



UTICA COMMUNITY SCHOOLS

Course Title: Trigonometry and Analytic Geometry

Course Content Expectations: Students should know and be able to apply the following concepts to various situations:

Trigonometric Functions

- To draw, measure, and label an angle
- To add and subtract angle measures
- To determine the relationships between angle measures with regards to parallel lines and transversals
- To determine the relationships between angle measures within similar triangles
- Definitions of trigonometric functions and basic identities

Acute Angles and Right Triangles

- Understanding trigonometric functions of acute angles including special angles
- Understanding trigonometric functions of non-acute angles including special angles by use of a reference angle
- Finding trigonometric function values using a calculator
- Solving right triangles using trigonometric ratios
- Applying the trigonometric ratios to bearing problems

Radian Measure and the Circular Functions

- Understanding radian measure
- Converting between degrees and radians
- Applying the concept of radian measure to arc length and area of a sector problems
- Understanding circular functions of real numbers
- Linear and Angular velocity

Graphs of Circular Functions

- Graphs of sine, cosine, tangent, secant, cosecant and cotangent functions
- Translations of the graphs of each of the trigonometric functions listed above.

Trigonometric Identities

- Fundamental Identities
- Verifying Trigonometric Identities
- Sum and Difference Identities for sine, cosine and tangent
- Double Angle Identities
- Half Angle Identities

Inverse Trigonometric Functions and Trigonometric Equations

- Inverse trigonometric functions and their graphs
- Solving trigonometric equations (including those with multiple angles)
- Solving trigonometric equations with inverse trigonometric functions

Applications of Trigonometric Functions

- Oblique triangles and the Law of Sines
- Area of a triangle given two sides and an included angle
- The Ambiguous Case of the Law of Sines
- The Law of Cosines
- Area of a triangle given all three sides using Heron's (Hero's) Formula
- The introduction to and application of vectors

Complex Numbers and Polar Equations

- Operations on complex numbers, including addition, subtraction, product, quotient, powers and roots.
- Converting between the Standard Form of complex numbers and the Trigonometric Form
- Graphing polar coordinates

Exponential and Logarithmic Functions

- Exponential and Logarithmic Functions and their graphs
- Evaluating logarithms
- Change of Base Formula
- Solving exponential and logarithmic equations

Conics

- Distance Formula and Midpoint Formula
- Graphing all conic sections and their transformations
- Circles: Be able to identify center and radius from an equation
- Parabolas: Be able to identify focus, equation for the directrix and equation for the axis of symmetry from an equation
- Ellipses: Be able to identify center, vertices, foci, major and minor axes from an equation
- Hyperbolas: Be able to identify center, vertices, foci, transverse axis, and equations of asymptotes from an equation
- Converting between the Standard Form and the General Form of a conic section equation
- Identifying the type of conic section from its equation

Sequences and Series

- Arithmetic Sequences and Series
- Geometric Sequences and Series
- Finding the nth term of a sequence
- Finding the sum of a series
- Infinite Series
- Convergent and Divergent Series
- Using Sigma Notation to describe a sequence
- Binomial Theorem and Pascal's Triangle