NCBS 447: SUPPORT FOR MATH 47

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2025
Units:	0
Hours:	3 lecture per week (36 total per quarter)
Corequisite:	MATH 47.
Degree & Credit Status:	Non-Degree-Applicable Non-Credit Course Basic Skills
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Pass/No Pass Only
Repeatability:	Unlimited Repeatability

Student Learning Outcomes

- Students will be able to solve problems involving applications of basic functions
- Students will develop conceptual understanding of basic functions
- Students will demonstrate an ability to solve equations and inequalities
- Students will assess their own learning process and performance in preparation for calculus

Description

Core prerequisite skills, competencies, and concepts needed in Path to Calculus. Intended for students who are concurrently enrolled in MATH 47 at Foothill College and who want extra support. Topics include a review of skills, including developing a knowledge of function families with their graphs and behavior, transformations, average rate of change, inverses, and compositions. Family functions include linear, quadratic, and power.

Course Objectives

The student will be able to:

1. Explore topics related to developing effective learning skills.
2. Graph, analyze, and transform linear, quadratic, piecewise, absolute value, power, and radical functions, and solve and apply related equations and inequalities.
3. Recognize the relationship between functions and their inverses graphically and algebraically.
4. Solve application problems using linear, quadratic, piecewise, power, and radical functions and model real world applications.
5. Understand and compute rates of change.
6. Use technology, such as graphing calculators and/or computer software, to assist in solving problems involving any of the topics in (1) through (5) above.
7. Discuss mathematical problems and write solutions in accurate mathematical language and notation.
8. Interpret mathematical solutions.

Course Content

1. Explore topics related to developing effective learning skills
   a. Learn study skills
      i. Organizational skills
      ii. Time management
      iii. Test preparation
      iv. Test-taking skills
   b. Self-assess using performance criteria to judge and improve one's own work
      i. Analyze and correct errors on one's exam
      ii. Self-assess one's understanding of specific mathematical concepts
      iii. Develop and execute a plan to deepen understanding
   c. Identify, utilize, and evaluate the effectiveness of resources in improving one's own learning, such as study groups, computer resources, lab resources, and tutoring resources
2. Graph, analyze, and transform linear, quadratic, piecewise, absolute value, power, and radical functions, and solve and apply related equations and inequalities
   a. Use function notation
      i. Evaluate functions
      ii. Determine a relation vs. a function
      iii. Be able to convert words representing function relationships into symbolic and graphical representation
   b. Recognize each function type
   c. Explore the behavior of graphs
      i. Increasing and decreasing
      ii. Local extrema
   d. Find domain and range
   e. Transform graphs
      i. Identify and graph the change in a function that results from shifts, reflections, stretches, and compressions
      ii. Be able to recognize the change in a graph of a function when a combination of transformations is applied
      iii. Understand the concept of symmetry of functions
      iv. Odd, even, or neither
   f. Compose and combine functions
   g. Solve equations and inequalities
3. Recognize the relationship between functions and their inverses graphically and algebraically
   a. Determine whether or not a function as an inverse function
   b. Properties of inverse functions
   c. Notation
4. Solve application problems using linear, quadratic, piecewise, power, and radical functions and model real world applications
   a. Create an appropriate model from a verbal description or graph
   b. Use chosen models to solve application problems
   c. Interpret solutions
5. Understand and compute rates of change
   a. Calculate average rate of change from a table, graph, or an equation

   b. Understand the implications of a function that has a constant or variable rate of change
   c. Interpret the meaning of an average rate of change in the context of a applications
6. Use technology, such as graphing calculators and/or computer software, to assist in solving problems involving any of the topics in (1) through (5) above
   a. Calculator/computer utilities for evaluating problems involving optimization
   b. Calculator/computer utilities for finding zeros or roots of functions
7. Discuss mathematical problems and write solutions in accurate mathematical language and notation
   a. Application problems from other disciplines
   b. Proper notation
8. Interpret mathematical solutions
   a. Explain the significance of solutions to application problems

Lab Content

Not applicable.

Special Facilities and/or Equipment

1. Access to graphing technology, such as a graphing calculator or graphing software
2. When taught online or hybrid:
a. Internet access
b. Course management system
c. Specific software related to the course

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Written homework
Quizzes and tests

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture
Discussion
Cooperative learning exercises

Representative Text(s) and Other Materials

Boelkins, Matthew. Active Prelude to Calculus. 2019.

Abramsom, Jay. Precalculus, 2nd ed. (Openstax). 2024.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Problem sets
2. Exploratory activities and/or projects
3. Reading and/or writing assignments

Discipline(s)

Mathematics