



## Northern York County School District

### Curriculum Overview

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| <b>Course: Transition to College Math</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |
| <b>Grade Level: 11-12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 |
| <b>Approval Date:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Length of Time: 180 Days</b> |
| <b>Course Description:</b><br><p>The Transition to College Math course is designed to bridge the gap between algebra II, geometry, and collegiate courses in mathematics. Emphasis will be placed on linear, polynomial, rational, trigonometric, exponential, and logarithmic functions, systems of equations, inequalities, and other algebraic and geometric concepts. Students may use graphing calculators for various mathematical applications. Both topics and depth of study aim to be consistent with the expectations of a traditional College Algebra course required for many non-math dependent collegiate majors or many associate degree programs.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 |
| <b>Prerequisite:</b> Students must have a teacher recommendation and completion of algebra I, geometry & algebra II.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                 |
| <b>Course Objectives:</b> <ul style="list-style-type: none"> <li>• Graph, solve, model, and analyze real world problems with linear, quadratic, polynomial, radical, absolute value, piecewise, rational, inverse, exponential, logistic, and logarithmic functions</li> <li>• Solve and graph linear, polynomial, absolute value, and rational inequalities</li> <li>• Identify characteristics of conics</li> <li>• Solve exponential growth and decay real-world problems</li> <li>• Solve systems of equations and inequalities including multivariable linear systems</li> <li>• Introduce students to the fundamentals of trigonometry</li> <li>• Prepare students for college entrance math test</li> <li>• Prepare students for math SAT test</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                 |
| <b>Related Standards:</b> <ul style="list-style-type: none"> <li>• CC.2.2.HS.C.2 – Graph and analyze functions and use their properties to make connections between the different representations.</li> <li>• CC.2.2.HS.C.4 – Interpret the effects transformations have on functions and find the inverses of functions.</li> <li>• CC.2.2.HS.C.5 - Construct and compare linear, quadratic, and exponential models to solve problems.</li> <li>• CC.2.2.HS.C.6 - Interpret functions in terms of the situations they model.</li> <li>• CC.2.2.HS.C.7– Apply radian measure of an angle and the unit circle to analyze the trigonometric functions.</li> <li>• CC.2.2.HS.D.2 – Write expressions in equivalent forms to solve problems.</li> <li>• CC.2.2.HS.D.3 - Extend the knowledge of arithmetic operations and apply it to polynomials.</li> <li>• CC.2.2.HS.D.4 - Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs.</li> <li>• CC.2.2.HS.D.5 - Use polynomial identities to solve problems.</li> <li>• CC.2.2.HS.D.6 – Extend the knowledge of rational functions to rewrite in equivalent forms.</li> </ul> |                                 |

- CC.2.2.HS.D.7 - Create and graph equations or inequalities to describe numbers or relationships.
- CC.2.2.HS.D.8 – Apply inverse operations to solve equations or formulas for a given variable.
- CC.2.2.HS.D.9 - Use reasoning to solve equations and justify the solution method.
- CC.2.2.HS.D.10 - Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.
- CC.2.1.HS.F.1 - Apply and extend the properties of exponents to solve problems with rational exponents.
- CC.2.1.HS.F.2 - Apply properties of rational and irrational numbers to solve real world or mathematical problems.
- CC.2.1.HS.F.6 - Extend the knowledge of arithmetic operations and apply it to complex numbers.
- CC.2.1.HS.F.7 - Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.
- CC.2.3.HS.A.7 – Apply trigonometric ratios to solve problems involving right triangles.
- CC.2.3.HS.A.10 - Translate between the geometric description and the equation for a conic section.

#### Units:

- Equations, Inequalities, and Mathematical Modeling
- Functions and their Graphs
- Polynomial Functions
- Rational Functions and Conics
- Exponential and Logarithmic Functions
- Systems of Equations
- Practice SAT Tests
- Trigonometric Functions
- Practice College Entrance Tests

#### Concepts:

- **Equations, Inequalities, and Mathematical Modeling** – Equations and inequalities are used in mathematical modeling to represent real-world situations by translating them into mathematical expressions to analyze and solve.
- **Functions and their Graphs** – Functions define clear relationships between variables, and graphs provide intuitive visual representation of those relationships.
- **Polynomial Functions** - A polynomial function is an expression built from variables and coefficients, involving only non-negative exponents of the variable. These versatile functions are widely used to model real-world situations.
- **Rational Functions and Conics** – Rational functions and conics model real-world phenomena across various fields, such as physics, astronomy, and engineering, and provide a foundation for more advanced mathematical concepts. Rational functions describe relationships with

#### Competencies:

- Graph real world problems with linear, quadratic, polynomial, radical, absolute value, piecewise, rational, inverse, exponential, logistic, and logarithmic functions
- Solve real world problems with linear, quadratic, polynomial, radical, absolute value, piecewise, rational, inverse, exponential, logistic, and logarithmic functions
- Model real world problems with linear, quadratic, polynomial, radical, absolute value, piecewise, rational, inverse, exponential, logistic, and logarithmic functions
- Analyze real world problems with linear, quadratic, polynomial, radical, absolute value, piecewise, rational, inverse, exponential, logistic, and logarithmic functions
- Perform operations with complex numbers
- Evaluate composite functions
- Use synthetic and long division to find the zeros of polynomial functions

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| <p>division and asymptotes. Conic sections include circles, ellipses, parabolas, and hyperbolas.</p> <ul style="list-style-type: none"> <li>• <b>Exponential and Logarithmic Functions</b> – Exponential and logarithmic functions model fundamental processes like compound interest and population growth and help simplify complex data and relationships enabling the prediction of future trends, data analysis, and informing decisions in various real-world applications.</li> <li>• <b>Systems of Equations</b> – Studying systems of equations build essential problem-solving and logical reasoning skills, provides a practical tool for modeling real-world scenarios, and is a foundational skill for success in higher-level math. These systems find the intersection of multiple conditions, allowing for more accurate and structured solutions to complex problems.</li> <li>• <b>Trigonometric Functions</b> – Trigonometric functions describe the relationships between the angles and sides of a right-angled triangle. The Law of Sines and the Law of Cosines are also fundamental tools used to find missing sides and angles in any triangle, not just right-angled triangles.</li> </ul> | <ul style="list-style-type: none"> <li>• Solve linear, polynomial, absolute value, and rational inequalities</li> <li>• Find and analyze equations of various functions including composite functions</li> <li>• Use synthetic and long division to divide polynomials</li> <li>• Identify characteristics of conics</li> <li>• Apply properties of logarithms</li> <li>• Solve exponential growth and decay real-world problems</li> <li>• Solve systems of equations and inequalities including multivariable linear systems</li> <li>• Use trigonometry to solve right triangles</li> <li>• Evaluate angles using trigonometry</li> <li>• Evaluate inverse trigonometric functions</li> <li>• Apply the law of sines/cosines to solve triangles</li> </ul> |
| <p><b>Learning Activities:</b></p> <ul style="list-style-type: none"> <li>• Warm Up Problems</li> <li>• Note-Making</li> <li>• Direct Instruction</li> <li>• Class Discussions</li> <li>• Collaboration Activities</li> <li>• Guided Practice</li> <li>• Independent Practice</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p><b>Performance Tasks:</b></p> <ul style="list-style-type: none"> <li>• Quizzes</li> <li>• Unit Test</li> <li>• Unit Activities</li> <li>• Unit Project</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Other Assessment Measures:</b></p> <ul style="list-style-type: none"> <li>• Homework</li> <li>• Classwork</li> <li>• Presentations</li> <li>• Writing Prompts</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Textbook/Primary Resource:</b><br/>Larson College Algebra Book 11<sup>th</sup> Edition</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Supplemental Resource Materials:</b></p> <ul style="list-style-type: none"> <li>• District / Teacher Created Resources</li> <li>• Online Resources</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |