

MTH 104 INTERMEDIATE ALGEBRA WITH TRIGONOMETRY

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 Review classifying a given real number as being a counting or natural number, whole number, integer, rational or irrational number.
- 1.2 Introduce the concept of imaginary and complex numbers.
- 1.3 Write complex numbers in $a + bi$ form; add, subtract, multiply, and divide complex numbers in $a + bi$ form.

2. Properties of Real Numbers

- 2.1 Review identifying and using the Commutative, Associative, Distributive, Identity, and Inverse Properties.

***3. Equation Solving Techniques**

- 3.1 Review solving linear equations in one variable.
- 3.2 Review solving literal equations and formulas for a single variable.
- 3.3 Solve quadratic equations in one variable.
 - 3.3a Review solving by factoring
 - 3.3b Solve by using the square root method.
 - 3.3c Solve by completing the square where $a = 1$.
 - 3.3d Solve by the quadratic formula.
 - 3.3e Use the discriminant to classify the roots.
- 3.4 Solve rational equations.
- 3.5 Solve radical equations involving one radical term.

4. Polynomials

- 4.1 Review adding and subtracting polynomials.
- 4.2 Multiply polynomials.
- 4.3 Review division of a polynomial by a monomial.
- 4.4 Divide a polynomial by a binomial using long division.

5. Factoring

- 5.1 Review the following factoring techniques: Factor a monomial GCF from a polynomial, factor a polynomial containing four terms by grouping, factor the difference of two squares, factor trinomials of the form $ax^2 + bx + c$.
- 5.2 Factor perfect square trinomials.
- 5.3 Factor the sum and difference of two cubes.

6. Rational Expressions

- 6.1 Review simplifying rational expressions.
- 6.2 Review multiplying and dividing rational expressions.
- 6.3 Review adding and subtracting rational expressions with like denominators.
- 6.4 Add and subtract rational expressions with unlike denominators.
- 6.5 Simplify complex fractions.

***7. Inequalities in one variable**

- 7.1 Review the solution of a linear inequality in one variable, express the solution using set notation and interval notation, and graph the solution on the real number line.
- 7.2 Solve compound linear inequalities, express the solution using set notation and interval notation, and graph the solution on the real number line.

8. Absolute Value

- 8.1 Review the concept of absolute value as distance from zero on the real number line.
- 8.2 Solve a linear absolute value equation in one variable.
- 8.3 Solve a linear absolute value inequality in one variable, express the solution using set notation and interval notation, and graph the solution on the real number line.

9. Functions

- 9.1 Introduce the use of function notation.

***10. The Cartesian Coordinate System**

- 10.1 Review graphing linear equations in two variables by plotting points.
- 10.2 Review slope and its relationship to horizontal, vertical, parallel and perpendicular lines.
- 10.3 Review graphing linear equations using the slope and y-intercept.
- 10.4 Write the equation of a line using the slope-intercept form and the point-slope form.
- 10.5 Graph linear inequalities in two variables.
- 10.6 Use the vertex, axis of symmetry, and intercepts to graph a quadratic equation of the form $y = ax^2 + bx + c$.

***11. Systems of Equations**

- 11.1 Review solving systems of linear equations in two variables graphically and algebraically.
- 11.2 Solve a system of three linear equations in three variables algebraically.

12. Exponents and Radicals

- 12.1 Review simplifying exponential expressions with integer exponents.
- 12.2 Simplify exponential expressions with rational exponents.
- 12.3 Review simplifying square root radical expressions.
- 12.4 Simplify cube root radical expressions.
- 12.5 Perform arithmetic operations on square root and cube root radical expressions.

***13. Trigonometry**

- 13.1 Review the use of the Pythagorean Theorem.
- 13.2 State the sine, cosine, and tangent ratios in terms of opposite side, adjacent side and hypotenuse of a right triangle.
- 13.3 Use special triangles (30° - 60° - 90° , 45° - 45° - 90°) to find sine, cosine, and tangent ratios of special angles.
- 13.4 Find any angle or side of a right triangle given one acute angle and one side, or two sides.
- 13.5 Solve realistic applications involving right triangles.