

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Mathematics 021 – Foundations for Calculus I: Early Transcendentals

2 hours lecture, 2 units

Catalog Description

Support for this course focuses on the skills and concepts needed for success in *Calculus and Analytic Geometry I*. This course is for students concurrently enrolled in Calculus I (Math C2210) at Cuyamaca College. Students will receive extra support in algebra, analytic geometry, trigonometry, technology, and study skills. **Pass/No Pass only. Non-degree applicable.**

Prerequisite

Appropriate placement

Co-requisite

MATH C2210

Course Content

A just-in-time approach to content relevant to the MATH C2210 entrance skills and to success in MATH C2210:

- 1) Algebra
 - a. Domain and range
 - b. Methods for solving equations involving polynomials, logarithms, exponents, absolute value, and/or radicals
 - c. Function composition
 - d. Properties of rational exponents
 - e. Properties of real numbers
- 2) Trigonometry
 - a. Identities and formulas
 - b. Standard angles
 - c. Converting between radian and degree measure
 - d. Solving trigonometric equations
- 3) Geometry
 - a. Analytic geometry
 - b. Formulas for standard geometric objects
 - c. Similarity
- 4) Mathematical Reasoning
 - a. Recognizing mathematical arguments
 - b. Modeling
- 5) Graphing
 - a. Functions and their inverses
 - b. Graph interpretation
- 6) Study Skills
 - a. Affective domain
 - b. Use of relevant technology
 - c. Test-taking strategies
 - d. Reading and note-taking strategies

Course Objectives

Students will be able to

- 1) Use skills and knowledge from algebra, geometry, trigonometry to successfully complete Calculus I, MATH C2210, problems.
- 2) Apply problem solving skills and gain confidence working Calculus I problems from MATH C2210.
- 3) Assess and improve their mathematical competency.
- 4) Apply effective study skills.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Group and independent exploratory activities which measure students' ability to analyze the connections between the numeric, algebraic, and verbal representations of various types of algebraic expressions, equations, inequalities, functions, and systems of equations and/or inequalities when applied to real-world problems and data analysis.
- 2) Quizzes and exams (including a comprehensive in-class final exam) which measure students' ability to work independently using graphic, numeric, and algebraic techniques to simplify algebraic expressions; formulate, analyze and solve algebraic equations, inequalities, and systems of equations and inequalities; identify and analyze algebraic, exponential, and logarithmic functions; apply formulas to evaluate geometric objects; use all of the above in solving real-world application problems; and recognize and graph elementary conics.
- 3) Homework in which students apply graphic, numeric and algebraic principles discussed in class to a series of practice problems to help them formulate questions and receive feedback from the instructor, tutors, or classmates.
- 4) Computer laboratory assignments in which students apply algebraic principles and problem-solving techniques discussed in class to help students identify gaps in their skill attainment and concept mastery and to improve their symbolic manipulation abilities and problem-solving skills.

Special Materials Required of Student

Graphing calculator

Minimum Instructional Facilities

- 1) Smart classroom with white boards, overhead projector/screen, graphing utility overhead viewing panels
- 2) Math lab with computers, white boards, overhead projector/screen, appropriate software for integrated computer instruction (word processing, spreadsheet and other workplace software)

Method of Instruction

- 1) Lecture and discussion
- 2) Teamwork
- 3) Instructor-guided discovery and computer-facilitated instruction

Out-of-Class Assignments

- 1) **Reading:** Lecture notes; assigned textbook sections explaining mathematical concepts and procedures; instructional materials provided by the instructor; worked example sets; reference materials for mathematical symbols and notation; supplemental explanations from approved online resources; and documentation for graphing calculators or mathematical software.
- 2) **Writing / Problem Solving:** Problem sets requiring clear, step-by-step demonstration of reasoning using correct mathematical notation; written explanations supporting solutions and justifying methods; error analysis and revision of incorrect or incomplete work; solution summaries explaining conceptual understanding; problem-based learning tasks requiring application of

multiple skills; written responses to mathematical prompts or inquiry problems; and organized documentation of problem-solving strategies used in individual or group assignments.

- 3) **Other:** Online homework assignments or quizzes using learning platforms; collaborative problem solving using shared documents or discussion boards; graph construction by hand and with technology; review and annotation of instructor feedback to revise and resubmit work; preparation for exams through practice tests and concept reviews; mathematical modeling activities using real-world data; use of graphing calculators or math software to explore and verify solutions; and completion of study logs, learning reflections, or structured practice plans to build mastery.

Texts and References

- 1) Required (representative example): None
- 2) Supplemental: Interactive Math on Canvas course with exploratory projects and classroom activities created by Cuyamaca College faculty

Exit Skills

Students who successfully complete this course will exit with the following skills, competencies and/or knowledge:

- 1) Appropriate use of PreCalculus vocabulary and concepts in service of Calculus, including domain and range; graphs and properties of algebraic, exponential, logarithmic, and trigonometric functions; and standard function operations (addition, subtraction, multiplication, division, composition, and inverses).
- 2) Familiarity with graphical, symbolic and technology-based methods for solving equations as part of solving Calculus I problems

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Use the analytical, numerical, and graphical methods of PreCalculus in solving Calculus I problems.
- 2) Solve multi-disciplinary application problems and interpret the results in context.
- 3) Apply study habits that promote success in Calculus I.