

MATH 126/126E – Precalculus (3-5 Credits)

DESCRIPTION:

A rigorous discussion of algebra concepts necessary for calculus is the focal point of this course. Topics include an in-depth investigation of algebraic functions and their graphs and solutions of systems of equations.

MATH 126 Prerequisite: MATH 096 or MATH 097 both with a grade of C or better; or a satisfactory ACT/SAT/Placement Test Score. **NOTE:** This course serves as a prerequisite for MATH 127 which is essential for students planning to take Calculus I (MATH 181).

MATH 126E (Expanded):

Students who do not place or advance into the normal 3-credit MATH 126 can self-remediate and retake the placement test. Students with MATH 95E credit or sufficient placement score may enroll into MATH 126E (Expanded), which has the same Student Learning Outcomes as MATH 126 (listed below) and requires a co-requisite 2-credit MATH 26 Learning Support class. Topics in MATH 26 include: Graphing Linear Equations in Two Variables; Working with Real Numbers, Exponents, and Polynomial Arithmetic; Solving Linear Equations and Inequalities; Writing Equations of Lines Given Two Points; Solving Systems of Equations; Working with Functions and Function Notation; Graphing Functions; Factoring Polynomials; Working with Rational Expressions; Solving Rational Equations; perform Arithmetic with Irrational Numbers; Solving Radical Equations; and Solving Quadratic Equations.

MATH 126E Prerequisite: MATH 095E with a grade of C or better; or a satisfactory ACT/SAT/Placement Test Score.

MATH 126E Co-requisite: MATH 26

STUDENT LEARNING OUTCOMES:

- Solve polynomial, exponential and logarithmic equations.
- Work with the Cartesian coordinate system, being able to graph linear, exponential, polynomial absolute value, square root, piecewise defined, rational and logarithmic functions.
- Understand function concepts, including operations on functions, and inverse functions.
- Solve systems of linear and nonlinear equations.
- Apply and extend all concepts.

TEXT:

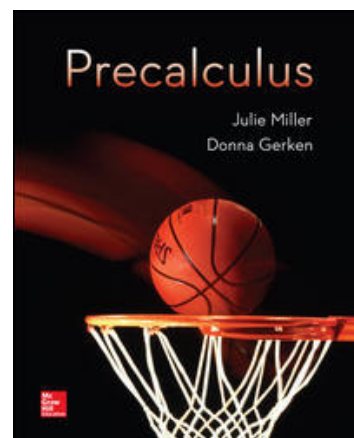
Title: *Precalculus, 1st Edition;

Authors: Julie Miller and Donna Gerken;

Publisher: McGraw Hill Education;

ISBN-13: 978-0078035609

*Note: Full-time instructors have the right to use no text or a different text.



OUTLINE:

- **Functions and Relations:** Plot Points on a Rectangular Coordinate System, Distance and Midpoint Formulas, Graph Equations by Plotting Points, x- and y-Intercepts, Identify the Center and Radius of a Circle Equation in Standard and General Form, Write the Equation of a Circle in Standard Form Given the Radius and Center, Graph a Circle Given a Radius and Center, Determine Whether a Relation is a Function, Evaluate a Function, Determine x- and y-Intercepts of a Function Defined by $y = f(x)$, Determine Domain and Range from a Function, Interpret a Function Graphically, Graph Linear Equations in Two Variables, Determine the Slope of a Line, Apply the Slope-Intercept Form of a Line, Compute Average Rate of Change, Apply the Point-Slope Formula, Determine the Slopes of Parallel and Perpendicular Lines, Create Linear Functions to Model Data, Recognize Basic Functions (Library of Functions), Apply Vertical and Horizontal Translations (Shifts), Apply Vertical and Horizontal Shrinking and Stretching, Apply Reflections Across the x- and y-axes, Graphing Multiple Transformations of Functions, Test for Symmetry, Identify Even and Odd Functions, Interpreting and Graphing Piecewise-Defined Functions, Investigate Increasing/Decreasing/Constant Behavior of a Function, Determine Relative Minima and Maxima of a Function, Perform Operations on Functions, Evaluate a Difference Quotient, Compose and Decompose Functions (Miller/Gerken, Chapter 1)
- **Polynomial and Rational Functions:** Graph a Quadratic Function Written in Vertex Form and Standard Form, Find the Vertex Of a Parabola By Using The Vertex Formula and/or Writing in Vertex Form, Solve Applications Involving Quadratic Functions by Finding the Vertex, Determine the End Behavior of a Polynomial Function, Identify Zeros and Multiplicities of Zeros, Sketch a Polynomial Function, Divide Polynomials Using Long Division and Synthetic Division, Apply the Remainder and Factor Theorems, Apply the Rational Zero Theorem, Apply Theorems and Synthetic Division to Find The Real and Imaginary Zeros of a Polynomial, Identify Vertical, Horizontal, and Slant Asymptotes, Graph Rational Functions, Solve Polynomial and Rational Inequalities (Miller/Gerken, Sections 2.1-2.6)
- **Exponential and Logarithmic Functions:** Determine Whether Two Functions are Inverses, Find the Inverse of a Function, Graph Exponential Functions $y = a^x$ and $y = e^x$, Convert Between Logarithmic and Exponential Forms, Evaluate Logarithmic Functions, Apply Basic Properties of Logarithms, Graph Logarithmic Functions, Apply the Product, Quotient, and Power Properties of Logarithms, Write a Logarithmic Expression in Expanded Form and as a Single Logarithm, Apply the Change-of-Base Formula, Solve Exponential and Logarithmic Equations, Use Exponential and Logarithmic Equations/Functions in Applications, Create and Apply Models for Exponential/Logistic Growth and Decay in Applications (Miller/Gerken, Chapter 3)
- **Trigonometric Functions:** Identify Solutions to and Solve Systems of Linear Equations in Two Variables, Solve Nonlinear Systems of Equations in Two Variables (Miller/Gerken, Sections 8.1, 8.4)

Optional Topics

- **Review Topics:** Imaginary Numbers and their Operations, Quadratic Equations over Complex Numbers, Applications Involving Simple Interest/Rate of Work Done/Motion/Quadratics, Solve Linear Inequalities/Compound Inequalities/Absolute Value Inequalities (Miller/Gerken, Sections R.6-R.8)
- **Linear Systems in Three Variables and Partial Fraction Decomposition:** (Miller/Gerken, Sections 8.2-8.3)

EVALUATION:

Grades may be determined by student performance in one or more of the following areas: in-class tests, take-home tests, homework assignments, quizzes, special projects, papers, attendance, and class participation. Degree of importance and types of assessment used will depend on the instructor.

This course satisfies the math requirement in the General Education Core component for selected degree and certificate programs at CSN.