

**SWEETWATER UNION HIGH SCHOOL DISTRICT**

**DIVISION OF ADULT EDUCATION**

High School Subjects

VI  
Level

General Math - Intermediate  
2015

9025  
Code

**DURATION:** Approximately 60 hours, extended if necessary until all

**GRADE LEVEL:** 9-12/Adult

**PREREQUISITES:** None

**CREDIT:** One semester credit toward the mathematics requirement

**PROGRAM DESCRIPTION:**

Students will develop skills in computation, especially as they apply to solving simple one and two-step word problems involving whole numbers, fractions, decimals, percents, ratio, proportion, measurement, and basic algebra. Students acquire concepts through a variety of learning modalities and styles and are required to gather and use information, understand systems, use resources and technology, and share information with others in completing the course. The curriculum is process based with self-evaluation as an integral part.

**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. Students know the properties of, and compute with, rational numbers expressed in a variety of forms.
2. Students use exponents, powers, and roots and use exponents in working with fractions.
3. Students make decisions about how to approach problems.
4. Students use strategies, skills, and concepts in finding solutions.

5. Students determine a solution is complete and move beyond a particular problem by generalizing to other situations.
6. Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems.
7. Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area, and volume are affected by changes of scale.
8. Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures.
9. Students compute and analyze statistical measurements for data sets.
10. Students determine theoretical and experimental probabilities and use these to make predictions about events.

**OBJECTIVES:**

- 1.0 Students know the properties of, and compute with, rational numbers expressed in a variety of forms:
  - 1.1 Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation.
  - 1.2 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.
  - 1.3 Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.
  - 1.4 Calculate the percentage of increases and decreases of a quantity.
  - 1.5 Solve problems that involve discounts, markups, commissions, and profit and compute simple and compound interest.
- 2.0 Students use exponents, powers, and roots and use exponents in working with fractions:
  - 2.1 Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.
  - 2.2 Add and subtract fractions by using factoring to find common denominators.
  - 2.3 Multiply, divide, and simplify rational numbers by using exponent rules.
  - 2.4 Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not square, determine without a calculator the two integers between which its square root lies and explain why.

- 2.5 Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.
- 3.0 Students make decisions about how to approach problems:
- 3.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
- 4.0 Students use strategies, skills, and concepts in finding solutions:
- 4.1 Use estimation to verify the reasonableness of calculated results.
- 4.2 Make and test conjectures by using both inductive and deductive reasoning.
- 5.0 Students determine a solution is complete and move beyond a particular problem by generalizing to other situations:
- 5.1 Evaluate the reasonableness of the solution in the context of the original situation.
- 5.2 Develop generalizations of the results obtained and the strategies used and apply them to new problem situations.
- 6.0 Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:
- 6.1 Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).
- 6.2 Construct and read drawings and models made to scale.
- 6.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.
- 7.0 Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area, and volume are affected by changes of scale:
- 7.1 Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders.
- 7.2 Estimate and compute the area of more complex or irregular two-and three-dimensional figures by breaking the figures down into more basic geometric objects.

7.3 Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and the volume is multiplied by the cube of the scale factor.

7.4 Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units ( $1 \text{ square foot} = 144 \text{ square inches}$  or  $[1 \text{ ft}^2] = [144 \text{ in}^2]$ ,  $1 \text{ cubic inch}$  is approximately  $16.38 \text{ cubic centimeters}$  or  $[1 \text{ in}^3] = [16.38 \text{ cm}^3]$ ).

8.0 Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures:

8.1 Identify and construct basic elements of geometric figures (e.g., altitudes, mid-points, diagonals, angle bisectors and perpendicular bisectors; central angles, radii, diameters and chords of circles) by using a compass and straightedge.

8.2 Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflections.

8.3 Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.

8.4 Demonstrate an understanding of conditions that indicate two geometrical figures are congruent and what congruence means about the relationships between the sides and angles of the two figures.

9.0 Students compute and analyze statistical measurements for data sets:

9.1 Compute the range, mean, median, and mode of data sets.

10.0 Students determine theoretical and experimental probabilities and use these to make predictions about events:

10.1 Represent all possible outcomes for compound events in an organized way (e.g., tables, grids, tree diagrams) and express the theoretical probability of each outcome.

10.2 Represent probabilities as ratios, proportions, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable; know that if  $P$  is the probability of an event,  $1 - P$  is the probability of an event not occurring.

10.3 Understand the difference between independent and dependent events.

**INSTRUCTIONAL STRATEGIES AND TIMES:**

Teacher lecture and demonstration	05%
Class discussions	05%
Small groups dynamics	15%
Teacher supervision of student practice	65%
Evaluation	10%

**EVALUATION:**

Evaluation of individual achievement is based upon:

1. Satisfactory completion of assignments as evaluated by the instructor.
2. Satisfactory completion of teacher-made and/or standardized tests 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  
March 21, 1974

Revised:  
April 15, 1980  
August 14, 1986  
August 21, 1997  
August 21, 2006  
May 26, 2015  
October 26, 2015

*Formerly titled Refresher Mathematics*