

Saddlebrook Preparatory School
Mathematics Curriculum – Algebra II

Saddlebrook Course Number: 3

Florida DOE Course Number: 1200330

Course Title: Algebra II

Credit: 1.0

A. Major Concepts/Content.

The purpose of this course is to continue the study of algebra and to provide the foundation for applying algebraic skills to other mathematical and scientific fields. The content should include, but not be limited to, the following:

- structure and properties of the complex number system
- arithmetic and geometric sequences and series
- relations, functions and graphs extended to polynomial, exponential, and logarithmic functions
- varied solution strategies for linear equations, inequalities, and systems of equations and inequalities
- -varied solutions strategies, including the quadratic formula, for quadratic equations
- conic sections and their applications
- data analysis, including measures of central tendency and dispersion
- probability, permutations, and combinations

B. Course Requirements

These requirements include the benchmarks from the Sunshine State Standards that are most relevant to this course. The benchmarks printed in regular type are required for this course.

The portions printed in *italic type* are not required for this course.

After successfully completing this course, the student will:

1. Demonstrate understanding of the different ways numbers are represented and used in the real world.

- associate verbal names, written word names, and standard numerals with integers, rational numbers, irrational numbers,

real numbers, and complex numbers.

- understand the relative size of integers, rational numbers, irrational numbers, and real numbers.
- understand concrete and symbolic representations of real and complex numbers in real-world situations.
- understand that numbers can be represented in a variety of equivalent forms, including integers, fractions, decimals, percents, scientific notation, exponents, radicals, absolute value, and logarithms.

2. Demonstrate understanding of number systems.

- understand *and use* the basic concepts of limits and infinity.
- understand and use the real number system.
- understand the structure of the complex number system

3. Demonstrate understanding of the effects of operations on numbers and the relationships among these operations, select appropriate operations, and compute for problem solving.

- understand and explain the effects of addition, subtraction, multiplication, and division on real numbers, including square roots, exponents, and appropriate inverse relationships.
- select and justify alternative strategies, such as using properties of numbers, including inverse, identity, distributive, associative, and transitive, that allow operational shortcuts for computational procedures in real-world or mathematical problems.
- add, subtract, multiply, and divide real numbers, including square roots and exponents, using appropriate methods of computing, such as mental mathematics, paper and pencil, and calculator

4. Use estimation in problem solving and computation.

- use estimation strategies in complex situations to predict results and to check the reasonableness of results.

5. Demonstrate understanding and apply theories related to numbers.

- apply special number relationships such as sequences and series to real-world problems.

6. Measure quantities in the real world and use the measures to solve

problems.

- use concrete and graphic models to derive formulas for finding rate, distance, time, angle measures, and arc length.
- relate the concepts of measurement to similarity and proportionality in real-world situations.

7. Compare, contrast, and convert within systems of measurement (both standard/nonstandard and metric/customary).

- select and use direct (measured) and indirect (not measured) methods of measurement as appropriate.
- solve real-world problems involving rated measures (miles per hour, feet per second).

8. Visualize and illustrate ways in which shapes can be combined, subdivided, and changed.

- understand geometric concepts such as perpendicularity, parallelism, tangency, congruency, similarity, reflections, symmetry, and transformations including flips, slides, turns, enlargements, rotations and fractals.
- analyze and apply geometric relationships involving planar cross-sections (the intersection of a plane and a three-dimensional figure).

9. Use coordinate geometry to locate objects in two and three dimensions and to describe objects algebraically.

- 1 represent and apply geometric properties and relationships to solve real-world and mathematical problems including ratio, proportion, and properties of right triangle trigonometry.
- using a rectangular coordinate system (graph), apply and algebraically verify properties of two and three-dimensional figures, including distance, midpoint, slope, parallelism, and perpendicularity.

10. Describe, analyze, and generalize a wide variety of patterns, relations, and functions.

- describe, analyze, and generalize relationships, patterns, and functions using words, symbols, variables, tables, and graphs.
- determine the impact when changing parameters of given functions.

11. Use expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.

- represent real-world problem situations using finite graphs, matrices, sequences, series and recursive relations.

- use systems of equations and inequalities to solve real-world problems graphically, algebraically, and with matrices.

12. Demonstrate understanding and use the tools of data analysis for managing information.

- interpret data that has been collected, organized, and displayed in charts, tables, and plots.

- calculate measures of central tendency (mean, median, and mode) and dispersion (range, *standard deviation*, and *variance*) for complex sets of data and determine the most meaningful measure to describe the data.

- analyze real-world data and make predictions of larger populations by *applying formulas to calculate measures of central tendency and dispersion* using the sample population data and using appropriate technology, including calculators and computers.

13. Identify patterns and make predictions from an orderly display of data using concepts of probability and statistics.

- determine probabilities using counting procedures, tables, tree diagrams and formulas for permutations and combinations.

- determine the probability for simple and compound events as well as independent and dependent events.