

# MTH 095 : INTERMEDIATE ALGEBRA

## Transcript title

Intermediate Algebra

## Credits

4

## Grading mode

Standard letter grades

## Total contact hours

40

## Lecture hours

40

## Prerequisites

MTH 060 or higher (except MTH 098, MTH 105Z, and STAT 243Z) or minimum placement Math Level 10.

## Course Description

Continues the algebra foundation necessary to study college level algebra. Includes polynomial, exponential, radical, and rational expressions. Linear and quadratic functions will be used to model situations and interpret data. An understanding of the connection between narrative, numeric, algebraic, and graphical representations of functions is emphasized. Graphing by hand and using technology are implemented as appropriate. Uses graphing technology.

## Course learning outcomes

1. Algebraically simplify polynomial, exponential, radical, and rational expressions.
2. Algebraically solve quadratic and square root equations.
3. Identify, evaluate, and analyze functions using verbal, graphic, algebraic, and numeric representations.
4. Create, interpret, and use function models to make estimates and predictions.
5. Graphically represent and analyze linear and quadratic functions by hand or using technology as appropriate.

## Content outline

1. Algebraically simplify polynomial, exponential, radical, and rational expressions
  - a. Simplify Polynomial Expressions, including but not limited to knowing proper terminology, performing operations (add, subtract, multiply, divide by a monomial)
  - b. Simplify Exponential Expressions, including but not limited to rules and properties of exponents (product Rule, power of a product, quotient rule, power of a quotient, power rule, and zero exponent), negative integer exponents, rational exponents
  - c. Simplify Radical Expressions, including but not limited to evaluating perfect roots without technology and approximating irrational roots with technology, square roots of negatives written using  $i$
2. Algebraically solve quadratic and square root equations.
  - a. Solve Quadratic Equations, including but not limited to using various methods of factoring, square root property, and the quadratic formula. Determine the most efficient method for solving a quadratic equation, including those resulting in real and complex solutions.
  - b. Solve Square Root Equations, including but not limited to square root equations in one variable and literal square root equations.
3. Identify, evaluate, and analyze functions using verbal, graphic, algebraic, and numeric representations.
  - a. Identify Functions, including but not limited to determining if a relation is a function and exploring graphical representations of functions beyond linear and quadratic (higher order polynomials, absolute value, and square root).
  - b. Evaluate Functions using function notation correctly to evaluate given a graph or an equation.
  - c. Analyze Functions by describing domain and range, increasing/decreasing behavior, and determine if a function is linear, quadratic, or neither from a table of values, a graph, and an equation
4. Create, interpret, and use function models to make estimates and predictions.
  - a. Create function models from verbal descriptions, creating scatterplots and analyzing trends, finding linear and quadratic regression equations with technology, and identifying and describing when and why model breakdown occurs.
  - b. Interpret the meaning of function model, including but not limited to defining variables, describing the meaning of specific terms of a linear model, identifying dependent and independent variables and describing the meaning of any ordered pair and of a point of intersection for a system of equations model.
  - c. Using function models to make estimates and make predictions for linear and quadratic functions, determining the minimum or maximum value of a quadratic model graph determining zero output(s) of a function model graph, and determining points of intersection from the graph of a system of equations using technology.
5. Graphically represent and analyze linear and quadratic functions by hand or using technology as appropriate.
  - a. Graphically represent functions by hand, including but not limited to appropriate scales, labeling axes, units, identifying and label ordered pairs of intercepts and other important graph features such as the vertex and axis of symmetry, and correctly drawing linear and quadratic graphs.
  - b. Graphically represent functions using technology, including but not limited to inputting functions into a graphing utility, algebraically solving for  $y$  when necessary, displaying graphs in an appropriate viewing window and creating an accurate and appropriate sketch on paper of a graph originally created using technology.
  - c. Graphically analyze linear and quadratic functions, including but not limited to evaluating linear and quadratic functions using technology, finding intercepts using technology, recognizing that quadratic functions are second degree polynomials and graph as parabolas, describing the relationship between the  $x$ -intercepts of

the graph of a function and the solutions of the related quadratic equation, analyzing quadratic functions given in standard form.

## **Required materials**

Students are required to have a license for web-based software which will include an e-text. Paper copy of the textbook is optional.