

Miami-Dade Community College
MAC 1147 Integrated Pre-calculus Algebra and Trigonometry

Course Description: This course includes all the topics of Pre-Calculus Algebra (MAC 1140) and Trigonometry (MAC 1114). Refer to the course descriptions of those two courses. (5-hrs. lecture)

Pre-requisite: MAC 1105 with a grade of C or better or equivalent

Course Competencies:

Competency 1: The Student will demonstrate knowledge of the polynomial, rational and other algebraic Functions, their properties and their graphs by:

- a. Defining the functions.
- b. Identifying the domains and ranges of the functions.
- c. Graphing the functions, and their transformations.
- d. Defining inverse functions.

Competency 2: The Student will demonstrate knowledge of polynomial and rational inequalities by:

- a. Solving linear and nonlinear inequalities.
- b. Graphing linear and no linear I equalities.

Competency 3: The Student will demonstrate knowledge of exponential and logarithmic functions, their properties and their graphs by:

- a. Defining the exponential and logarithmic functions.
- b. Identifying the domains and ranges of the exponential and logarithmic functions.
- c. Graphing the exponential and logarithmic functions, and their transformations.
- d. Evaluating logarithmic expressions.
- e. Solving exponential and logarithmic equations.

Competency 4: The Student will demonstrate knowledge of piecewise defined functions by:

- a. Defining piecewise defined functions.
- b. Identifying the different conic sections.
- c. Graphing piecewise defined functions.

- Competency 5: The Student will demonstrate knowledge of conic sections by
- a. Identifying the different conic sections.
 - b. Graphing the different conic sections.
- Competency 6: The Student will demonstrate knowledge matrices and determinants by:
- a. Defining matrices and dimensions of matrices.
 - b. Performing algebraic operations on matrices.
 - c. Evaluating determinants.
 - d. Solving linear systems using Cramer's Rule.
- Competency 7: The Student will demonstrate knowledge of sequences and series by:
- a. Defining sequences and series (including arithmetic and geometric).
 - b. Writing the a_n term of sequences.
 - c. Finding the sums of series (including arithmetic and geometric).
- Competency 8: The Student will demonstrate knowledge of mathematical induction by:
- a. Proving that a given formula is the true through the Principle of Mathematical Induction.
- Competency 9: The Student will demonstrate knowledge of the Binomial Theorem by:
- a. Expanding a Binomial using the Binomial Theorem.
- Competency 10: The Student will demonstrate knowledge of applications of Precalculus by solving problems involving, buy not limited to, the following:
- a. Exponential and Logarithmic Growth and Decay Model
- Competency 11: The Student will demonstrate knowledge of the trigonometric functions their properties and their graphs by:
- a. Defining the functions in three different ways.
 - b. Graphing the trigonometric functions, and their transformations.
 - c. Finding approximate values of the trigonometric functions using a calculator.
 - d. Finding exact values of trigonometric functions with reference angles of measures 0,30,45,60,90 degrees and their radian equivalent.

Competency 12: The Student will demonstrate knowledge of inverse trigonometric functions their properties and their graphs by:

- a. Defining the inverse trigonometric functions including domains and ranges.
- b. Graphing inverse trigonometric functions.

Competency 13: The Student will demonstrate knowledge of trigonometric identities by:

- a. Simplifying trigonometric expressions.
- b. Finding exact values of sums and differences of angles, half angles.
- c. Proving trigonometric identities.

Competency 14: The Student will demonstrate knowledge of solving trigonometric equations by:

- a. Finding all solutions on the domain $0 \leq x < 2\pi$
- b. Finding all solutions on the real numbers.
- c. Using identities to solve equations.

Competency 15: The Student will demonstrate knowledge of solving triangles by:

- a. Solving right triangles.
- b. Solving triangles using the law of sines or the law of cosines.