



New York Mills High School

Curriculum Document

Curriculum Area: Math

Course Name: Algebra II-Non-Linear

Common Course Catalog Number: 244

Length of Course: Semester

Pre-Requisite: Algebra II-Non-Linear

Grade Level: 9

Course Description:

In this course students will know how to use and solve: exponents and exponential functions; quadratic equations and functions; polynomials and polynomial factoring; rational equations and functions; and radicals. Then the students will understand the connections from Algebra to Geometry.

Essential Learner Outcomes

- Students will know how to graph quadratic equations and inequalities.
- Students will know how to solve quadratic equations and inequalities.
- Students will know how to add and subtract polynomials.
- Students will know how to multiply polynomials.
- Students will know how to factor polynomials.
- Students will know how to solve proportions.
- Students will know how to simplify, multiply, divide, add and subtract rational expressions.
- Students will know how to add, subtract, multiply and divide radical expressions.
- Students will know how to solve a radical equation.

Units of Study:

Unit 1- Students will approximate and evaluate square roots and simplify radicals. They will use these skills to solve quadratic equations by finding square roots and by using the quadratic

formula. Students will graph quadratic functions, and use the x-intercepts of the graphs to solve the related quadratic equations. They will see how the discriminate relates to the number of x-intercepts of the graph of a quadratic function and the number of solutions of a quadratic equation. Students will also graph quadratic inequalities. Finally, Students choose a linear, quadratic, or exponential model that best fits a collection of data.

Unit 2- Students will identify, compute with, and factor polynomial expressions; and they solve quadratic equations. Students add, subtract, and multiply polynomial expressions in the first half of the chapter. In the second half of the chapter, they factor polynomial expressions and use factoring to solve quadratic equations.

Unit 3- Students will work with expressions that involve polynomials and rational expressions. They learn to solve and apply proportions. They set up and solve percent problems. Direct variation is reviewed and inverse variation is introduced. Rational expressions are simplified and used to find geometric probabilities. Students learn to add and subtract rational expressions. They divide polynomials by a monomial or binomial, including the use of polynomial long division. Finally, students solve rational equations and explore the graphs of rational functions.

Unit 4- Students will investigate and graph square-root functions. They will simplify expressions involving radicals and will solve radical equations by factoring, by using the quadratic formula, or by completing the square. Students will study and use the Pythagorean Theorem and its converse. They will be introduced to the midpoint and distance formulas. They will also use similar triangles to explore trigonometric ratios. They will conclude the chapter by using deductive reasoning to complete and construct direct and indirect proofs of theorems in algebra.