BAKER COLLEGE
STUDENT LEARNING OUTCOMES
MTH1310 Pre-Calculus
5 Semester hours

Student Learning Outcomes and Enabling Objectives

1. Evaluate Equations.
   a. Solve Equations.
   b. Apply equations to real-world situations.
   c. Perform the complete set of operations with complex numbers.
   d. Solve quadratic equations by means of completing the square, the square root property, and the quadratic formula.
   e. Apply quadratic equations to real-world situations.
   f. Solve radical equations and equations with rational exponents.
2. Analyze Functions and Relations
   a. Determine the domain and range of a function.
   b. Apply transformations to basic functions.
   c. Construct graphs of functions as well as interpreting graphs.
   d. Perform the complete set of operations, including composition, with functions.
3. Evaluate polynomial and rational functions.
   a. Identify zeros, y-intercept, maxima, minima, axis of symmetry and function values of quadratic functions.
   b. Graph quadratic functions.
   c. Determine the end behavior of a polynomial function.
   d. Apply the Intermediate Value Theorem.
   e. Identify zeros, y-intercept, extreme values, turning points, and function values of polynomial functions.
   f. Graph polynomial functions.
   g. Determine the infinite behavior of a function.
   h. Identify the vertical, horizontal, and oblique asymptotes of a rational function.
   i. Graph rational functions.
   j. Apply quadratic and rational functions to real-world situations.
4. Evaluate exponential and logarithmic functions.
   a. Identify the inverse of a function algebraically and graphically.
   b. Convert between logarithmic and exponential forms.
   c. Graph exponential and logarithmic functions.
   d. Apply properties of logarithms, including basic properties; the product, quotient, and power properties; and change-of-base formula.

e. Write a logarithmic expression in expanded form and as a single logarithm.
    f. Solve exponential and logarithmic functions.
    g. Apply exponential and logarithmic functions to real-world situations, including exponential growth and decay models.
5. Analyze conic sections.
    a. Recognize standard forms of conic sections.
    b. Graph conic sections.
    c. Apply conic sections to real-world situations.
6. Evaluate trigonometric functions.
    a. Convert between degree and radian measure.
    b. Apply radian measures to angles.
    c. Define trigonometric functions of any angle based on a right triangle or the unit circle.
    d. Apply trigonometric functions to real-world situations.
    e. Determine the period, amplitude, and phase shift of a sinusoidal function.
    f. Graph trigonometric functions.
    g. Solve equations using trigonometric identities and inverse trigonometric functions.
    h. Solve problems using the Law of Sines and Law of Cosines.
    i. Model harmonic motion.
    j. Apply trigonometry to polar coordinate systems.
    k. Convert ordered pairs and equations between polar and rectangular coordinates.
7. Apply vectors to describe magnitude and direction.
    a. Interpret vectors geometrically.
    b. Represent vectors in component form.
    c. Perform basic operations on vectors in component form.
8. Analyze sequences and series.
    a. Find the first several terms of a sequence.
    b. Write the terms of a sequence defined by a recursive formula.
    c. Find the formula for an arithmetic sequence.
    d. Find the formula for a geometric sequence.
    e. Calculate sums, properly using summation notation.
    f. Determine whether a geometric sum converges or diverges.
9. Explore the elementary concepts of limits.
    a. Evaluate the difference quotient for functions.
    b. Find a limit using a table or a graph.
    c. Find the limit of a sum, difference, product, and quotient.
    d. Find the limit of a polynomial, power, or root.

Big Ideas and Essential Questions

Big Ideas
- Functions and Algebraic Structures
- Conic Sections
- Trigonometric Functions
- Vectors
- Series and Sequences
- Concepts of Limits

Essential Questions
1. How can functions and Algebraic Structures be used to solve real-world problems?
2. How do functions and the algebraic description of shapes and graphs allow me to analyze the world around me?
3. How can trigonometry be used to describe triangles and harmonic motion?
4. How can vectors be used to solve application problems involving magnitude and direction?
5. How can sequences and series help me to describe patterns?
6. How can limits be used to describe the behavior of a function?

These SLOs are not approved for experiential credit.

Effective: Fall 2023