

MTH 098 - Elementary Algebra - Objectives

Students will be required to spend one additional hour each week on a supplemental learning activity determined by instructor. Creating open expressions and using those expressions to write equations involving one or two variables to solve problems and applications will be integrated throughout this course (especially in * topics). Examples from other disciplines will be incorporated whenever possible. A comprehensive departmental final exam testing the degree of mastery of the following course objectives is required.

1. Sets of Numbers

1.1 Classify a given real number as being a counting or natural number, whole number, integer, rational or irrational number.

2. Properties of Real Numbers

2.1 Identify and be able to use the Commutative, Associative, Distributive, Identity, and Inverse Properties.

3. Operations on Real Numbers

- 3.1 Review arithmetic operations on integers.
- 3.2 Review arithmetic operations on rational numbers.
- 3.3 Evaluate a given expression by applying the correct priority of operations.

***4. Equation Solving Techniques**

- 4.1 Solve first degree equations in one variable.
- 4.2 Solve literal equations and formulas for a single variable.
- 4.3 Solve quadratic equations by factoring.
- 4.4 Solve proportions.
- 4.5 Solve rational equations with monomial denominators.

5. Polynomials

- 5.1 Define and identify polynomials and their degree.
- 5.2 Add and subtract polynomials.
- 5.3 Multiply a monomial by a monomial.
- 5.4 Multiply a polynomial by a monomial.
- 5.5 Multiply a binomial by a binomial.
- 5.6 Divide a polynomial by a monomial.

6. Factoring

- 6.1 Factor a monomial GCF from a polynomial.
- 6.2 Factor a polynomial containing four terms by grouping.
- 6.3 Factor the difference of two squares.
- 6.4 Factor trinomials of the form $x^2 + bx + c$.
- 6.5 Factor trinomials of the form $ax^2 + bx + c$, where a is a nonzero integer using either the "ac factoring by grouping method" or the "trial and error method."

7. Rational Expressions

- 7.1 Simplify rational expressions.
- 7.2 Multiply and divide rational expressions.
- 7.3 Add and subtract rational expressions with like denominators.
- 7.4 Add and subtract rational expressions with unlike monomial denominators.

***8. Inequalities in One Variable**

- 8.1 Solve a linear inequality in one variable.
- 8.2 Graph the solution to a linear inequality on the real number line.

***9. Absolute Value**

- 9.1 Use the concept of absolute value as distance from zero on the real number line to determine the absolute value of real numbers.

***10. The Cartesian Coordinate System**

- 10.1 Use the Cartesian coordinate system to describe the x - and y -axes, the origin and quadrants, and determine the positions of ordered pairs.
- 10.2 Graph linear equations in two variables by plotting points.
- 10.3 Determine the x - and y -intercepts and use them to graph a linear equation.
- 10.4 Understand the concept of the slope of a line and use the slope formula to determine the slope of the line through two given points.
- 10.5 Determine the slopes of horizontal, vertical, parallel and perpendicular lines.
- 10.6 Graph linear equations in two variables by the slope-intercept method.
- 10.7 Determine the equation of a line in slope-intercept form:
 - Given the slope and the y -intercept
 - Given a graph with integer x - and y -intercepts.
- 10.8 Given two points in the coordinate plane, calculate the distance between them using the distance formula.
- 10.9 Find the midpoint of the line segment joining two points in the coordinate plane using the midpoint formula.

***11. Systems of Equations**

- 11.1 Solve a system of linear equations in two variables graphically.
- 11.2 Solve a system of linear equations in two variables algebraically.

12. Exponents and Radicals

- 12.1 Simplify exponential expressions with integer exponents.
- 12.2 Simplify radical expressions whose radicands are perfect squares or perfect cubes.
- 12.3 Simplify square root radical expressions whose radicands are not perfect squares.

***13. Geometry**

- 13.1 Review area and perimeter of triangles, squares, and rectangles.
- 13.2 Review radius, diameter, circumference and area of circles.
- 13.3 Review complementary, supplementary and vertical angles.
- 13.4 Review sum of angles of triangles and angles of parallelograms.
- 13.5 Review the use of the Pythagorean Theorem.
- 13.6 Review using proportions to solve problems involving similar triangles.
- 13.7 Identify the alternate interior angles, alternate exterior angles and corresponding angles formed when two parallel lines are cut by a transversal.
- 13.8 Find unknown angle measures using alternate interior angles, alternate exterior angles and corresponding angles formed when two parallel lines are cut by a transversal.