MATH 170 – PRE-CALCULUS | 4 CREDITS

SYLLABUS

CATALOG DESCRIPTION

An in-depth study of linear, piecewise, quadratic, polynomial, rational, exponential, and logarithmic functions and their graphs. Also includes the Fundamental Theorem of Algebra, systems of equations and inequalities, conic sections, sequences and series, and applications in geometry.

Prerequisites: ACCUPLACER score of 104-120 or Grade of "C" or better in Math 115

Semester Offered: Fall, Spring and Summer

Common Student Learning Outcomes

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in…

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

General Learning Outcomes

Upon successful completion of the course, the student will be able to…

1. Functions and Graphs
2. Polynomial and rational functions
3. Exponential and logarithmic functions
4. Linear and nonlinear systems
5. Conic Sections
6. Sequences and Series
7. Computer/Calculator usage

Specific Learning Outcomes

Upon successful completion of the course, the student will be able to…

1.1 determine whether a relation represents a function
1.2 find the value of a function
1.3 find the domain of a function
1.4 find the average rate of change of a function
1.5 graph functions using vertical and/or horizontal shifts, compression or stretching and reflections
1.6 graph linear and quadratic functions
1.7 graph piecewise functions
1.8 form composite functions
1.9 determine whether a function is one-to-one
1.10 find the inverse of a function defined by an equation, graph, or ordered pairs

2.1 analyze and graph quadratic and higher order polynomial functions
2.2 solve polynomial and rational inequalities
2.3 find the vertical, horizontal and/or oblique asymptotes of a rational function
2.4 analyze and graph rational functions
2.5 perform arithmetic operations on complex numbers
2.6 use the Rational Roots Theorem to find all the zeros of a polynomial

3.1 evaluate and graph exponential and logarithmic functions
3.2 convert between exponential and logarithmic expressions
3.3 combine or expand logarithmic expressions
3.4 solve logarithmic and exponential equations
3.5 solve applications modeled by exponential and logarithmic functions

4.1 solve systems of nonlinear equations
4.2 solve systems of linear equations with 2 or 3 unknowns by substitution and elimination methods
4.3 use systems of linear equations to solve applied problems
4.4 add, subtract, and multiply matrices
4.5 use inverse matrices and determinants to solve linear systems

5.1 find the center and radius of a circle and graph circles
5.2 find the equation of a circle given its graph
5.3 find the focus and directrix of a parabola and graph parabolas
5.4 find the equation of a parabola given its graph
5.5 find the vertices and foci of an ellipse and graph ellipses
5.6 find the equation of an ellipse given its graph
5.7 find the vertices, foci, and asymptotes of a hyperbola and graph hyperbolas
5.8 find the equation of a hyperbola given its graph
5.9 identify various conic sections
5.10 use equations of conic sections to solve applied problems

6.1 find any term in a sequence when given a formula for the nth term of the sequence
6.2 find the terms of a sequence that is defined recursively
6.3 find the formula for the general term in a given arithmetic or geometric sequence,
6.3 find the sum of an indicated number of terms in an arithmetic or geometric sequence
6.4 write a series given in sigma notation in its expanded form and vice versa
6.5 solve applied problems involving sequences and series

7.1 utilize a graphing calculator where appropriate

OTHER REQUIREMENTS:

A TI-83 Plus or TI-84 Plus Graphing Calculator is required for the course. Graphing calculators capable of symbolic manipulation (such as TI-89 or TI-92 and other such calculators) will not be allowed on examinations.