing them in a more simple way. Teachers can either directly present similarities and differences, accompanied by deep discussion and inquiry, or simply ask students to identify similarities and differences on their own. While teacher-directed activities focus on identifying specific items, student-directed activities encourage variation and broaden understanding, research shows.

Summarizing and Note Taking - These skills promote greater comprehension by asking students to analyze a subject to expose what's essential and then put it in their own words. According to research, this requires substituting, deleting, and keeping some things and having an awareness of the basic structure of the information presented.

Cues, Questions, and Advance Organizers Cues - Questions, and advance organizers help students use what they already know about a topic to enhance further learning. Research shows that these tools should be highly analytical, should focus on what is important, and are most effective when presented before a learning experience

Cooperative Learning - Research shows that organizing students into cooperative groups yields a positive effect on overall learning. When applying cooperative learning strategies, keep groups small and don't overuse this strategy-be systematic and consistent in your approach.

Reinforcing Effort and Providing Recognition - Effort and recognition speak to the attitudes and beliefs of students, and teachers must show the connection between effort and achievement. Research shows that although not all students realize the importance of effort, they can learn to change their beliefs to emphasize effort.

Taken from: *Marzano's Nine Instructional Strategies for Effective Teaching and Learning*

Academic Vocabulary/ Word Wall	Enrichment/Extensions/ Modifications
Essential Vocabulary: Rational Expression Simplified Form Complex Fractions Rational Equations Extraneous Solutions	

Hyperbola Cross Multiplying	