

Algebra II and Trigonometry

The standards for this combined course in Algebra II and Trigonometry include all of the standards listed for Algebra II and Trigonometry. This course is designed for advanced students who are capable of a more rigorous course at an accelerated pace. The standards listed for this course provide the foundation for students to pursue a sequence of advanced mathematical studies from Mathematical Analysis to Advanced Placement Calculus.

Expressions and Operations

- AII/T.1 The student, given rational, radical, or polynomial expressions, will
- add, subtract, multiply, divide, and simplify rational algebraic expressions;
 - add, subtract, multiply, divide, and simplify radical expressions containing rational numbers and variables, and expressions containing rational exponents;
 - write radical expressions as expressions containing rational exponents and vice versa; and
 - factor polynomials completely.
- AII/T.2 The student will investigate and apply the properties of arithmetic and geometric sequences and series to solve real-world problems, including writing the first n terms, finding the n^{th} term, and evaluating summation formulas. Notation will include Σ and a_n .
- AII/T.3 The student will perform operations on complex numbers, express the results in simplest form using patterns of the powers of i , and identify field properties that are valid for the complex numbers.

Equations and Inequalities

- AII/T.4 The student will solve, algebraically and graphically,
- absolute value equations and inequalities;
 - quadratic equations over the set of complex numbers;
 - equations containing rational algebraic expressions; and
 - equations containing radical expressions.
- Graphing calculators will be used for solving and for confirming the algebraic solutions.
- AII/T.5 The student will solve nonlinear systems of equations, including linear-quadratic and quadratic-quadratic, algebraically and graphically. Graphing calculators will be used as a tool to visualize graphs and predict the number of solutions.

Functions

- AII/T.6 The student will recognize the general shape of function (absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic) families and will convert between graphic and symbolic forms of functions. A transformational approach to graphing will be employed. Graphing calculators will be used as a tool to investigate the shapes and behaviors of these functions.
- AII/T.7 The student will investigate and analyze functions algebraically and graphically. Key concepts include
- domain and range, including limited and discontinuous domains and ranges;
 - zeros;
 - x - and y -intercepts;
 - intervals in which a function is increasing or decreasing;
 - asymptotes;
 - end behavior;
 - inverse of a function; and
 - composition of multiple functions.
- Graphing calculators will be used as a tool to assist in the investigation of functions.

AII/T.8 The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x -intercepts of a graph, and factors of a polynomial expression.

Statistics

AII/T.9 The student will collect and analyze data, determine the equation of the curve of best fit, make predictions, and solve real-world problems, using mathematical models. Mathematical models will include polynomial, exponential, and logarithmic functions.

AII/T.10 The student will identify, create, and solve real-world problems involving inverse variation, joint variation, and a combination of direct and inverse variations.

AII/T.11 The student will identify properties of a normal distribution and apply those properties to determine probabilities associated with areas under the standard normal curve.

AII/T.12 The student will compute and distinguish between permutations and combinations and use technology for applications.

Trigonometry

AII/T.13 The student, given a point other than the origin on the terminal side of an angle, will use the definitions of the six trigonometric functions to find the sine, cosine, tangent, cotangent, secant, and cosecant of the angle in standard position. Trigonometric functions defined on the unit circle will be related to trigonometric functions defined in right triangles.

AII/T.14 The student, given the value of one trigonometric function, will find the values of the other trigonometric functions, using the definitions and properties of the trigonometric functions.

AII/T.15 The student will find, without the aid of a calculator, the values of the trigonometric functions of the special angles and their related angles as found in the unit circle. This will include converting angle measures from radians to degrees and vice versa.

AII/T.16 The student will find, with the aid of a calculator, the value of any trigonometric function and inverse trigonometric function.

AII/T.17 The student will verify basic trigonometric identities and make substitutions, using the basic identities.

AII/T.18 The student, given one of the six trigonometric functions in standard form, will

- state the domain and the range of the function;
- determine the amplitude, period, phase shift, vertical shift, and asymptotes;
- sketch the graph of the function by using transformations for at least a two-period interval; and
- investigate the effect of changing the parameters in a trigonometric function on the graph of the function.

AII/T.19 The student will identify the domain and range of the inverse trigonometric functions and recognize the graphs of these functions. Restrictions on the domains of the inverse trigonometric functions will be included.

AII/T.20 The student will solve trigonometric equations that include both infinite solutions and restricted domain solutions and solve basic trigonometric inequalities.

AII/T.21 The student will identify, create, and solve real-world problems involving triangles. Techniques will include using the trigonometric functions, the Pythagorean Theorem, the Law of Sines, and the Law of Cosines.