

CONCEPT MAP

Trigonometry

Suggested Sequence:

1. Trigonometry
2. Analytic Trigonometry
3. Additional Topics in Trigonometry
4. Complex Numbers
5. Exponential and Logarithmic Functions

Trigonometry

Key Concepts:

- Radian and Degree Measure
- Trigonometric Functions:
The Unit Circle
- Right Triangle Trigonometry
- Trigonometric Functions of Any Angle
- Graphs of Sine and Cosine Functions
- Graphs of Other Trigonometric Functions
- Inverse Trigonometric Functions
- Applications and Models

CSOs: T 3.1, 3.2, 3.5

Estimated days to complete: 35

Enduring Understanding:

Six trigonometric functions and their inverses.

Essential Question(s):

- How is trigonometry used to find unknown values?
- Why are certain values undefined for certain functions?
- How can you compare the graphs of the sine, cosine, tangent functions and their inverses?

Key Vocabulary:

- Sine, cosine, tangent
- Secant, cosecant, cotangent
- Coterminal angles
- Reference angles
- Special right triangles
- Positive and negative angles
- Unit circle
- Degree
- Radians
- Arcsin and \sin^{-1}
- Arcosin and \cos^{-1}
- Arctan and \tan^{-1}
- Angular velocity
- Linear velocity
- Vertical shift(displacement)
- Horizontal shift(displacement)
- Stretch
- Compression
- Asymptote
- Domain
- Range
- Period
- Amplitude
- Maximum and minimum
- Inverse functions

Analytic Trigonometry

Key Concepts:

- Using fundamental identities
- Verifying trigonometric identities
- Solving trigonometric equations
- Sum and difference formulas
- Multiple-angle and Product-to-sum formulas

CSOs: T 3.3, 3.4, 3.8

Estimated days to complete: 15

Enduring Understanding:

Identities are used to evaluate, simplify, and solve trigonometric expressions and equations.

Essential Question(s):

- What approaches can be used to verify an identity?
- What is the best approach?

Key Vocabulary:

- Pythagorean identities
- Reciprocal identities
- Half angle formulas
- Double angle formulas
- Sum and difference formulas
- Quotient identities
- Cofunction identities
- Even/odd identities
- Power reducing formulas
- Product to sum and sum to product formulas

Additional Topics in Trigonometry

Key Concepts:

- Law of Sines
- Law of Cosines
- Vectors in the Plane
- Vectors and dot products

CSOs: T 3.8, 3.9, 3.11

Estimated days to complete: 15

Enduring Understanding:

The law of cosines and the law of sines can be used to find missing measures. Vectors are added and multiplied and this helps with mathematical calculations for engineering and physics.

Essential Question(s):

- How can you determine if a triangle had no solution, one solution, or two solutions?
- How can you solve triangles using these laws?
- Why can't physical models of vector quantities be represented by scalar quantities?

Key Vocabulary:

- Law of sines
- Law of cosines
- AAS
- Oblique triangles
- ASA
- SSA
- Ambiguous case for law of sines
- SSS
- Heron's formula
- Area formula of an oblique triangle
- Direction and magnitude
- Initial point
- Terminal point
- Length
- Equivalent vectors
- Head to tail
- X Y Z components
- Resultant
- Parallelogram law
- Scalar multiplication
- Vectors and dot products

Complex Numbers

Key Concepts:

- Complex numbers
- Complex solutions of equations
- Trigonometric form of a complex number
- DeMoivre's Theorem
- Polar coordinates

CSOs: T 3.10

Estimated days to complete: 10

Enduring Understanding:

Complex Numbers

Essential Question(s):

- Why is it important to understand complex numbers?

Key Vocabulary:

- Imaginary units
- Complex number
- Standard form of complex numbers (Trigonometric form of a complex number)
- Complex conjugate
- Polar coordinate system
- Polar axis
- DeMoivre's theorem
- Nth root of a complex number
- Conjugate pairs

Exponential and Logarithmic Functions

Key Concepts:

- Exponential Functions and their graphs
- Logarithmic functions and their graphs
- Properties of logarithms
- Exponential and Logarithmic equations
- Exponential and Logarithmic models

CSOs: PC 2.4, 2.5

Estimated days to complete: 10

Enduring Understanding:

Exponential and Logarithmic functions

Essential Question(s):

- How are exponential and logarithmic functions related?
- How do you apply transcendental functions to model and solve problems?

Key Vocabulary:

- Exponent
- Logarithmic inverse function
- Natural base
- Change of base formula