

SWEETWATER UNION HIGH SCHOOL DISTRICT

DIVISION OF ADULT EDUCATION

High School Subjects

VI
Level

General Math - Advanced
2015

9026
Code

DURATION: Approximately 60 hours, extended if necessary until all

GRADE LEVEL: 9-12/Adult

PREREQUISITES: General Math - Intermediate or equivalent skills

CREDIT: One semester credit toward the mathematics requirement

PROGRAM DESCRIPTION:

Students will increase skills in computation. They will also develop basic concepts of geometry, probability, negative numbers, indirect measurement, and graphing equations, as well as apply math as a problem solving tool in relation to real life situations. Students 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. Know the properties of, and compute with, rational numbers expressed in a variety of forms:.
2. Compute and analyze statistical measurements for data sets.
3. Determine theoretical and experimental probabilities and use these to make predictions about events.
4. Express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs.
5. Interpret and evaluate expressions involving integer powers and simple roots.

6. Graph and interpret linear and some nonlinear functions.
7. Solve simple linear equations and inequalities over the rational numbers.
8. Develop not only an understanding of the symbolic language of mathematics and the sciences but also algebraic skills and concepts to use in a wide variety of problem-solving situations.

OBJECTIVES:

- 1.0 Students know the properties of, and compute with, rational numbers expressed in a variety of forms:
 - 1.1 Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.
- 2.0 Students compute and analyze statistical measurements for data sets:
 - 2.1 Compute the range, mean, median, and mode of data sets.
 - 2.2 Understand how additional data added to data sets may affect these computations of measures of central tendency.
 - 2.3 Understand how the inclusion or exclusion of outliers affects measures of central tendency.
- 3.0 Students determine theoretical and experimental probabilities and use these to make predictions about events:
 - 3.1 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.
 - 3.2 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.
 - 3.3 Understand the difference between independent and dependent events.
- 4.0 Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs:
 - 4.1 Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).
 - 4.2 Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$.

- 4.3 Represent quantitative relationships graphically and interpret the meaning of a specific part of a graph in the situation represented by the graph.
- 5.0 Students interpret and evaluate expressions involving integer powers and simple roots:
- 5.1 Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.
- 5.2 Multiply and divide monomials; extend the process of taking powers and extracting roots to monomials when the latter results in a monomial with an integer exponent.
- 6.0 Students graph and interpret linear and some nonlinear functions:
- 6.1 Graph functions of the form $y = nx^2$ and $y = nx^3$ and use in solving problems.
- 6.2 Graph linear functions, noting that the vertical change (change in y -value) per unit of horizontal change (change in x -value) is always the same and know that the ratio ("rise over run") is called the slope of a graph.
- 6.3 Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.
- 7.0 Students solve simple linear equations and inequalities over the rational numbers:
- 7.1 Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.
- 7.2 Solve multistep problems involving rate, average speed, distance, and time or a direct variation.
- 8.0 Students develop not only an understanding of the symbolic language of mathematics and the sciences but also algebraic skills and concepts to use in a wide variety of problem-solving situations.
- 8.1 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents.
- 8.2 Students solve equations and inequalities involving absolute values.
- 8.3 Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$.
- 8.4 Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.

8.5 Students graph a linear equation and compute the x - and y - intercepts (e.g., graph $2x + 6y = 4$). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$).

8.6 Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula.

8.7 Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.

8.8 Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.

8.9 Students add, subtract, multiply, and divide monomials and polynomials. Students solve multi-step problems, including word problems, by using these techniques.

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.

General Math - Advanced

Approved:
BOARD OF TRUSTEES
March 21, 1974

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

Formerly titled Refresher Mathematics