

Based on the book: Precalculus by Sullivan (Pearson publications)
Other books cover similar topics.

Precalculus Assessment Exam topics

Chapter 4 Polynomial and Rational Functions

- 4.1.1 Identify Polynomial Functions and Their Degree
- 4.1.2 Graph Polynomial Functions Using Transformations
- 4.1.3 Identify the Real Zeros of a Polynomial Function and Their Multiplicity
- 4.1.4 Analyze the Graph of a Polynomial Function
- 4.3.1 Analyze the Graph of a Rational Function
- 4.3.2 Solve Applied Problems Involving Rational Functions

Chapter 5 Exponential and Logarithmic Functions

- 5.3.1 Evaluate Exponential Functions
- 5.3.2 Graph Exponential Functions
- 5.3.3 Define the Number e
- 5.3.4 Solve Exponential Equations
- 5.4.1 Change Exponential Expressions to Logarithmic Expressions and Logarithmic Expressions to Exponential Expressions
- 5.4.2 Evaluate Logarithmic Expressions
- 5.4.3 Determine the Domain of a Logarithmic Function
- 5.4.4 Graph Logarithmic Functions
- 5.4.5 Solve Logarithmic Equations

Chapter 6 Trigonometric Functions

- 6.1.1 Convert between Decimals and Degrees, Minutes, Seconds Forms for Angles
- 6.1.2 Find the Arc Length of a Circle
- 6.1.3 Convert from Degrees to Radians and from Radians to Degrees
- 6.1.4 Find the Area of a Sector of a Circle
- 6.1.5 Find the Linear Speed of an Object Traveling in Circular Motion
- 6.2.1 Find the Exact Values of the Trigonometric Functions Using a Point on the Unit Circle
- 6.2.2 Find the Exact Values of the Trigonometric Functions of Quadrantal Angles
- 6.2.3 Find the Exact Values of the Trigonometric Functions of $\pi/4 = 45^\circ$
- 6.2.4 Find the Exact Values of the Trigonometric Functions of $\pi/6 = 30^\circ$ and $\pi/3 = 60^\circ$
- 6.2.5 Find the Exact Values of the Trigonometric Functions for Integer Multiples of $\pi/6 = 30^\circ$, $\pi/4 = 45^\circ$, and $\pi/3 = 60^\circ$
- 6.2.6 Use a Calculator to Approximate the Values of a Trigonometric Function
- 6.2.7 Use a Circle of Radius r to Evaluate the Trigonometric Functions
- 6.3.1 Determine the Domain and the Range of the Trigonometric Functions
- 6.3.2 Determine the Period of the Trigonometric Functions
- 6.3.3 Determine the Signs of the Trigonometric Functions
- 6.3.4 Find the Values of the Trigonometric Functions Using Fundamental Identities
- 6.3.5 Find the Values of the Trigonometric Functions of an Angle Given One of the Functions and the Quadrant of the Angle
- 6.3.6 Use Even-Odd Properties to Find Exact Values of the Trigonometric Functions
- 6.4.1 Graph Functions of the Form $y = A\sin(\omega x)$ Using Transformations
- 6.4.2 Graph Functions of the Form $y = A\cos(\omega x)$ Using Transformations
- 6.4.3 Determine the Amplitude and Period of Sinusoidal Functions
- 6.4.4 Graph Sinusoidal Functions Using Key Points
- 6.4.5 Find an Equation for a Sinusoidal Graph
- 6.5.1 Graph Functions of the Form $y = A\tan(\omega x) + B$ and $y = A\cot(\omega x) + B$

6.5.2 Graph Functions of the Form $y = A\csc(\omega x) + B$ and $y = A\sec(\omega x) + B$

6.6.1 Graph Functions of the Form $y = A\sin(\omega x - \phi) + B$

6.6.2 Find a Sinusoidal Function From Data

Chapter 7 Analytic Trigonometry

7.1.1 Find the Exact Values of Inverse Sine, Cosine, and Tangent Functions

7.1.2 Find an Approximate Value of Inverse Sine, Cosine, and Tangent Functions

7.1.3 Use Properties of Inverse Functions to Find Exact Values of Certain Composite Functions

7.1.4 Find the Inverse Function of a Trigonometric Function

7.1.5 Solve Equations Involving Inverse Trigonometric Functions

7.2.1 Find the Exact Value of Expressions Involving the Inverse Sine, Cosine, and Tangent Functions

7.2.2 Know the Definition of the Inverse Secant, Cosecant, and Cotangent Functions

7.2.3 Use a Calculator to Evaluate $\sec^{-1}x$, $\csc^{-1}x$, and $\cot^{-1}x$

7.2.4 Write a Trigonometric Expression as an Algebraic Expression

7.3.1 Use Algebra to Simplify Trigonometric Expressions

7.3.2 Establish Identities

7.4.1 Use Sum and Difference Formulas to Find Exact Values

7.4.2 Use Sum and Difference Formulas to Establish Identities

7.4.3 Use Sum and Difference Formulas Involving Inverse Trigonometric Functions

7.5.1 Use Double-angle Formulas to Find Exact Values

7.5.2 Use Double-angle Formulas to Establish Identities

7.5.3 Use Half-angle Formulas to Find Exact Value

7.7.1 Solve Equations Involving a Single Trigonometric Function

7.8.1 Solve Trigonometric Equations Quadratic in Form

7.8.2 Solve Trigonometric Equations Using Identities

7.8.3 Solve Trigonometric Equations Linear in Sine and Cosine

7.8.4 Solve Trigonometric Equations Using a Graphing Utility

Chapter 8 Applications of Trigonometric Functions

8.1.1 Find the Value of Trigonometric Functions of Acute Angles Using Right Triangles

8.1.2 Use the Complementary Angle Theorem

8.1.3 Solve Right Triangles

8.1.4 Solve Applied Problems

8.2.1 Solve SAA or ASA Triangles

8.2.2 Solve SSA Triangles

8.2.3 Solve Applied Problems

8.3.1 Solve SAS Triangles

8.3.2 Solve SSS Triangles

8.3.3 Solve Applied Problems

8.4.1 Find the Area of SAS Triangles

8.4.2 Find the Area of SSS Triangles

Chapter 9 Polar Coordinates, Vectors

9.1.1 Plot Points Using Polar Coordinates

9.1.2 Convert from Polar Coordinates to Rectangular Coordinates

9.1.3 Convert from Rectangular Coordinates to Polar Coordinates

9.1.4 Transform Equations from Polar to Rectangular Form

9.2.1 Graph and Identify Polar Equations by Converting to Rectangular Equations

- 9.2.2 Test Polar Equations for Symmetry
- 9.2.3 Graph Polar Equations by Plotting Points
- 9.3.1 Convert a Complex Number from Rectangular Form to Polar Form
- 9.3.2 Plot Points in a Complex Plane
- 9.3.3 Find Products and Quotients of Complex Numbers in Polar Form
- 9.3.4 Use DeMoivre's Theorem
- 9.3.5 Find Complex Roots
- 9.4.1 Graph Vectors
- 9.4.2 Find a Position Vector
- 9.4.3 Add and Subtract Vectors Algebraically
- 9.4.4 Find a Scalar Multiple and the Magnitude of a Vector
- 9.4.5 Find a Unit Vector
- 9.4.6 Find a Vector from Its Direction and Magnitude
- 9.4.7 Analyze Objects in Static Equilibrium
- 9.5.1 Find the Dot Product of Two Vectors
- 9.5.2 Find the Angle between Two Vectors
- 9.5.3 Determine Whether Two Vectors Are Parallel
- 9.5.4 Determine Whether Two Vectors Are Orthogonal
- 9.5.5 Decompose a Vector into Two Orthogonal Vectors
- 9.5.6 Compute Work
- 9.6.1 Find the Distance between Two Points in Space
- 9.6.2 Find Position Vectors in Space
- 9.6.3 Perform Operations on Vectors
- 9.6.4 Find the Dot Product
- 9.6.5 Find the Angle between Two Vectors
- 9.6.6 Find the Direction Angles of a Vector
- 9.7.1 Find the Cross Product of Two Vectors
- 9.7.2 Know Algebraic Properties of the Cross Product
- 9.7.3 Know Geometric Properties of the Cross Product
- 9.7.4 Find a Vector Orthogonal to Two Given Vectors
- 9.7.5 Find the Area of a Parallelogram

Chapter 10 Analytic Geometry

- 10.2.1 Analyze Parabolas with Vertex at the Origin
- 10.2.2 Analyze Parabolas with Vertex at (h, k)
- 10.2.3 Solve Applied Problems Involving Parabolas
- 10.3.1 Analyze Ellipses with Vertex at the Origin
- 10.3.2 Analyze Ellipses with Vertex at (h, k)
- 10.3.3 Solve Applied Problems Involving Ellipses
- 10.4.1 Analyze Hyperbolas with Vertex at the Origin
- 10.4.2 Find the Asymptotes of a Hyperbola
- 10.4.3 Analyze Hyperbolas with Vertex at (h, k)
- 10.4.4 Solve Applied Problems Involving Hyperbolas