San Bernardino Valley College
Curriculum Approved: May 5, 2003
Last updated: April 2003

I. COURSE DESCRIPTION:

A. Division: Science and Math
Department: Math
Course ID: MATH 151
Course Title: Precalculus
Units: 4
Lecture: 4 Hours
Laboratory: None
Prerequisite: MATH 102 or eligibility for MATH 151 as determined through the SBVC assessment process.

B. Catalog Description: This course provides foundational skills to facilitate success in calculus. Includes inequalities, functions and their graphs, polynomials and rational functions, exponential and logarithmic functions, conics, sequences and series, mathematical induction, binomial theorem and systems of equations and inequalities.

C. Schedule Description: This course provides foundational skills to facilitate success in calculus.

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: One

III. EXPECTED OUTCOMES FOR STUDENTS:

Upon successful completion of the course, the student should be able to:
A. Work with functions numerically, graphically and algebraically
B. Graph polynomial, rational, exponential and logarithmic functions
C. Recognize and graph conic sections
D. Solve systems of non-linear equations and inequalities
E. Analyze application problems involving finite and infinite sequences and series and various functions

IV. CONTENT:

A. Functions (numerically, graphically, algebraically)
   1. Operations of functions
   2. Inverse functions
   3. Transformations
B. Polynomial and Rational Functions with applications
   1. Linear and quadratic functions with applications
   2. Theory of Polynomials
   3. Graphs of Rational functions
C. Exponential and Logarithmic Functions
   1. Graphs of Exponential and Logarithmic functions
   2. Properties of Exponential and Logarithmic functions
   3. Applications of Exponential and Logarithmic functions
D. Systems of Nonlinear Equations & Inequalities
   1. Analytical and graphical solutions
   2. Applications
E. Conics
   1. Circles
   2. Ellipses
   3. Hyperbolas
F. Sequences and Series
   1. Arithmetic and Geometric
   2. Mathematical Induction

3. Binomial Theorem

V. METHODS OF INSTRUCTION:

A. Lecture
B. Discussion
C. Drill at the chalkboard
D. Group study
E. Computer aided instruction
F. Calculator aided instruction

VI. TYPICAL ASSIGNMENTS:

A. Daily reading and/or problem assignments will reinforce and extend classroom presentations.
B. Written assignments will include solutions of various problems illustrative of the appropriate mathematical concepts and processes.

VII. EVALUATION(S)

A. Four to six regularly scheduled tests
   1. Typical exam problems:
      a) For $f(x) = \frac{1}{2x+1}$ and $g(x) = x^2 - 1$ find the composite function $f \circ g$ and also find the domain of $f \circ g$.
      b) Find the non vertical asymptote of the graph of the function $f(x) = \frac{3x^3 - 4x^2 + x + 7}{x^2 - 9}$
B. Quizzes and/or homework assignments
   1. Typical homework or quiz problems:
      a) Consider the following function: $f(x) = x^4 + x^3 - 4x^2 + x - 1$
      b) Find the approximate intervals on which the given function is increasing.
      c) Find the dimensions of a rectangle with perimeter 250 and largest possible area
C. Comprehensive final exam
   1. Typical final exam problem:
      a) Determine algebraically whether the graph of the given equation is symmetric with respect to the *x*-axis, the *y*-axis or the origin.

$$5y = 7x^2 - 2x$$

b) Consider the function $f(x) = \frac{x^2 - x - 2}{x^2 + x - 12}$

Determine algebraically each of the following.

i. The equations of any vertical asymptotes _____
ii. The equations of any horizontal asymptotes _____
iii. Any y-intercepts _____
iv. Any x-intercepts _____
v. The coordinates of the point where the graph of *f* intersects its horizontal asymptote_____
vi. Graph the function to obtain an accurate comprehensive graph using your graphing calculator.

VIII. TYPICAL TEXT(S):

E. John Hornsby and Margaret Lial. A Graphical Approach to College Algebra and Trigonometry, 2nd edition. Addison-Wesley, 1998.
Hungerfords, Contemporary College Algebra, A Graphing Approach. Harcourt College Publishers, 2001.

IX. OTHER SUPPLIES REQUIRED OF STUDENTS: TI-85 Graphing Calculator