Haddon Township High School
Course Overview

Subject Area: Math
Course Name: Algebra II

Summary: This course continues to build on the algebraic foundation established from Algebra I. Major concepts include basic concepts of Algebra, inequalities & absolute value, linear equations & functions, products & factors of polynomials, rational expressions, irrational & complex numbers, quadratic equations & functions, exponential functions and transformations.

Unit Title	Student Learning Target	Standards	Resources	Assessment
Unit 1 Expressions, Equations and Inequalities	*Students will ...* • Use an expression to model the nth term of a pattern • Use variables to represent unknown quantities in real world situations • Apply properties of real numbers to simplify algebraic expressions • Apply the properties of equality to solve an equation • Apply the properties of inequality to solve an inequality Find all of the values of a variable that make an equation or inequality true	A-SSE.1. Interpret expressions that represent a quantity in terms of its context. • Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.* ☐ 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*	Equipment needed: Smart Board, calculator Teacher Resources: text books, workbooks, online resources	Tests and quizzes, standardized test prep, homework, enrichment problems, group work, performance tasks

		functions. ☐ A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*		
Unit 2 Functions, Equations and Graphs	*Students will ...* • Identify different forms of linear equations • Determine which form of a linear equation is most easily found with the given information • Convert between various forms of linear equations • Identify the different kinds of transformations • Determine whether a transformation changes the location or shape of a graph or both • Make a scatterplot of linear data • Use linear regression to find the line of best	☐ F-IF.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.* ☐ 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	Equipment needed: Smart Board, calculator Teacher Resources: text books, workbooks, online resources	Tests and quizzes, standardized test prep, homework, enrichment problems, group work, performance tasks

	fit of linear data with a graphing calculator Use the correlation coefficient to analyze linear data with a graphing calculator	relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity*. ☐ F-IF.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ☐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. ☐F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of		

		the function. ☐F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.* A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.		
Unit 3 Linear Systems	*Students will ...* • Solve a linear system using a graph or a table	• A-CED.2 Create equations in two or more variables to represent relationships between	Equipment needed: Smart Board, calculator Teacher Resources: text books, workbooks, online resources	Tests and quizzes, standardized test prep, homework, enrichment problems, group work, performance tasks

	• Solve linear systems algebraically • Solve a system of linear inequalities • Solve problems using linear programming • Solve systems in three variables • Represent and solve systems with matrix	quantities; graph equations on coordinate axes with labels and scales. • A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. • A-REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a		

		system with the same solutions • A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. • A-REI.8 (+) Represent a system of linear equations as a single matrix equation in a vector variable • A-REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make		

		tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. • A-REI.12 Graph the solutions to a linear inequality in two variables as a half- plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.		
Unit 4 Polynomials and Polynomial Functions	*Students will ...* • To classify polynomials and graph polynomial functions • To analyze the	• A-SSE.1 Interpret expressions that represent a quantity in terms of its context	Equipment needed: Smart Board, calculator Teacher Resources: text books, workbooks, online resources	Tests and quizzes, standardized test prep, homework, enrichment problems, group work, performance tasks

	factored form of a polynomial • To write a polynomial function from its zeros • To solve polynomial equations by factoring and graphing • To divide polynomials using long division and synthetic division • To solve equations using the Rational Root Theorem and the Conjugate Root Theorem • To use the Fundamental Theorem of Algebra to solve polynomial equations with complex solutions • To expand a binomial using Pascals Triangle • To fit data to linear, quadratic, cubic or quartic models • To apply transformations to graphs of polynomials	• A-SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2). • A-APR.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x). • A-APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined		

		by the polynomial • A-APR.4 Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity (x2 + y2)2 = (x2 – y2)2 + (2xy)2 can be used to generate Pythagorean triples. • A-APR.5 (+) Know and apply the Binomial Theorem for the expansion of (x + y)n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.1 • A-APR.6 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. • N.CN.7 Solve quadratic equations with real coefficients that have complex solutions. • N.CN.8 (+) Extend polynomial identities to the complex numbers. For example, rewrite x2+ 4 as (x + 2i)(x – 2i). • N.CN.9 Know the Fundamental Theorem of Algebra; show that it is true for quadratic		

		polynomials.		