

Trigonometry

MAT-2100

2022 07/01/2022 to 06/30/2023 Modified 04/22/2022

Course Description

Trigonometry is a one-semester course designed to take the student through a detailed study of trigonometric identities. The material will include topics on graphs and functions, the Law of Sines and Law of Cosines, vectors, complex numbers and polar coordinates. The student will take a closer look at conic sections, exponential and logarithmic functions, and inverse trigonometric functions. The subject matter will be presented by video lecture, daily practice, and include sample video solutions, a glossary of terms and other ancillary materials to aid in learning.

The student will notice that most lessons have biblical integration where Scripture is given and then an explanation as to how it relates to the lesson is shown. The student will see that all things come from God, including Trigonometry!

Rationale

Trigonometry builds on geometric properties and algebraic principles learned in Geometry and Algebra 2 and takes them to a higher level. By exploring uses of sines and cosines, practical applications involving vectors and matrices can be used to make math a tool for solving problems beyond simple four operation calculations.

Prerequisite

Algebra II and Geometry

Measurable Learning Outcomes

- A. The student will explore exponential and radical expressions and factor polynomials with an emphasis on both real and imaginary roots.
- B. The student will identify functions based on given properties including transformations, combinations, and inverse functions.
- C. The student will work with angles including right angle trigonometric functions and identities.
- D. The student will graph trigonometric functions and explore real life applications of trigonometric functions.
- E. The student will evaluate trigonometric equations using trigonometric identities and special formulas.
- F. The student will use the laws of sines and cosines and solve for roots of complex numbers, vectors and conic sections.
- G. The student will explore polar coordinates, solve polar equations and parametric equations with graphing on the polar coordinate plane.

Course Resources

See LUOA's [Systems Requirements](#) for computer specifications necessary to operate LUOA curriculum. Also view [Digital Literacy Requirements](#) for LUOA's expectation of users' digital literacy.

This course makes use of third-party digital resources to enhance the learning experience. LUOA staff and faculty have curated these resources. Students can safely access them to complete coursework. Please ensure that internet browser settings, pop-up blockers, and other filtering tools allow for these resources to be accessed. See Technologies and Resources Used in this Course below for a specific list.

- Note: Embedded YouTube videos may be utilized to supplement LUOA YouTube videos are the property of the respective content

creator, licensed to YouTube for distribution and user access. As a non-profit educational institution, LUOA is able to use YouTube video content under the YouTube Terms of Service. For additional information on copyright, please contact the [Jerry Falwell Library](#).

Scripture Attribution

- Grades 7-12: All Scripture quotations, unless otherwise indicated, are from the ESV® Bible (The Holy Bible, English Standard Version®), copyright © 2001 by Crossway, a publishing ministry of Good News Publishers. Used by permission. All rights reserved. May not copy or download more than 500 consecutive verses of the ESV Bible or more than one half of any book of the ESV Bible.

Technologies and Resources Used in this Course

The following resource(s) are used throughout this course:

- GeoGebra

Policies

Students are accountable for all information in the [Student Handbook \(https://www.liberty.edu/online-academy/wp-content/uploads/2021/11/LUOA-Student-Handbook.pdf\)](https://www.liberty.edu/online-academy/wp-content/uploads/2021/11/LUOA-Student-Handbook.pdf). Below are a few policies that have been highlighted from the Student Handbook.

Course Grading Policies

The student's grades will be determined according to the following grading scale and assignment weights. The final letter grade for the course is determined by a 10-point scale. Assignments are weighted according to a tier system, which can be referenced on the Grades page in Canvas. Each tier is weighted according to the table below. Items that do not affect the student's grade are found in Tier 0.

Grading Scale	Assignment Weights
A 90-100%	Tier 0 0%
B 80-89%	Tier 1 25%
C 70-79%	Tier 2 35%
D 60-69%	Tier 3 40%
F 0-59%	

In order for students to receive credit for a course, the following conditions have to be met:

- All semester exams and module tests have to be completed.
- All Tier 3 projects or papers have to be completed.
- Fewer than 10 zeros exist in the gradebook for blank submissions in a full credit course and 5 zeros for blank submissions in a semester course.

Types of Assessments

To simplify and clearly identify which policies apply to which assessment, each assessment has been categorized into one of four categories: Lesson, Assignment, Quiz, or Test. Each applicable item on the course Modules page has been designated with an identifier chosen from among these categories. Thus, a Quiz on the American Revolution may be designated by the title, "1.2.W - Quiz: The American Revolution." These identifiers were placed on the Modules page to help students understand which Resubmission and Honor Code policies apply to that assessment (see the Resubmission Policy and Honor Code Policy below for further details).

- **Lesson:** *Any item on the Modules page designated as a "Lesson"*

These include instructional content and sometimes an assessment of that content. Typically, a Lesson will be the day-to-day work that a student completes.

- **Assignment:** *Any item on the Modules page designated as an "Assignment"*

Typical examples of Assignments include, but are not limited to, papers, book reports, projects, labs, and speeches. Assignments are usually something that the student should do his or her best work on the first time.

- **Quiz:** *Any item on the Modules page designated as a "Quiz"*

This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Quizzes cover a smaller amount of material than Tests.

- **Test:** *Any item on the Modules page designated as a "Test"*

This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Tests cover a larger amount of material than Quizzes.

Resubmission Policy

Students are expected to submit their best work on the first submission for every Lesson, Assignment, Quiz, and Test. However, resubmissions may be permitted in the following circumstances:

- **Lesson:** Students are automatically permitted two attempts on a Lesson. Students may freely resubmit for their first two attempts without the need for teacher approval.
- **Assignment:** Students should do their best work the first time on all Assignments. However, any resubmissions must be completed before the student moves more than one module ahead of that Assignment. For example, a student may resubmit an Assignment from Module 3 while in Module 4, but not an Assignment from Modules 1 or 2. High School students may not resubmit an Assignment without expressed written permission from the teacher in a comment.
- **Quiz:** Students may NOT resubmit for an increased grade.
- **Test:** Students may NOT resubmit for an increased grade.

If a student feels that he or she deserves a resubmission on a Lesson, Assignment, Quiz, or Test due to a technical issue such as a computer malfunction, the student should message his or her teacher to make the request.

Honor Code Policy

Every time a student violates the Honor Code, the teacher will submit an Honor Code Incident Report. The Student Support Coordinator will review the incident and allocate the appropriate consequences. Consequences, which are determined by the number of student offenses, are outlined below:

- **Warning:** This ONLY applies to high school Lessons and elementary/middle school Assignments and Lessons. Students should view these actions as learning opportunities.
 - **Lessons:** A zero will be assigned for the question only.
 - **Elementary/Middle School Assignment:** The student must redo his or her work; however, the student may retain his or her original grade.
- **1st Offense:**
 - **Lesson, Quiz, or Test:** The student will receive a 0% on the entire assessment.
 - **Assignment:** The student will either:
 - Receive a 0% on the original assignment
 - Complete the Plagiarism Workshop
 - Retry the assignment for a maximum grade of 80%
- **2nd Offense:** The student will receive a 0% and be placed on academic probation.
- **3rd Offense:** The student will receive a 0% and the Director of Faculty will determine the consequences that should follow, possibly including withdrawal from the course or expulsion from the academy.

Materials Selection Policy

LUOA curates educational materials that are consistent with the school's philosophy; however, the fallen human condition depicted in literature (as in Scripture itself) is not always pleasant. Valuable works sometimes have objectionable or profane elements. Good books provide four (4) recognized values.

- They build godly attitudes and character traits.
- They deepen our social and cultural awareness.
- They strengthen our use of written language.
- They provide a lifelong source of enjoyment and relaxation.

In order to instill these values in students and fulfill the stated objectives of the school, all LUOA students are expected to read and study good books on a regular basis. Recognizing that materials designed for one level may not be appropriate for another, three (3) levels of criteria are applied:

- Elementary materials must contain no objectionable material,
- Objectionable elements in sixth through eighth-grade materials must be limited and must serve a specific educational purpose, and
- Objectionable content may be included in high school materials but must be outweighed by positive literary, curricular, and/or Christian values.

The curriculum department has approved required educational materials for students.

Schedule

Module 1: Polynomials, Equations, & Functions

Week 1: Exponents & Roots

Week 2: Factoring Polynomials

Week 3: Rational Expressions & Solving Equations

Week 4: Functions

Module 2: Inverse Functions, Angles, & the Unit Circle

Week 5: Transforming Functions, Combining Functions, & Inverse Functions

Week 6: Angles & Circles

Week 7: The Unit Circle & Graphing Sine & Cosine

Week 8: The Other Trigonometric Functions

Week 9: Inverse Trigonometric Functions

Module 3: Right Triangle Trigonometry & Trigonometric Identities

Week 10: Right Triangle Trigonometry

Week 11: The Trigonometric Identities

Week 12: The Sum, Difference, Double-Angle & Half-Angle Formulas

Module 4: Law of Sines & Cosines, & Vectors

Week 13: The Law of Sines & the Law of Cosines

Week 14: Vectors

Week 15: Complex Zeros & Trigonometric Form of Complex Numbers

Week 16: Polar Coordinates, Polar Equations, & Parametric Equations

Module 5: Conics

Week 17: Conic Sections

Week 18: Review & Quarter Exam