MATH G170: PRECALCULUS

Item	Value
Curriculum Committee Approval Date	12/07/2021
Top Code	170100 - Mathematics, General
Units	4 Total Units
Hours	72 Total Hours (Lecture Hours 72)
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)
Local General Education (GE)	• GWC Mathematic Competency (GB2)
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

This course will cover topics required for studying calculus. Particular emphasis will be placed on the analysis of polynomial, rational, exponential, logarithmic, trigonometric and inverse functions. Other topics include analytic geometry, linear systems, elementary theory of equations, polar coordinates, and complex numbers. This course is essential for those students planning to study MATH G180 (Calculus 1). PREREQUISITE: MATH G120 or appropriate Math Placement. Transfer Credit: CSU; UC: Credit Limitation: MATH G115 and MATH G170 combined: maximum credit, five semester/seven and a half quarter units.

Course Level Student Learning Outcome(s)

1. Course Outcomes
2. Solve trigonometric equations over the set of real numbers.
3. Solve logarithmic and exponential equations.
4. Solve polynomial and rational inequalities.

Course Objectives

- 1. Graph equations and functions in the rectangular coordinate system: polynomial, rational, exponential, logarithmic, parametric, and conic sections.
- 2. Apply transformations to the graphs of functions and relations.
- 3. Explain the principles of polar coordinates, polar equations, and parametric equations.
- 4. Graph functions and relations in polar coordinates.
- 5. Analyze results from the graphs and/or equations of functions and relations.
- 6. Find the inverse of a function and determine the algebraic and graphical relationships.
- 7. Solve and apply equations including rational, linear, polynomial, exponential, logarithmic, absolute value, algebraic, trigonometric, and absolute value inequalities.
- 8. Solve systems of equations and inequalities.
- 9. Apply functions to model real world applications.
- 10. Graph the basic trigonometric functions and apply changes in period, phase and amplitude to generate new graphs.
- 11. Identify special triangles and their related angle and side measures.
- 12. Evaluate the trigonometric function of an angle given in degree and radian measure.
- 13. Manipulate and simplify trigonometric expressions.
- 14. Prove trigonometric identities.

Lecture Content

Functions and their graphs Properties of functions Domain and range Algebra of functions Graphs of functions Intercepts Library of functions Graphing using transformations Polynomial and Rational Functions Linear functions and their graphs Polynomial functions and their graphs Vertices Rational functions and their graphs Asymptotic behavior Polynomial and rational inequalities Real and complex zeroes of a polynomial Solve polynomial and rational equations Algebraic Functions Radical functions Absolute value functions Solve radical functions Solve absolute value equations Absolute value inequalities Exponential and Logarithmic Functions Composite functions Inverse functions Exponential functions Logarithmic functions Solve logarithmic and exponential equations Trigonometric Functions Angles and their measure Trigonometric functions on the unit circle Properties of trigonometric functions Graphs of trigonometric functions Period Amplitude Phase shift Inverse trigonometric functions Analytic Trigonometry Inverse trigonometric functions Trigonometric identities Sum and difference formulas Double-angle and half-angle formulas Sum-to-product and product-to-sum formulas Solve trigonometric equations Applications of Trigonometric Functions Right triangle trigonometry Law of sines Law of cosines Area of a triangle Polar Coordinates Polar coordinates Polar equations and graphs Conic Sections and Plane Curves The parabola The ellipse The hyperbola Plane curves and parametric equations Systems of Equations and Inequalities Substitution and elimination/addition Partial fraction decomposition Systems of inequalities

Method(s) of Instruction

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

Reading Assignments

Course textbook or instructor handouts which provide explanations worked examples, and problems to be solved.

Writing Assignments

Students will be required to write their own solutions to regular homework exercises, test questions, and quizzes. To be successful, these papers must demonstrate clarity, mathematical modeling, and problem-solving skills.

Out-of-class Assignments

Computer assignments may be required. These will consist of individual laboratory assignments designed to further illustrate the concepts presented in the lecture.

Demonstration of Critical Thinking

Students will demonstrate critical thinking and problem-solving skills by using logic, in conjunction with past mathematical solving techniques, to solve and interpret a variety of applications not previously seen. Demonstrations will be shown by completing assignments, participating in discussions, and completing required exams and quizzes.

Required Writing, Problem Solving, Skills Demonstration

Students will be required to write their own solutions to regular homework exercises, test questions and quizzes. To be successful, these papers must demonstrate clarity, mathematical modeling, and problem solving skills.

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. Precalculus, 11th ed. Pearson, 2020 2. Required Abramson, Jay. Precalculus , ed. OpenStax (OER) (latest), 2014 Rationale: Reliable OER source