

## MATH 003: College Mathematics Fundamentals and Problem Solving

Math 003 prepares students to succeed in a college-level mathematics course. The course focuses on conceptual and problem solving skills with emphasis on practicing symbolic reasoning, evaluating, the meaning of quantities, variables, expressions and formulas, changes in quantities, constant rate of change, and linear functions, inequalities, systems of equations, exponential and logarithmic functions, quadratic functions, polynomial functions, rational functions and radical functions.

**Prerequisites:** None

**Labs:** Two one hour and twenty minutes labs per week. They will be held at the registered times. Attendance and participation is mandatory. Emphasis will be given to active learning activities and student engagement.

### Learning Outcomes

During the course students will do the following

- Develop and refine skills to analyze if two mathematical expressions are equivalent.
- Develop, refine, and utilize logical, quantitative, and covariational reasoning.
- Understand and be able to use definitions of and notations for: function, domain, and range.
- Understand and be able to verbalize percent and percent change.
- Understand and verbalize how the value of a function changes as its argument changes.
- Understand, be able to calculate, and be able to verbally describe rates of change. Be able to identify which functions have a constant rate of change and which do not.
- Understand specific functions (linear, exponential, and logarithmic functions) and their properties verbally, visually, numerically, and symbolically (rule of four). Be able to navigate between these four perspectives for linear, exponential, and logarithmic functions.
- Given a function or functions, understand ways to create a new function (via addition, composition, and transformations) and analyze properties of the new function.
- Understand when a function has an inverse and be able to identify if a specific function, described numerically or visually, has an inverse function.
- Given a linear, exponential, or logarithmic function, determine its inverse function.
- Model real world situations using linear, exponential, or logarithmic functions. Interpret and make predictions from a model.

## Weekly Schedule

Three units (weekly: two 1 ½ hours labs, 2 hours lesson videos and readings materials, approximately 4 hours of homework and quizzes)

WEEK	TOPIC
1	Practicing Symbolic Reasoning. <i>Evaluating, Simplifying and Solving: A Conceptual and Practice Oriented Review.</i>
2	The Meaning of Quantities, Variables, Expressions and Formulas
3	Changes in Quantities, Constant Rate of Change, and Linear Functions
4	Changes in Quantities, Constant Rate of Change, and Linear Functions Inequalities
5	Systems of Equations Exponential and Logarithmic Functions
6	Exponential and Logarithmic Functions
7	Quadratic Functions
8	Polynomial Functions
9	Rational Functions
10	Radical Functions