

**SWEETWATER UNION HIGH SCHOOL DISTRICT****DIVISION OF ADULT EDUCATION**

## High School Subjects

<u>VI</u> Level	<u>Algebra - Intermediate 1</u> <u>Algebra - Intermediate 2</u> 2015	<u>9029</u> <u>9020</u> Code
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**DURATION:** Approximately 60 hours for each course, extended if necessary until all required work is satisfactorily completed.

**GRADE LEVEL:** 9-12

**PREREQUISITES:** Successful completion of Algebra 1, 2 (or Extended Algebra 1a, 1b, 2a, 2b) and Formal Geometry 1, 2

**CREDIT:** One (1) unit of high school math credit may be earned for each semester course.

**PROGRAM DESCRIPTION:**

The Intermediate Algebra course expands the mathematical content and concepts of Algebra 1 as well as Geometry. Students who complete Intermediate Algebra will have knowledge of algebraic solutions of problems in various content areas. This course focuses on abstract thinking skills, the function concept, and algebraic solutions.

**STUDENT LEARNER OUTCOMES:**

- Students will establish personal, academic and/or workforce goals and demonstrate progress toward them
- Students will solve problems
- Students will communicate clearly and collaborate with others
- Students will use resources, including technology, to research, organize and communicate information

**GOALS:**

Through the principles and practice presented in this course, students will

- 1.0 Solve and apply systems of linear equations and inequalities (in two or three variables) involving absolute value (CS Alg II 1.0, 2.0).
- 2.0 Perform operations with polynomial expressions, including long division factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes (CS Alg II 3.0, 4.0).
- 3.0 Know and apply the properties of exponents and logarithms, and use exponential functions to solve problems involving growth and decay (CS Alg II 11.0, 12.0, 14.0)

- 4.0 Demonstrate how the graph of a conic section (e.g., asymptotes, foci, eccentricity) depends on the coefficients of the quadratic equation representing it (CS Alg II 16.0).
- 5.0 Know and apply topics in discrete math (CS Alg II 18.0, P&S 4.0, 5.0)
- 6.0 Know and apply topics in trigonometry (CS TR 6.0).

**OBJECTIVES:**

Students who successfully complete this course will be able to:

- 1.0 With respect to solving and applying systems of linear equations and inequalities (in two or three variables) involving absolute value (CS Alg II 1.0, 2.0).
  - 1.1 Understand that equations in one variable are often created to describe properties of a specific but unknown number.
  - 1.2 Understand that equations in two or more variables that represent a relationship between quantities can be built by experimenting with specific numbers in the relationship.
  - 1.3 Write and graph equations and inequalities that specify an unknown quantity or to express a relationship between two or more quantities. Use the equations and inequalities to solve problems.
  - 1.4 Interpret systems of linear equations and inequalities geometrically.
  - 1.5 Graph absolute value functions of the form  $y = a|x - h| + k$ , and relate the graphs to the parent function  $y = |x|$ .
- 2.0 Perform operations with polynomial expressions, including long division factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes (CS Alg II 3.0, 4.0).
  - 2.1 Add, subtract, multiply, divide polynomials. This includes both long and synthetic division.
  - 2.2 Factor polynomials, including the sum and difference of cubes.
  - 2.3 Solve problems involving functional concepts, such as composition, defining the inverse function, and performing arithmetic operations on functions.
  - 2.4 Add, subtract, multiply, and divide complex numbers, and interpret complex numbers as solutions to equations.
  - 2.5 Add, subtract, multiply, divide, reduce, and evaluate rational expressions with monomial and polynomial numerators and denominators, and simplify complicated rational expressions, including those with negative exponents in the denominator. Apply these techniques to solve problems.

- 2.6. Solve rational equations and use them in applications such as work problems.
  - 2.7. Solve quadratic equations by factoring, completing the square, or the quadratic formula, including those with complex solutions. Apply these techniques in solving word problems.
  - 2.8. Solve higher order polynomial equations using both long division and synthetic division, factoring, and the remainder and factor theorems.
- 3.0 With respect to knowing and applying the properties of exponents and logarithms, and using exponential functions to solve problems involving growth and decay,
- 3.1 Know and apply the laws of rational exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay.
  - 3.2. Understand and use the properties of logarithms, including change of base and use of the natural logarithm.
  - 3.3. Understand, both graphically and algebraically, the inverse relationship between exponential and logarithmic functions, and the inverse relationship between power and radical functions.
  - 3.4. Solve problems using power, radical, exponential, and logarithmic equations.
- 4.0 With respect to identifying, analyzing, and graphing conic sections,
- 4.1 Identify and graph parabolas (with the equation given in various forms) and determine the zeroes, vertex, focus, directrix, and axis of symmetry.
  - 4.2 Identify and graph circles (with the center at the origin only) and determine the radius.
  - 4.3 Identify and graph ellipses (with the center at the origin only) and determine the foci, major and minor axis, and vertices and co-vertices.
  - 4.4 Identify and graph hyperbolas (with the center at the origin only) and determine the foci, vertices, and asymptotes.
- 5.0 With respect to knowing and applying topics in discrete math,
- 5.1 Use fundamental counting principles to compute combinations and permutations, and use these to compute probabilities.
  - 5.2 Use the binomial theorem to expand binomial expressions that are raised to positive integral powers. Use the binomial theorem or Pascal's Triangle to compute binomial probabilities.

- 5.3 Determine probabilities of compound events, distinguishing between independent and dependent events. Determine conditional probabilities.
  - 5.4 Know the features of the normal distribution, and use it to calculate probabilities.
  - 5.5 Find the general term and sums of arithmetic series and of both finite and infinite geometric series, and apply both arithmetic and geometric sequences and series in solving problems.
- 6.0 With respect to knowing and applying topics in trigonometry,
- 6.1 Know the definition of sine and cosine as y- and x- coordinates of points on the unit circle, and determine unit circles values for common angles given in degrees.
  - 6.2 Know the law of sines and the law of cosines, and apply those laws to solve problems involving non-right triangles, including finding area.

**INSTRUCTIONAL STRATEGIES AND TIMES:**

Individual work on assignments	50%
Teacher/student evaluation of student practice	20%
Computer assisted learning	10%
Assessment	20%

**EVALUATION:**

1. Satisfactory completion of written assignments as evaluated by the instructor.
2. Satisfactory completion of teacher-made and/or standardized test as evaluated by the instructor.
3. Satisfactory progress and participation in classroom activities as evaluated by the instructor.

**CONDITIONS FOR REPETITION:**

Students who have failed to meet the objectives because of insufficient attendance or inability to master content may repeat the course.

Approved:  
 BOARD OF TRUSTEES  
 April 10, 1986

Revised:

June 20, 1990

August 26, 2002

August 21, 2006

(Formerly called Algebra 3 and Algebra 4 with Trig)

July 26, 2010

May 26, 2015

October 26, 2015