Department: Mathematics
Course Name: Algebra II

Course Description:
Following the strengthening and development of basic algebra skills, a thorough treatment of algebraic concepts is provided through the study of polynomial, rational, and transcendental functions and their graphs. Other topics include matrices, series and sequences, probability and statistics. This course places an emphasis on critical thinking, complex communication, collaboration, creativity and risk-taking. Successful completion of this course is a graduation requirement. With departmental approval, rising 10^{th} graders may take Algebra II concurrently with Geometry.

Content:
Polynomial, rational, and transcendental functions– their graphs and applications
In depth treatment of probability, data analysis and statistics
A brief introduction to sequences, and series
Students will recognize patterns and apply rules to deduce, analyze, calculate, and solve problems
Comprehension and representation of data visually will be developed.

Skills:
Evaluate expressions.
Classify real numbers.
Use properties to solve equations.
Solve inequalities and compound inequalities. Graph their solutions.
Solve absolute value equations and inequalities.
Identify functions and one-to-one functions in multiple representations.
Identify domain and range for continuous and discrete relations.
Use function notation to evaluate function values.
Write linear equations in standard form and slope-intercept form.
Identify parallel or perpendicular lines.
Determine x- and y-intercepts.
Calculate slope and average rate of change. Interpret the meaning of the slope and the y-intercept.
Evaluate and graph piece-wise functions
Identify and sketch graphs of parent functions including linear, absolute value, quadratic, power functions, square root, cube root, reciprocal, exponentials and logarithms.
Describe transformations of functions.
Graph linear and absolute value inequalities.
Solve systems of linear equations graphically and algebraically.
Solve systems of linear inequalities graphically.
Graph quadratic functions.
Find and interpret the maximum and minimum values of a quadratic function.
Solve quadratic equations graphically, by factoring, by using the Square Root Property, by completing the square, and by the quadratic formula.
Perform operations with complex numbers.
Use the discriminant to determine the number and type of roots of a quadratic equation.
Write a quadratic function in vertex form and transform graphs of quadratic functions.
Solve polynomials by factoring.
Determine the number and type of roots for a polynomial equation.
Find the zeros of a polynomial function.

Find the combination of functions. Find the composition of functions.
Find the inverse of a function. Determine whether two functions are inverses.
Simplify radicals and radical expressions.
Add, subtract, multiply and divide radical expressions.
Rationalize denominators.
Write expressions with rational exponents in radical form and vice versa.
Simplify expressions in exponential or radical form.
Solve equations and inequalities containing radicals.
Graph exponential growth and decay functions.
Solve exponential equations.
Evaluate logarithmic expressions.
Solve logarithmic equations.
Simplify and evaluate expressions and solve equations using properties of logarithms.
Use common and natural logarithms.
Simplify rational expressions and complex fractions. Identify excluded values.
Add and subtract rational expressions.
Graph rational functions with vertical and horizontal asymptotes and points of discontinuity.
Solve rational equations and inequalities.
Use arithmetic and geometric sequences. Find sums of arithmetic and geometric series.
Use counting techniques. Evaluate factorials.
Compute theoretical and experimental probabilities. Compute probabilities of compound events.
Find probabilities of independent and dependent events. Use Venn Diagrams. Use two-way frequency tables to find conditional probabilities.
Find measures of central tendency and dispersion.
Apply the standard normal distribution and z-values.

Text and Materials:
Illustrative Mathematics, Algebra 2
Author: McGraw-Hill
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Methods of Instruction:
Lecture
Demonstration
Exploration
Guided practice
DeltaMath
Desmos Activities

Methods of Evaluation:
Homework
Classwork
Formative assessments
Summative assessments
Projects