



Syllabus

MAT 097 Algebra and Introduction to Functions

General Information

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Department Mathematics

Course Prefix MAT

Course Number 097

Course Title Algebra and Introduction to Functions

Course Information

Catalog Description A transitional course in mathematics designed to provide the student with a solid algebraic background for further studies in mathematics or the sciences. In addition to improving algebraic fluency by simplifying expressions and solving equations, this course provides an introduction to the concept of a function. The family of linear functions is introduced, with an emphasis on modeling with realistic applications. This course carries imputed (financial aid) credit. It does not fulfill FLCC's Mathematics or general elective requirements.

Credit Hours (imputed) 4

Lecture Contact Hours 4

Lab Contact Hours 0

Other Contact Hours 0

Grading Scheme Letter

Prerequisites

Placement into Math Level 0 or 1

Co-requisites

None

First Year Experience/Capstone Designation

This course DOES NOT satisfy the outcomes applicable for status as a FYE or Capstone.

SUNY General Education

This course is designated as satisfying a requirement in the following SUNY Gen Ed categories

None

FLCC Values

Institutional Learning Outcomes Addressed by the Course

Inquiry and Interconnectedness

Course Learning Outcomes

Course Learning Outcomes

1. Use algebraic skills to simplify and factor expressions.
2. Use average rate of change to describe functions, and to model realistic scenarios using linear functions.
3. Use and interpret function notation.
4. Use algebraic skills to solve equations.

Outline of Topics Covered

General philosophy, emphasize realistic applications wherever possible, particularly in motivating new concepts.

General outline of topics covered

1. **General skills**
 - a. **Evaluating expressions containing exponents**
 - b. **Order of operations with Real Numbers**
 - i. **From basic expressions (2 or 3 operators) to more involved (multiple parenthesis and operators)**
 - c. **Algebraic substitution (including applied problems)**
 - d. **Solving first degree equations**
 - e. **Solve for one variable in terms of another**
2. **Exponents**

- a. Applying properties of exponents in both directions (eg.):
 - i. $(x^2)^3 = x^6$ and $x^6 = (x^2)^3$
 - b. Negative exponents
 - c. Fractional exponents of the form $1/n$ where n is an integer greater than or equal to 2.
 - i. Connection to radicals
 - d. Address common misconceptions of exponents (eg.):
 - i. $(x + y)^2 \neq x^2 + y^2$
 - ii. $(-x)^2 \neq -x^2$
 - iii. $ab^x \neq (ab)^x$
 - iv. $b^{-x} \neq -b^x$
 - e. Solving equations with exponents
3. Factoring techniques
- a. Common factor
 - b. Difference of two squares
 - c. Trinomial factoring
4. Quadratic Equations (Real solutions)
- a. Solving by factoring
 - i. Zero product principle
 - b. Solving by taking square roots
5. Functions
- a. Definition of a function
 - b. Four forms: verbal, algebraic, tabular (numeric), graphical
 - c. Function notation
 - d. Evaluating functions
 - e. Average rate of change (calculation and interpretation)
 - f. Solving for the input of a function given an output

- g. Interpreting the realistic meaning of the inputs and outputs of a function**
- h. Stating the domain and range of realistic functions. Stating just the domain of abstract functions**

6. Linear functions

- a. Defining property: constant average rate of change (calculation and interpretation)**
- b. Forms: point-slope, slope-intercept, general.**
- c. Converting between forms listed in b.**
- d. Finding the slope, horizontal and vertical intercepts algebraically and graphically**
- e. Interpreting the realistic meaning of the slope, horizontal and vertical intercepts**
- f. Modeling with linear functions**
- g. Solving linear equations algebraically and graphically**
- h. Solving systems of linear equations algebraically and graphically**
 - i. Algebraically by substitution and elimination**
 - ii. Dependent and inconsistent systems**