PRE CALCULUS
MA 165

Catalogue Description

Selected topics from algebra, exponential and logarithmic functions, trigonometry and analytic geometry are chosen to provide a suitable background for Calculus I. 3 credits Prerequisite: Ma 112 or equivalent.

Goals

A. To develop and expand algebra skills.
B. To increase the student's ability to understand and graph functions.
C. To increase the student's ability to explain and write about how graphs are used.
D. To increase the ability of the student to perform analytic geometry processes.
E. To teach a knowledge of trigonometry.
F. To prepare the student for Calculus I.
G. To increase the student's ability to use graphing calculators and computers.
H. To increase the students ability to read and write about simple mathematical concepts.

Procedures

A. Lecture/Discussion
B. Classroom computer and graphing calculator demonstrations.
C. Hands-on classwork with graphing calculators.
D. Video presentations and written review of some of the videos.
E. Computer Software Supplements and Tutorials in Math Resource Center
F. Daily homework assignments and required reading in the text, with some written explanations of the concepts and the logic used and in-class discussion of explanations and solutions.

Course Content

A. Fundamental Concepts

1. Real Numbers, estimation, evaluating numerical expressions
2. Intervals, Inequalities and Absolute Values
3. Solving Equations and Inequalities
4. Solving Quadratic Equations
5. Distance Formula (Two-dimensions)
6. Midpoint (Two-dimensions)

B. Functions

1. Mappings and Definition of a Function
2. Written and oral discussions about mapping and functions
3. Functional Notation
4. Domain and Range of a Function
5. Graph of a Function
6. Written and oral discussion of graphs in our technological world
7. Composite and Inverse Functions

C. Types of Functions

1. Linear Functions and Slope
2. Parallel and Perpendicular Lines
3. Slope-Intercept Form of a Line

4. Quadratic Functions
5. Polynomial Functions
6. Rational Functions

D. Exponential and Logarithmic Functions

1. Evaluating and Graphing Exponential Functions
2. Solving Equations in Exponential Form
3. Written and oral discussion of exponential growth with respect to populations and epidemics
3. Definition of Logarithmic Function
4. Operation with Logarithmic Functions
5. Solving Logarithmic Equations
6. e and Natural Logarithmic Functions

E. Trigonometric

1. Angles and the Unit Circles
2. Radian and Degree measure
3. Unit Circle Definitions of the Trig Functions
4. Ratio Definitions of the Trig Functions
5. Evaluating Trig Functions
6. Graphs of Trig Functions
7. Inverse Trig Functions

F. Analytic Trigonometric

1. Solving Trig Equations
2. Fundamental Identities
3. Verifying Trig Identities
4. Sum, Difference, Double Angle, Half Angle, Trig Identities

Evaluation methods

1. Daily written homework assignments with explanations of the mathematical methods used. Students are expected to do all of them and be prepared to discuss the problems in class.

2. Quizzes. Quizzes will be given as necessary. All quizzes will count collectively as an additional test.

3. Tests. Unit tests will be given every three to four weeks. The results will be discussed in class.

4. A written report on the modeling of real world data to fit one of the special functions studied in the course, such as the exponential function. The report will require the use of relevant computer software, or a graphing calculator.

5. Comprehensive Final Exam. This will test whether the student has finally learned to do and to explain the problems that are representative of the course and to what extent he/she possesses these skills at the written and problem solving level at the conclusion of the course.

Required Text: Cohen, David, PreCalculus, 5th Ed., West Publishing Co., 1997. Student Solution's Manual to accompany Cohen.

Required Calculator: TI 81 or TI 82

Bibliography

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Halder, A Primer for Calculus, Wadsworth Pub. Co., Belmont, Ca., 1986.

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McKeague, Charles, Intermediate Algebra, Academic Press Pub., New York, NY, 1986.

Stuart, Redline, Watts, Mathematics for Calculus, Brook/Cole Pub. Co., Belmont, Ca., 94002, 1989.

Swokowski, Earl, Functions and Graphs, Prindle, Weber & Schmidt, Boston, Ma., 1987.

Relevant Software

Kemeny, Kurtz, Math Series, Pre-Calculus: True Basic Inc., Hanover, New Hampshire, 1988.

Proskurowski and Hickemell, Comp-U-Calc to Accompany Berkey, Calculus, 2nd Ed.

Student Edition of Math Calc, Addison-Wesley, Reading, Ma., 1988.

Tront, Joseph, Eureka, John Wiley & Sons Inc., New York, NY, 1986.