



Switched-On
SCHOOLHOUSE

Course Catalog

Trigonometry

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COURSE OVERVIEW

Trigonometry is a five-unit elective course for high school students who have successfully completed Algebra I, Geometry, and Algebra II. The materials cover a development of trigonometry from right triangle trigonometry to oblique triangles and the polar plane. Throughout the course, students will develop trigonometric formulas and use them in real-world applications, evaluate trigonometric proofs using complex trigonometric identities and solving trigonometric equations with regard to the unit circle.

The course seeks to help students expand their knowledge and skills so that they may achieve the following goals:

- Use trigonometry as a tool for indirect measurement.
- Model natural phenomenon with trigonometric functions.
- Perform operations with complex numbers using trigonometry.
- Use trigonometric identities to evaluate trigonometric proofs and solve trigonometric equations with regard to the unit circle.
- Solve for unknown sides and angles of right and oblique triangles using right triangle trigonometry, law of sines and law of cosines.

In attaining these goals, students will begin to see the "big picture" of mathematics and understand how numeric, algebraic, and geometric concepts are woven together to build a foundation for higher mathematical thinking.

| UNIT 1: RIGHT TRIANGLE TRIGONOMETRY | | | | |
|-------------------------------------|-----|--------------------------------------------|-----|-------------------------------------------------|
| Assignment Titles | | | | |
| TRIGONOMETRY | 1. | Course Overview | 13. | Quiz 3: The Reciprocal Functions and Identities |
| | 2. | Lengths of Sides | 14. | Radian Measure |
| | 3. | Angle Measures | 15. | Reference Angles |
| | 4. | Indirect Measure | 16. | Velocity |
| | 5. | Quiz 1: Solving a Right Triangle | 17. | Quiz 4: Radian Measure |
| | 6. | Angles in the Coordinate Plane | 18. | Project: Parametric Equations |
| | 7. | The Unit Circle | 19. | Special Project* |
| | 8. | Trigonometric Values of Special Angles | 20. | Review |
| | 9. | Quiz 2: The Unit Circle and Special Angles | 21. | Test |
| | 10. | Reciprocal Functions | 22. | Alternate Test* |
| | 11. | Points on the Terminal Side | 23. | Glossary and Credits |
| | 12. | Pythagorean Identities | | |

| UNIT 2: GRAPHING AND INVERSE FUNCTIONS | | | | |
|----------------------------------------|----|--------------------------------------|-----|-------------------------------------------|
| Assignment Titles | | | | |
| TRIGONOMETRY | 1. | Graphing and Amplitude | 10. | Trigonometric Equations: Part II |
| | 2. | Project: The Reciprocal Functions | 11. | Quiz 2: Inverse Trigonometric Functions |
| | 3. | Period and Frequency | 12. | Project: Modeling with Periodic Functions |
| | 4. | Vertical and Horizontal Translations | 13. | Special Project* |
| | 5. | Sinusoidal Functions | 14. | Review |
| | 6. | Quiz 1: Graphing | 15. | Test |
| | 7. | Inverse Functions | 16. | Alternate Test* |
| | 8. | Inverse Reciprocal Functions | 17. | Glossary and Credits |
| | 9. | Trigonometric Equations: Part I | | |

| UNIT 3: ANALYTIC TRIGONOMETRY | |
|-------------------------------|---------------------------------------------|
| TRIGONOMETRY | Assignment Titles |
| | 1. The Fundamental Trigonometric Identities |
| | 2. Proving Identities |
| | 3. Cosine Addition Formula |
| | 4. Sine Addition Formula |
| | 5. Tangent Addition Formula |
| | 6. Quiz 1: Identities and Addition Formulas |
| | 7. Double-Angle Formulas |
| | 8. Project: Solving Equations Graphically |
| | 9. Half-Angle Formulas |
| | 10. Converting Between Products and Sums |
| | 11. Quiz 2: More Identities |
| | 12. Project: Adding Waves |
| | 13. Special Project* |
| | 14. Review |
| | 15. Test |
| | 16. Alternate Test* |
| 17. Glossary and Credits | |

| UNIT 4: TRIGONOMETRIC APPLICATIONS | |
|------------------------------------|----------------------------------------------|
| TRIGONOMETRY | Assignment Titles |
| | 1. Law of Sines |
| | 2. Ambiguity and Area of a Triangle |
| | 3. Law of Cosines: Finding a Side |
| | 4. Law of Cosines: Finding an Angle |
| | 5. Project: Heron's Formula |
| | 6. Quiz 1: Trigonometry of Oblique Triangles |
| | 7. Introduction to Vectors |
| | 8. Vector Components |
| | 9. Navigation Application |
| | 10. Vector Multiplication |
| | 11. Quiz 2: Vectors |
| | 12. Special Project* |
| | 13. Review |
| | 14. Test |
| | 15. Alternate Test* |
| 16. Glossary and Credits | |

| UNIT 5: POLAR COORDINATES | |
|---------------------------|-----------------------------------------|
| TRIGONOMETRY | Assignment Titles |
| | 1. Introduction to Polar Coordinates |
| | 2. Polar Equations |
| | 3. Project: Graphing in the Polar Plane |
| | 4. Polar Curves |
| | 5. Polar Forms of Conics |
| | 6. Quiz 1: Polar Equations |
| | 7. Polar Form of Complex Numbers |
| | 8. Multiply and Divide Complex Numbers |
| | 9. Powers and Nth Roots |
| | 10. Project: Fractals |
| | 11. Quiz 2: Complex Numbers |
| | 12. Special Project* |
| | 13. Review |
| | 14. Test |
| | 15. Alternate Test* |
| 16. Glossary and Credits | |

| UNIT 6: COURSE REVIEW AND EXAM | |
|--------------------------------|--------------------------|
| TRIGONOMETRY | Assignment Titles |
| | 1. Review |
| | 2. Exam |
| | 3. Alternate Exam |

(*) Indicates alternate assignment