

## Algebra II Topics and Trigonometry

5 credit - Level: II

Grades: 11-12

Prerequisite: A minimum grade of 75% in Geometry Topics

Units of study include probability, and statistics, integers, algebraic expressions, rational and irrational numbers, first and second equations/inequalities and their graphs, trigonometric functions and their graphs.

### PROFICIENCIES

#### Equations and Inequalities

- use real number line to graph and order real numbers
- identify properties of and use operations with real numbers
- evaluate and simplify algebraic expressions
- solve and use linear equations in real life problems
- rewrite equations and formulas with more than one variable
- use varied strategies to solve real life problems
- solve simple and compound inequalities
- solve and use absolute value equations and inequalities in real life problems

#### Linear Equations and Functions

- represent relations and functions
- graph and evaluate linear functions
- find, use and classify slopes of lines including parallel and perpendicular lines
- use slope-intercept form and standard form to graph linear equations
- write linear and direct variation equations
- for a set of data, use a scatter plot to identify the correlation and approximate the best-fitting line
- graph and use linear inequalities in two variables to solve real life problems
- represent and use absolute value functions to model real life situations

#### Systems of Linear Equations and Inequalities

- graph, solve and use linear equations and systems to solve real life problems
- use algebraic methods to solve linear systems and model real life situations
- graph and use systems of linear inequalities to find the solutions of the systems and to solve real life problems
- solve systems of linear equations in three variables and apply to real life situations

#### Matrices and Determinants

- add and subtract matrices, multiply a matrix by a scalar and solve matrix equations and apply to real life situations
- multiply two matrices and apply to real life situations
- evaluate determinants of  $2 \times 2$  and  $3 \times 3$  matrices
- use Cramer's Rule to solve systems of linear equations
- find and use inverse matrices and apply to real life situations
- solve systems of linear equations using inverse matrices and apply to real life situations

#### Quadratic Functions

- graph quadratic functions and apply to real life situations
- solve quadratic equations by factoring
- solve quadratic equations by finding square roots and apply to real life situations
- solve quadratic equations with complex solutions and perform operations with complex numbers
- solve quadratic equations by completing the square
- use completing the square to write quadratic functions in vertex form
- solve quadratic equations using the quadratic formula and apply to real life situations
- graph quadratic inequalities in two variables
- write quadratic functions given characteristics of their graphs

**Polynomials and Polynomial Functions**

- use properties of exponents to evaluate and simplify expressions involving powers
- use exponents and scientific notation to solve real life problems
- evaluate polynomial functions
- add, subtract and multiply polynomials and apply to real life situations
- factor polynomial expressions and apply to real life situations
- divide polynomials and relate the result to the remainder theorem and the factor theorem and apply to real life situations

**Probability**

- use the fundamental counting principle, permutations, and combinations to count the number of ways an event can happen
- find theoretical, experimental and geometrical probabilities
- find the probabilities of unions and intersections of two events
- use complements to find the probability of an event
- find the probability of independent and dependent events

**Trigonometric Ratios**

- use trigonometric relationships to evaluate trigonometric functions of acute angles and apply to real life situations
- measure angles in standard positions using degree measures and radian measures
- calculate arc lengths and areas of sectors
- evaluate trigonometric functions of any angle and apply to real life situations