Section 5.1 (Circles) Learning Objectives:

- Video 1: The Pythagorean Theorem and the Distance Formula (9:39)

  - State the Pythagorean theorem.
  - State the distance formula.
  - Apply the Pythagorean theorem to derive the distance formula.

- Video 2: The Equation of a Circle (6:55)

  - State the standard form of the equation of a circle.
  - Apply the distance formula to derive the standard form of the equation of a circle.
  - Determine an equation of a circle from a description.

- Video 3: The Intersection of a Circle and a Line (10:01)

  - Determine the points of intersection between a circle and a line, including the coordinate axes.

Section 5.2 (Angles) Learning Objectives:

- Video 1a: Measuring Angles (Part 1) (5:41)

  - Understand the measurements of angles using degrees and radians.

- Video 1b: Measuring Angles (Part 2) (10:28)

  - Convert angle measurements between degrees and radians.
  - Determine coterminal angles.

- Video 2: The Common Angles of the Unit Circle (6:26)

  - State the common angles of the unit circle in both degrees and radians.

- Video 3: Arc Length and Area (12:01)

  - Determine the length of a circular arc.
  - Determine the area of a sector of a circle.

- Video 4: Linear and Angular Velocity (9:02)

  - Apply the circle concepts to linear and angular velocities.

Section 5.3 (Points on Circles) Learning Objectives:

- Video 1: The Sine and Cosine Functions on the Plane (7:55)

  - State the definitions of the sine and cosine functions using points on the plane.
  - State the sign relationships between the sine and cosine functions and the quadrants.
  - Understand the relationship between the definitions of the sine and cosine functions using points on the plane and the quadrants.

- Video 2: The Pythagorean Identity (5:21)

  - State the Pythagorean identity.
  - Understand the relationship between the Pythagorean identity and points on a circle.
  - Apply the Pythagorean identity to calculate sine and cosine functions.

- Video 3: Reference Angles (6:11)

– State the definition of reference angles.

– Understand reference angles and their application to the unit circle diagram.

- Video 4: The Unit Circle Diagram (13:00)

    – State the relationships between the sides of the 30-60-90 and 45-45-90 triangles.

    – State the values of the sine and cosine functions on the first quadrant.

    – Determine the sine and cosine functions of the common angles on the unit circle diagram.

Section 5.4 (The Other Trig Functions) Learning Objectives:

- Video 1: Definitions and Relationships (8:02)

    – State the definitions of the other trigonometric functions using points on the plane.

    – State the relationships between the other trigonometric functions and the sine and cosine functions.

    – Determine the values of trigonometric functions given an angle on the unit circle diagram.

- Video 2: The Other Pythagorean Identities (3:00)

    – State the two alternative forms of the Pythagorean identity.

    – Understand the derivation of the alternative forms of the Pythagorean identity.

- Video 3: Algebra and Geometry (8:58)

    – Determine the values of trigonometric functions using algebra.

    – Determine the values of trigonometric functions using geometry.

- Video 4: Proving Trigonometric Identities (8:46)

    – Prove trigonometric identities using the Pythagorean identities and the relationships between the trigonometric functions.

Section 5.5 (Right Triangle Trigonometry) Learning Objectives:

- Video 1: The Right Triangle Relationships (7:50)

    – State the three basic formulas for right triangle trigonometry.

    – Understand the relationship between the right triangle formulas for the sine and cosine functions and the definitions of the sine and cosine functions using points on the plane.

- Video 2: The Cofunction Identities (4:35)

    – State the cofunction identities.

    – Understand the relationship between the cofunction identities and the right triangle formulas.

- Video 3: Solving Right Triangles (10:42)

    – Apply the right triangle trigonometry to solve right triangles using exact values from the unit circle or approximate values from a calculator.

Section 6.1 (Sinusoidal Graphs) Learning Objectives:

- Video 1: The Graphs of Sine and Cosine (10:09)

    - State the coordinates of the key values of the sine and cosine functions.
    - Understand the relationship between the unit circle and the graphs of the sine and cosine functions.

- Video 2: The Negative Angle Identities (4:05)

    - State the the negative angle identities for the sine and cosine functions.
    - Understand the relationship between the unit circle and the negative angle identities.

- Video 3a: The Key values of Transformed Trigonometric Functions (Part 1) (10:57)

    - State the definition of the amplitude, midline, period, and horizontal shift of a transformed trigonometric function.
    - Determine the amplitude, midline, period, and horizontal shift of a transformed trigonometric function from an equation.

- Video 3b: The Key values of Transformed Trigonometric Functions (Part 2) (6:51)

    - Determine the coordinates of the key values of a trigonometric function from the equation.

- Video 4a: Transformed Sinusoidals (Part 1) (8:59)

    - Graph a transformed trigonometric function.

- Video 4b: Transformed Sinusoidals (Part 2) (6:33)

    - Determine the amplitude, midline, period, and horizontal shift of a transformed trigonometric function from a graph.
    - Determine the equation of a transformed trigonometric function from a graph.

Section 6.2 (The Other Trig Functions) Learning Objectives:

- Video 1: The Graphs of Tangent and Cotangent (8:13)

    - State the coordinates of the key features of the tangent and cotangent functions.
    - Understand the relationship between the graphs of the sine and cosine functions and the tangent and cotangent functions.

- Video 2: The Graphs of Secant and Cosecant (5:09)

    - State the coordinates of the key features of the secant and cosecant functions.
    - Understand the relationship between the graphs of the sine and cosine functions and the secant and cosecant functions.

- Video 3: The Graphs of Transformed Trigonometric Functions (11:42)

    - Graph a transformed trigonometric function given an equation.

- Video 4: The Negative Angle Identities (3:01)

    - State the negative angle identities for the tangent, cotangent, secant, and cosecant functions.
    - Understand the relationship between the negative angle identities of the sine and cosine functions and the other trigonometric functions.

Section 6.3 (The Inverse Trig Functions) Learning Objectives:

- Video 1: The Inverse Trigonometric Functions (13:20)

  – State the domains and ranges of the inverse trigonometric functions.

  – Understand the relationship between the sine, cosine, and tangent functions and their inverses.

- Video 2: Evaluating Inverse Trigonometric Functions (5:36)

  – Determine the exact values of the inverse trigonometric functions for the common angles of the unit circle.

  – Determine the approximate values of the inverse trigonometric functions using a calculator in both degrees and radians.

- Video 3: Compositions of Trigonometric Functions and Inverse Trigonometric Functions (8:38)

  – Determine the value of the composition of an inverse trigonometric function and a trigonometric function evaluated at the common angles of the unit circle.

  – Determine the value of the composition of a trigonometric function and an inverse trigonometric function using algebra.

  – Determine the value of the composition of a trigonometric function and an inverse trigonometric function using geometry.

Section 6.4 (Solving Trig Functions) Learning Objectives:

- Video 1: Graphs and Solutions (5:22)

  – Understand the connection between the graphs of trigonometric functions and solutions of trigonometric equations.

  – Understand the connection between the unit circle and solutions of trigonometric equations.

- Video 2: Exact Solutions (8:12)

  – Determine the exact solutions of basic trigonometric equations in both degrees and radians when working with known unit circle values.

- Video 3: Approximate Solutions (8:14)

  – Determine the approximate solutions of basic trigonometric equations in both degrees and radians when working with general values.

- Video 4: Solving More Complex Equations (9:31)

  – Determine the solutions of linear trigonometric equations in which the argument has an arbitrary coefficient.

Section 6.5 (Modeling with Trigonometry) Learning Objectives:

- Video 1: Geometric Word Problems (9:06)

  – Apply trigonometric concepts to solve geometric word problems.

- Video 2: Algebraic Word Problems (16:27)

  – Apply trigonometric concepts to solve word problems involving periodic oscillating behaviors.

Section 7.1 (More Trig Equations) Learning Objectives:

- Video 1: Review of the Identities (2:52)

    - State the three versions of the Pythagorean identity.
    - State the negative angle identities.
    - State the reciprocal identities.

- Video 2: Solving by Factoring (13:06)

    - Apply the trigonometric identities to solve trigonometric equations by factoring.

- Video 3: Solving with the Quadratic Formula (6:13)

    - Apply the trigonometric identities to solve trigonometric equations using the quadratic formula.

Section 7.2 (The Sum and Difference Identities) Learning Objectives:

- Video 1: The Sum and Difference Identities (7:52)

    - State the sum and difference identities for the sine and cosine functions.
    - Determine the exact values of trigonometric functions of certain angles beyond the common angles of the unit circle using the sum and difference identities.
    - Determine the value of expressions using the sum and difference identities.

- Video 2: Applications of the Sum and Difference Identities (8:32)

    - Determine the solutions of equations using the sum and difference identities.
    - Prove identities using the sum and difference identities.

- Video 3: Sums of Sinusoidals (7:05)

    - Convert the sum of sinusoidal functions with the same period into a single sinusoidal function.

- Video 4: More Identities (4:22)

    - Determine the value of expressions using the sum-to-product and product-to-sum identities.

Section 7.3 (The Double Angle Identities) Learning Objectives:

- Video 1: The Double Angle Identities (6:04)

    - State the double angle identities for the sine and cosine functions.
    - Determine the value of expressions using the double angle identities.
    - Understand the derivation of the double angle identities from the sum of angles identities.

- Video 2: Applications of the Double Angle Identities (6:40)

    - Determine the exact values of trigonometric functions of angles given partial information about the angles.
    - Prove trigonometric identities using the double angle identities.

- Video 3: The Power Reduction Formulas (5:37)

    - Simplify expressions using the power reduction identities.

- Video 4: The Half-Angle Identities (5:49)

– Determine the exact values of trigonometric functions of certain angles beyond the common angles of the unit circle using the half angle identities.

Section 7.4 (Modeling Changing Amplitude and Midline) Learning Objectives:

- Video 1: Variable Amplitude and Midline (4:04)

  – Understand how a variable amplitude impacts the shape of a sinusoidal function.
  – Understand how a variable midline impacts the shape of a sinusoidal function.

- Video 2: Population Models (9:13)

  – Apply variable midlines to model populations with seasonal variation and an underlying linear or exponential growth.

- Video 3: Damped Harmonic Oscillation (10:12)

  – Apply variable amplitudes to model damped harmonic oscillation.

Section 8.1 (The Laws of Sines and Cosines) Learning Objectives:

- Video 1: The Law of Sines (8:09)

  – State the law of sines.
  – Determine the unknown sides and angles of a triangle using the law of sines when two angles and one side are known.

- Video 2: The Ambiguous Case (13:14)

  – Determine both possibilities for the unknown sides and angles of a triangle using the law of sines in the ambiguous case.

- Video 3: The Law of Cosines (8:50)

  – State the law of cosines.
  – Determine the unknown sides and angles of a triangle using the law of cosines.

- Video 4: Applications (11:21)

  – Apply the law of sines and the law of cosines to geometric word problems.

Section 8.2 (Polar Coordinates) Learning Objectives:

- Video 1: Polar Coordinates (10:42)

  – State the formulas that relate Cartesian and polar coordinates.
  – Convert from Cartesian coordinates to polar coordinates and from polar coordinates to Cartesian coordinates.
  – Understand the relationship between polar coordinates and trigonometry.

- Video 2: Converting Equations (7:41)

  – Convert polar equations to Cartesian equations and Cartesian equations to polar equations.

- Video 3: Polar Graphs (14:34)

  – Graph basic polar curves.