

Masconomet Regional High School Curriculum Guide

COURSE TITLE:	<u>Applied Trigonometry</u>	COURSE NUMBER:	<u>1431</u>
DEPARTMENT:	<u>Mathematics</u>	GRADE LEVEL(S) & PHASE:	<u>11 – 12 , CP</u>
LENGTH OF COURSE:	<u>One Semester</u>		

Course Description:

The word "Trigonometry" comes from two Greek words interpreted to mean "the measurement of triangles." Early trigonometry was developed in ancient times as a device to aid in solving problems with right triangles. These types of problems still occur in engineering, navigation, surveying and other fields. Today, trigonometry applies to every kind of triangle, and also to quantities that rise and fall, such as vibrations, alternating current, business cycles, and more. Applied trigonometry will extend the student's fundamental math skills so that he/she may engage in more advanced mathematical and scientific disciplines later on. Practical applications of trigonometry will be used extensively to illustrate the power of the concepts presented. The course emphasizes an understanding of the definitions and principles of trigonometry and their application to problem solving. Students are expected to learn the basic trigonometric identities as well as the significant exact values of the trigonometric functions.

Central Objectives:

(Some are adapted from the Massachusetts Mathematics Curriculum Framework – November 2000)

At the end of the course, the student will be able to:

- A. Define the six trigonometric functions using a point on the terminal side, right triangles and circular functions.
- B. Express rotations in both radians and degrees and change from one unit to the other.
- C. Graph all six trigonometric functions with any amplitude, period, phase shift or vertical shift.
- D. Solve right triangles.
- E. Apply trigonometry to problem situations involving right triangles.
- F. Apply trigonometry to problem situations involving oblique triangles.
- G. Express the relationship between trigonometric and circular functions.
- H. Evaluate expressions and solve equations involving the inverse trigonometric functions.

These objectives address the Academic Expectations relating to effective communication, mathematical competency and problem solving skills.

Materials and Activities:

Text(s): Trigonometry; 4th edition

By: Charles P. McKeague

Saunders College Publishing: Fort Worth, TX: 1999

Students are expected to have and use a graphing calculator in class and when doing assignments. Parents may request that their child borrow a school owned calculator for the year.

- Lecture and class discussion to explain concepts and processes.
- Individual and group work to practice skills presented in class, to apply them to various problem-solving situations and to develop the ability to work cooperatively in such situations.
- Student assignments to develop proficiency in those skills and processes presented and practiced in class.
- Group and individual investigations related to understanding and applying the concepts in the central objectives.
- Graphing calculators will be used to investigate the graphs that arise while studying trigonometry.
- Independent projects such as reports and computer work may be presented by students.

Scope and Sequence:

Chapter One:

At the end of this chapter, the student should be able to:

- Define an angle and its parts
- Identify coterminal angles
- Explain the meaning of positive and negative angles
- Use the distance formula
- Define standard position for angles.
- Define the six trigonometric functions using a point on the terminal side of a rotation

- Define the six trigonometric functions in terms of the unit circle
- Determine the sign for each trigonometric function based on the quadrant location of its terminal side
- State and use the basic trigonometric identities: reciprocal, ratio and Pythagorean

Chapter Two:

At the end of this chapter, the student should be able to:

- Define the six trigonometric functions using the sides of a right triangle
- State and apply the Co-function Theorem
- Give exact values for the trigonometric functions of special angles ($30^\circ - 60^\circ - 90^\circ$ and $45^\circ - 45^\circ - 90^\circ$)
- Use trigonometric functions to find unknown parts in a right triangle
- Use the Pythagorean Theorem to find an unknown side in a right triangle
- Convert between decimal degrees and degree, minutes, seconds
- Solve problems involving angle of elevation and angle of depression
- Specify direction by giving its bearing and by describing its clockwise rotation from due north
- Apply trigonometric functions to right triangles in problem solving situations

Chapter Three:

At the end of this chapter, the student should be able to:

- Give the reference angle for any angle
- Explain the relationship between the trigonometric functions of an angle and its reference angle
- Define radian measure
- Change from degrees to radians and radians to degrees
- Find arc length and area of a sector

Chapter Seven:

At the end of this chapter, the student should be able to:

- Apply the law of sines
- Apply the law of cosines
- Use trigonometry to find the area of any triangle
- Apply the law of sines and the law of cosines to triangles in problem solving situations

Assessment:

- Daily assignments to be evaluated in light of completeness, care of presentation and the student's ability to explain the results. Late or incomplete assignments can earn at most half credit. Generally, no credit will be given for any assignment not completed within one day of the time it was due.
- Individual and group classwork/investigations to be evaluated in light of their completeness, care of presentation, student participation in the process and the student's ability to discuss the results/conclusions.
- Frequent quizzes to assess the student's progress in achieving course objectives on a short-term basis.
- Chapter tests to assess the student's ability to synthesize several classes and achieve course objectives on a long-term basis.
- End of course exam given in January.
- Assessments designed to determine how the student has met the Academic Expectations relating to effective communication, mathematical competency and problem solving skills.

Revised 07/09