

**Miami-Dade Community College**  
**MAC 1105**  
**COLLEGE ALGEBRA**

**Course Description** This course introduces the student to the concept of functions and their graphs. Students will graph linear, quadratic, rational, exponential, logarithmic, radical, power, and absolute value functions and transformations; perform operations on and compositions of functions; find the inverse of a function; apply the laws of logarithms to simplify expressions and solve equations; graph non-linear inequalities; solve related applications and modeling problems.

**Pre-requisite:** MAT 1033 with a grade of C or better or equivalent (3 hrs. lecture)

**Credits:** 3

**Course Competencies:**

**Competency 1:** The student will demonstrate knowledge of absolute value equations and inequalities by

- a. Solving absolute value equations
- b. Solving absolute value inequalities

**Competency 2:** The student will demonstrate knowledge of systems of linear equations by:

- a. Solving systems of linear equations in three variables (with or without technology)
- b. Solving applications involving systems of linear equations

**Competency 3:** The student will demonstrate knowledge of complex numbers by:

- a. Simplifying radicals that represent imaginary numbers
- b. Adding, subtracting, multiplying, and dividing complex numbers.

**Competency 4:** The student will demonstrate knowledge of quadratic equations and functions by:

- a. Using the discriminant to identify the types of solutions for quadratic equations.
- b. Graphing quadratic function and identifying the vertex, x-intercept, y-intercept and the axis of symmetry of the graph.
- c. Finding the maximum or minimum value of a quadratic function.
- d. Finding the maximum or minimum value of a quadratic function in quadratic models.
- e. Solving equations that are quadratic in form.

**Competency 5: The student will demonstrate knowledge of functions from a numerical, graphical, verbal and analytic perspective by:**

- a. Distinguishing if a given relation is a function
- b. Evaluating using functional notation
- c. Using the vertical line test to determine if a graph represents a function
- d. Identifying the domain and range of relations and functions
- e. Recognizing and graphing nonlinear relations
- f. Adding, subtracting, multiplying and dividing functions
- g. Forming compositions of functions
- h. Finding the inverse of a function
- i. Graphing a function and its inverse function
- j. Evaluating and graphing piecewise-defined functions

**Competency 6: The student will demonstrate knowledge of polynomial and rational functions and inequalities by:**

- a. Graphing polynomial functions
- b. Graphing rational functions
- c. Solving polynomial inequalities and graphing their solution set
- d. Solving rational inequalities and graphing their solution set

**Competency 7: The student will demonstrate knowledge of absolute value, radical and power functions by:**

- a. Finding the domain and range of these functions
- b. Graphing these functions and transformations

**Competency 8: The student will demonstrate knowledge of exponential and logarithmic functions by:**

- a. Graphing exponential and logarithmic functions
- b. Identifying the domain and range of exponential and logarithmic functions
- c. Applying properties of logarithms to expand logarithmic expressions
- d. Applying properties of logarithms to write logarithmic expressions as a single logarithm
- e. Solving exponential and logarithmic equations
- f. Applying modeling techniques to solve problems of exponential growth and decay

**Competency 9: The student will demonstrate knowledge of equations in two variables by:**

- a. Recognizing and graphing equations that represent circles
- b. Given the center and radius of a circle, writing the equation of the circle
- c. Determining the distance between two points