MATH C170: PRECALCULUS

Item	Value
Top Code	170100 - Mathematics, General
Units	5 Total Units
Hours	90 Total Hours (Lecture Hours 90)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)
Local General Education (GE)	• CL Option 1 Math Competency (CA3)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 2A Math Concepts (2A)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 2A Math Concepts (2A)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B4 Math/Quant.Reasoning (B4)

Course Description

Topics include algebra review, complex numbers, sequences and series, polynomial, rational, exponential, logarithmic, and trigonometric and inverse functions, vectors, analytic geometry, linear systems, matrices, and polar coordinates. This course is designed for those students planning to study calculus 1. PREREQUISITE: Successful completion, with a grade of C or better, of Intermediate Algebra or equivalent or a high school class of Integrated Math 3. Transfer Credit: CSU; UC: Credit Limitation: MATH C115 and MATH C170 combined: maximum credit, five semester or seven and one-half quarter units.

Course Level Student Learning Outcome(s)

1. Graph polynomial and rational functions.
2. Obtain and simplify the difference quotient for a given function.
3. Solve trigonometric equations.

Course Objectives

- 1. Find all real and complex roots or zeros of a polynomial equation.
- 2. Solve equations involving exponential or logarithmic expressions.
- 3. Prove or establish trigonometric identities.
- 4. Decompose a fractional expression via partial fractions.
- 5. Use appropriate technology such as calculators or computer software to enhance mathematical thinking, visualization, and understanding, to solve mathematical problems, and judge the reasonableness of the results.
- 6. Demonstrate quantitative reasoning skills by developing convincing arguments and by communicating mathematically both verbally and in writing.

Lecture Content

GRAPHS Rectangular Coordinates Intercepts, Symmetry, Graphing Key Equations Solving Equations Using a Graphing Utility Lines Circles FUNCTIONS and THEIR GRAPHS Functions The Graph of a Function Properties of Functions Library of Functions; Piecewise-defined Functions Graphing Techniques: Transformations Mathematics Models: Building Functions LINEAR and QUADRATIC FUNCTIONS Linear Functions, Their Properties, and Linear Models Building Linear Models from Data; Direct Variation Quadratic Functions and Their Properties Building Quadratic Models from Verbal Descriptions and Data Inequalities Involving Quadratic Functions POLYNOMIAL and RATIONAL FUNCTIONS Polynomial Functions and Models Properties of Rational Functions The Graph of a Rational Function Polynomial and Rational Inequalities The Real Zeros of a Polynomial Functions Complex Zeros; Fundamental Theorem of Algebra EXPONENTIAL and LOGARITHMIC FUNCTIONS Composite Functions One-to-One Functions; Inverse Functions Exponential Functions Logarithmic Functions Properties of Logarithms Logarithmic and Exponential Equations Financial Models Exponential Growth and Decay Models TRIGONOMETRIC FUNCTIONS Angles and Their Measure Trigonometric Functions: Unit Circle Approach Properties of the Trigonometric Functions Graphs of the Sine and Cosine Functions Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions Phase Shift; Building Sinusoidal Models ANALYTIC TRIGONOMETRY The Inverse Sine, Cosine, and Tangent Fu nctions The Inverse Trigonometric Functions (Continued) Trigonometric Identities Sum and Difference Formulas Double-angle and Half-angle Formulas Product-to-Sum and Sum-to-Product Formulas Trigonometric Equations APPLICATIONS of TRIGONOMETRIC FUNCTIONS Applications Involving Right Triangles The Law of Sines The Law of Cosines Area of a Triangle Simple Harmonic Motion; Damped Motion; Combining Waves POLAR COORDINATES; VECTORS Polar Coordinates Polar Equations and Graphs The Complex Plane; DeMoivres Theorem Vectors The Dot Product Vectors in Space The Cross Product ANALYTIC GEOMETRY Conics The Parabola The Ellipse The Hyperbola Rotation of Axes; General Form of a Conic Polar Equations of Conics Plane Curves and Parametric Equations SYSTEMS of EQUATIONS and INEQUALITIES Systems of Linear Equations; Substitution and Elimination Systems of Linear Equations; Matrices Systems of Linear Equations; Determinants Matrix Algebra Partial Fraction Decomposition Systems of Nonlinear Equations Systems of Inequalities SEQUENCES; INDUCTION; THE BINOMIAL THEOREM Sequences Arithmetic Sequences Geometric Sequences; Geometric Series Mathematical Induction The Binomial Theorem COUNTING and PROBABILITY Counting Permutations and Combinations Probability

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Instructional Techniques

All the teacing methods use computer, math software, graphing calculators, videos, and Powerpoint Presentations.

Reading Assignments

Reading in a textbook or supplementary OER source

Writing Assignments

Homework exercises, quizzes, comprehensive Midterm and Final exams

Out-of-class Assignments

Out-of-Class assignments include homework and quizzes.

Demonstration of Critical Thinking

Apply mathematics concepts to solve real world application problems, explain the reasoning, and present the results.

Required Writing, Problem Solving, Skills Demonstration

Included as homework assignments, part of classroom lectures and discussions, part of quizzes, Midterm Examination, Final Examination, and Projects.Students will be able to explain solutions and justify reasoning verbally or in writing and may be included in classroom discussions, quizzes, Midterm Examination, Final Examination, and Projects.

Eligible Disciplines

Mathematics: Masters degree in mathematics or applied mathematics OR bachelors degree in either of the above AND masters degree in statistics, physics, or mathematics education OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Sullivan and Sullivan. Precalculus - Concepts Through Functions, A Unit Circle Approach, 4th ed. Pearson, 2019

Other Resources

1. Coastline Library 2. Digital Video Tutor 3. MyMathLab access code 4. Student Solutions Manual