**Math 2412 – Precalculus**

**Textbook: PreCalculus 10/e**

Michael Sullivan, Addison Wesley, 10th ed,

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**Catalog Description:**  
4 Credits (4 hrs. lec., 1 hr. lab.) An integrated treatment of the concepts necessary for calculus beginning with a review of algebraic and transcendental functions including trigonometric functions. Topics also include the binomial theorem, analytic geometry, vector algebra, polar and parametric equations, mathematical induction and sequences and series. (2701015819) Prerequisite: College Level Readiness in Reading AND Writing,  [MATH 1314](http://catalog.lonestar.edu/content.php?filter%5B27%5D=MATH&filter%5B29%5D=&filter%5Bcourse_type%5D=-1&filter%5Bkeyword%5D=&filter%5B32%5D=1&filter%5Bcpage%5D=1&cur_cat_oid=22&expand=&navoid=8470&search_database=Filter#tt6159) and [MATH 1316](http://catalog.lonestar.edu/content.php?filter%5B27%5D=MATH&filter%5B29%5D=&filter%5Bcourse_type%5D=-1&filter%5Bkeyword%5D=&filter%5B32%5D=1&filter%5Bcpage%5D=1&cur_cat_oid=22&expand=&navoid=8470&search_database=Filter#tt8613) OR placement by testing.

**Course Learning Outcomes:**  
The student will:

* Demonstrate and apply knowledge of properties of functions.
* Recognize and apply algebraic and transcendental functions and solve related equations.
* Apply graphing techniques to algebraic and transcendental functions.
* Compute the values of trigonometric functions for key angles in all quadrants of the unit circle measured in both degrees and radians.
* Prove trigonometric identities.
* Solve right and oblique triangles.
* Apply the binomial theorem.
* Determine equations of conic sections, and graph conics, including translation and identification of vertices, foci and asymptotes.
* Perform basic operations and solve applications using vector algebra.
* Perform operations and graph equations using polar and parametric equations.
* Prove statements using mathematical induction.
* Use properties of arithmetic and geometric sequences and series to identify terms, find sums and solve applications.

**Book Sections:**

**Chapter 2**

2.1 Functions

2.2 The Graph of a Function

2.3 Properties of Functions

2.4 Library of Functions; Piecewise-defined Functions

**Chapter 3**

3.3 Quadratic Functions and Their Properties

3.4 Build Quadratic models from Verbal Descriptions and from Data

**Chapter 5**

5.3 Exponential Functions

5.4 Logarithmic Functions

5.5 Properties of Logarithms

5.6   Logarithmic and Exponential Equations

**Chapter 6**

6.1 Angles and Their Measure

6.2 Trigonometric Functions: Unit Circle Approach

6.3 Properties of the Trigonometric Functions

6.4 Graphs of the Sine and Cosine Functions

6.5 Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions

6.6 Phase Shift; Sinusoidal Curve Fitting

**Chapter 7**

7.1 The Inverse Sine, Cosine, and Tangent Functions

7.2 The Inverse Trigonometric Functions (continued)

7.3 Trigonometric Equations

7.4   Trigonometric Identities

7.5   Sum and Difference Formulas

7.6 Double-angle and Half-Angle Formulas

7.7 Product-to-Sum and Sum-to-Product Formulas

**Chapter 8**

8.1 Applications Involving Right Triangles

8.2 Law of Sines

8.3 Law of Cosines

8.4 Area of a Triangle

**Chapter 9**

9.1 Polar Coordinates

9.2 Polar Equations and Graphs

9.4 Vectors

9.5 The Dot Product

9.6 Vectors in Space

9.7 The Cross Product

**Chapter 10**

10.2 The Parabola

10.3 The Ellipse

10.4 The Hyperbola

**Chapter 11**

11.2 Systems of Linear Equations: Matrices

11.3 Systems of Linear Equations: Determinants

11.5 Partial Fraction Decomposition

**Chapter 12**

12.1 Sequences

12.2 Arithmetic Sequences

12.3 Geometric Sequences; Geometric Series

12.4 Mathematical Induction

12.5 The Binomial Theorem