

MATH 107 – TRIGONOMETRY & ANALYTIC GEOMETRY

SYLLABUS 2 SEMESTER COURSE

PROGRAM:

INSTRUCTOR: Natasza Krajcovic

COURSE TITLE: Trigonometry & Analytic Geometry
(CDLS courses: Geometry – Semester 1 and 2)

COURSE PREFIX: Math 107

CREDIT HOURS: 3

PREREQUISITES: MATH 106 minimum grade: C

COURSE MATERIALS:

Required Textbook:

All content materials for this course are included online in the course. Materials included videos, worksheets, quizzes/tests, and activities.

CATALOG DESCRIPTION:

An introduction to the tools and techniques of trigonometry. Topics include angles and their measure, the six trigonometric functions and their properties, inverse trigonometric functions, graphs, identities including the Law of Sines and the Law of Cosines, trigonometric equations, and solving triangles. Optional topics include complex numbers, De Moivre's Theorem, polar coordinates, and analytic geometry.

CURRICULAR RELATIONSHIPS:

This course is of interest to students in the sciences and in other fields who want or need a course at a level lower than Calculus.

STUDENT LEARNING OUTCOMES (OR COURSE OBJECTIVES):

Upon completion of this course, the student will be able to:

- Apply trigonometric, logarithmic, and polynomial functions to solve problems.
- Solve problems in analytic geometry.
- Choose appropriate mathematical functions to model physical phenomena.
- Present material in a logical fashion.

COURSE REQUIREMENTS:

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In order to receive a passing grade, the student must:

1. Engage in the online course content and activities a minimum of 8-10 hours per week throughout the 2 semesters (17 weeks per semester).
2. Actively participate in discussions and activities related to course objectives.
3. Complete all graded assignments – including course activities, module/lesson quizzes, discussions, unit post-tests/exams, and end-of-semester assessments.

Students will be expected to read the syllabus and understand all course requirements and expectations.

The table below summarizes all assignments, assessments, discussions and exams. Brief information is included for each assignment. Assignments are downloaded from the course and submitted to the instructor within the course. Quizzes, which are completed in each lesson, and units exams are listed in order below among assignments and discussions. The timing of all assignments and quizzes/exams is included in the Course Schedule section.

Semester 1

<i>Lesson / Activity</i>
Unit 1 Pre-test
Discussion 1: Introduction to Geometry and Transformations
1.01 Lesson 1 "Introduction to Geometry" and quiz
1.02 Lesson 2 "Basic Geometric Concepts" and quiz
1.03 Lesson 3 "Representing Transformations in a Plane" and quiz
1.04 Lesson 4 "Returning a Polygon to Its Original Position" and quiz
1.05 Lesson 5 "Defining Rigid Transformations" and quiz
1.06 Lesson 6 "Predicting Results of Rigid Transformations"
Graded Unit 1 Activity: Introduction to Geometry and Transformations
Unit 1 Post-test

<i>Lesson / Activity</i>
Unit 2 Pre-test
Discussion 2: Congruence, Proof, and Constructions
2.01 Lesson 1 "Transformations and Congruence" and quiz
Graded Course Activity 1: Activity: Sides and Angles of Congruent Triangles
2.02 Lesson 2 "ASA, SAS, and SSS Criteria for Congruent Triangles" and quiz
2.03 Lesson 3 "Lines, Angles, and Mathematical Proofs" and quiz
2.04 Lesson 4 "Proving Theorems about Lines and Angles" and quiz
2.05 Lesson 5 "Proving Theorems about Triangles" and quiz
2.06 Lesson 6 "Proving Theorems about Parallelograms" and quiz
2.07 Lesson 7 "Geometric Constructions with Lines and Angles" and quiz
Graded Unit 2 Activity: Congruence, Proof, and Constructions
Unit 2 Post-test

<i>Lesson / Activity</i>
Unit 3 Pre-test
Discussion 3: Similarity and Proof
3.01 Lesson 1 "Properties of Dilations" and quiz
3.02 Lesson 2 "Similarity and Similarity Transformations" and quiz
Graded Course Activity 2: ASA, SAS, and SSS Criteria for Similar Triangles
3.03 Lesson 3 "Similarity, Proportion, and Triangle Proofs" and quiz

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3.04 Lesson 4 “Using Congruence and Similarity with Triangles” and quiz
Graded Unit 3 Activity: Similarity and Proof
Unit 3 Post-test

<i>Lesson / Activity</i>
Unit 4 Pre-test
Discussion 4: Trigonometry and Geometric Modeling
4.01 Lesson 1 “Trigonometry Ratios” and quiz
4.02 Lesson 2 “Sine and Cosine of Complementary Angles” and quiz
4.03 Lesson 3 “Solving Problems with Right Triangles” and quiz
Graded Course Activity 3: Trigonometry and the Area of a Triangle
4.04 Lesson 4 “Proving the Laws of Sines and Cosines” and quiz
4.05 Lesson 5 “Applying the Laws of Sines and Cosines” and quiz
Graded Unit 4 Activity: Trigonometry and Geometric Modeling
Unit 4 Post-test
End of Semester test

Semester 2

<i>Lesson / Activity</i>
Unit 1 Pre-test
Discussion 1: Explaining Volume Formulas
1.01 Lesson 1 "Explaining Volume Formulas " and quiz
1.02 Lesson 2 "Using Volume Formulas " and quiz
1.03 Lesson 3 "Cross Sections of Three-Dimensional Objects" and quiz
Graded Unit 1 Activity: Extending to Three Dimensions
Unit 1 Post-test

<i>Lesson / Activity</i>
Unit 2 Pre-test
Discussion 2: Connecting Algebra and Geometry through Coordinates
2.01 Lesson 1 "Equation of a Circle" and quiz
2.02 Lesson 2 “Using Coordinates to Prove Geometric Theorems” and quiz
2.03 Lesson 3 "Slope Criteria for Parallel and Perpendicular Lines" and quiz
2.04 Lesson 4 "Dividing a Line Segment Based on a Ratio" and quiz
2.05 Lesson 5 “Using Coordinates to Compute Perimeters and Areas" and quiz
Graded Course Activity 1: Equation of a Parabola Based on Its Focus and Directrix
Graded Unit 2 Activity: Connecting Algebra and Geometry through Coordinates
Unit 2 Post-test

<i>Lesson / Activity</i>
Unit 3 Pre-test
Discussion 3: Circles With and Without Coordinates
3.01 Lesson 1 “Relationships among Inscribed Angles, Radii, and Chords” and quiz
3.02 Lesson 2 “Inscribed and Circumscribed Circles” and quiz
Graded Course Activity 3: Constructing a Tangent Line to a Circle
3.03 Lesson 3 “Relating Arc Length and Area to Radius” and quiz
Graded Unit 3 Activity: Circles With and Without Coordinates
Unit 3 Post-test

<i>Lesson / Activity</i>
Unit 4 Pre-test
Discussion 4: Independent and Conditional Probability

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4.01 Lesson 1 “Sample Space” and quiz
4.02 Lesson 2 “Applying the Addition Rule for Probability” and quiz
4.03 Lesson 3 “Applying the Multiplication Rule for Probability” and quiz
4.04 Lesson 4 “Independent Events” and quiz
4.05 Lesson 5 “Using Counting Techniques to Determine Probabilities” and quiz
4.06 Lesson 6 “Conditional Probability” and quiz
Graded Unit 4 Activity: Independent and Conditional Probability
Unit 4 Post-test

<i>Lesson / Activity</i>
Unit 5 Pre-test
Discussion 5: Applying Probability
5.01 Lesson 1 “Interpreting Two-Way Frequency Tables” and quiz
5.02 Lesson 2 “Using Probability to Make Fair Decisions” and quiz
5.03 Lesson 3 “Using Probability to Analyze Decisions and Strategies” and quiz
5.04 Lesson 4 “Applying Conditional Probability and Independence” and quiz
5.05 Lesson 5 “Interpreting Conditional Probability” and quiz
Graded Unit 5 Activity: Applying Probability
Unit 5 Post-test
End of Semester Test

Pre-tests: Pre-tests are not recorded in the gradebook. However, the pre-test scores provide information to the student and instructor on what areas the student is already proficient and what areas where additional support may be needed.

Quizzes: Quizzes are used at the end of each lesson to provide an interim assessment of student understanding.

Exams (End of Unit): At the end of each unit, an exam is given. They are to be completed in the week assigned. Tests consist of multiple choice and free-response questions. Exams are weighted at 20% of the course grade.

GRADE DISTRIBUTION AND SCALE:

In alignment with ASU academic policies, no D may apply to a major or minor field.

Grade Distribution (Weights):

Discussions	15%
Assignments	20%
Quizzes	20%
End of Unit Tests	20%
End-of-Semester Exam	25%
Total	100%

Grade Scale:

90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D

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59% and below

F

ADA STATEMENT:

Adams State University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. Adams State University is committed to achieving equal educational opportunities, providing students with documented disabilities access to university programs. In order for a course to be equally accessible to all students, different accommodations or adjustments may need to be implemented. The Office of Disability Services (ODS) is located in Richardson Hall, Suite 3-100, by mail at 208 Edgemont Blvd., Suite 3-100, Alamosa, CO 81101, by email at odsd@adams.edu, or by calling 719-587-7746. They are your primary resource on campus to discuss the qualifying disability, help you develop an accessibility plan, and achieve success in your courses. Please communicate with them as early as possible; this can be in person, via email, or by phone. The Disability Services Coordinator shall either provide you letters to give to your professors for accommodations or email these letters out to you and your professors.

ACADEMIC INTEGRITY:

In accordance with Academic Policy 100-03-01, Adams State University, to preserve academic integrity, does not tolerate academic dishonesty (misconduct). Every student is required to practice and adhere to the principle of ACADEMIC INTEGRITY while undertaking studies at Adams State University. Students and faculty at Adams State University value academic honesty as a virtue essential to the academic process. Cheating, plagiarism, unauthorized possession or disposition of academic materials, or the falsification or fabrication of one's academic work will not be tolerated.

Any offense will result in a zero for the exam, lesson, or exercise in question and will result in failure of the course. Please refer to the ASU Extended Studies Academic Integrity website for more information including the student handbook: [Academic Integrity at Adams State University](#).

All written work is subject to plagiarism detection software review.

STUDENT IDENTITY VERIFICATION:

Adams State University utilizes a variety of methods to verify the identity of students enrolled in courses, including but not limited to: secure logins and pass codes, proctored exams, security questions, and other technologies and practices that are effective in verifying student identity. Some of these methods may incur an extra cost to students; associated costs will be outlined in the course syllabus, other University documents, and on the University website. Adams State University reserves the right to request additional government-issued documentation of identity from students for the purpose of ensuring that the person enrolled in the course is the person completing assignments, exams, and all other course requirements. Any student engaged in incidents of student identity fraud may face reprimand, disciplinary warning, a lowered or failing

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grade(s), and/or probation, or suspension from the course, academic program or University, or expulsion from the University.

COURSE SCHEDULE:

Students will engage in the online course content and activities a minimum of Monday through Friday each week of the semester, which will run 17-18 weeks. The minimum time spent actively working online and on course assignments will be 1.5-2 hours per day.

In working with their school district, students will complete course content in structured time periods during the school day along with unstructured time periods decided by the student.

All course activities (along with the accompanying content) in a lesson are to be completed in the course week identified below.

Semester 1

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 1 Pre-test	Week 1
Discussion 1: Introduction to Geometry and Transformations	
1.01 Lesson 1 "Introduction to Geometry" and quiz	
1.02 Lesson 2 "Basic Geometric Concepts" and quiz	Week 2
1.03 Lesson 3 "Representing Transformations in a Plane" and quiz	
1.04 Lesson 4 "Returning a Polygon to Its Original Position" and quiz	Week 3
1.05 Lesson 5 "Defining Rigid Transformations" and quiz	
1.06 Lesson 6 "Predicting Results of Rigid Transformations"	Week 4
Graded Unit 1 Activity: Introduction to Geometry and Transformations	
Unit 1 Post-test	

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 2 Pre-test	Week 5
Discussion 2: Congruence, Proof, and Constructions	
2.01 Lesson 1 "Transformations and Congruence" and quiz	
Graded Course Activity 1: Activity: Sides and Angles of Congruent Triangles	Week 6
2.02 Lesson 2 "ASA, SAS, and SSS Criteria for Congruent Triangles" and quiz	
2.03 Lesson 3 "Lines, Angles, and Mathematical Proofs" and quiz	
2.04 Lesson 4 "Proving Theorems about Lines and Angles " and quiz	Week 7
2.05 Lesson 5 "Proving Theorems about Triangles" and quiz	
2.06 Lesson 6 "Proving Theorems about Parallelograms" and quiz	Week 8
2.07 Lesson 7 "Geometric Constructions with Lines and Angles" and quiz	
Graded Unit 2 Activity: Congruence, Proof, and Constructions	
Unit 2 Post-test	

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 3 Pre-test	Week 9
Discussion 3: Similarity and Proof	
3.01 Lesson 1 "Properties of Dilations" and quiz	
3.02 Lesson 2 "Similarity and Similarity Transformations" and quiz	Week 10
Graded Course Activity 2: ASA, SAS, and SSS Criteria for Similar Triangles	

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3.03 Lesson 3 “Similarity, Proportion, and Triangle Proofs” and quiz	Week 11
3.04 Lesson 4 “Using Congruence and Similarity with Triangles” and quiz	
Graded Unit 3 Activity: Similarity and Proof	Week 12
Unit 3 Post-test	

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 4 Pre-test	Week 13
Discussion 4: Trigonometry and Geometric Modeling	
4.01 Lesson 1 “Trigonometry Ratios” and quiz	
4.02 Lesson 2 “Sine and Cosine of Complementary Angles” and quiz	Week 14
4.03 Lesson 3 “Solving Problems with Right Triangles” and quiz	Week 15
Graded Course Activity 3: Trigonometry and the Area of a Triangle	
4.04 Lesson 4 “Proving the Laws of Sines and Cosines” and quiz	Week 16
4.05 Lesson 5 “Applying the Laws of Sines and Cosines” and quiz	
Graded Unit 4 Activity: Trigonometry and Geometric Modeling	Week 17
Unit 4 Post-test	
End of Semester test	

Semester 2

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 1 Pre-test	Week 1
Discussion 1: Explaining Volume Formulas	
1.01 Lesson 1 "Explaining Volume Formulas " and quiz	
1.02 Lesson 2 "Using Volume Formulas " and quiz	Week 2
1.03 Lesson 3 "Cross Sections of Three-Dimensional Objects" and quiz	
Graded Unit 1 Activity: Extending to Three Dimensions	Week 3
Unit 1 Post-test	

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 2 Pre-test	Week 4
Discussion 2: Connecting Algebra and Geometry through Coordinates	
2.01 Lesson 1 "Equation of a Circle" and quiz	
2.02 Lesson 2 “Using Coordinates to Prove Geometric Theorems” and quiz	Week 5
2.03 Lesson 3 "Slope Criteria for Parallel and Perpendicular Lines" and quiz	
2.04 Lesson 4 "Dividing a Line Segment Based on a Ratio" and quiz	Week 6
2.05 Lesson 5 “Using Coordinates to Compute Perimeters and Areas" and quiz	
Graded Course Activity 1: Equation of a Parabola Based on Its Focus and Directrix	Week 7
Graded Unit 2 Activity: Connecting Algebra and Geometry through Coordinates	
Unit 2 Post-test	

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 3 Pre-test	Week 8
Discussion 3: Circles With and Without Coordinates	
3.01 Lesson 1 “Relationships among Inscribed Angles, Radii, and Chords” and quiz	
3.02 Lesson 2 “Inscribed and Circumscribed Circles” and quiz	Week 9
Graded Course Activity 3: Constructing a Tangent Line to a Circle	
3.03 Lesson 3 “Relating Arc Length and Area to Radius” and quiz	Week 10
Graded Unit 3 Activity: Circles With and Without Coordinates	
Unit 3 Post-test	

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 4 Pre-test	

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Discussion 4: Independent and Conditional Probability	Week 11
4.01 Lesson 1 “Sample Space” and quiz	
4.02 Lesson 2 “Applying the Addition Rule for Probability” and quiz	Week 12
4.03 Lesson 3 “Applying the Multiplication Rule for Probability” and quiz	
4.04 Lesson 4 “Independent Events” and quiz	Week 13
4.05 Lesson 5 “Using Counting Techniques to Determine Probabilities” and quiz	
4.06 Lesson 6 “Conditional Probability” and quiz	Week 14
Graded Unit 4 Activity: Independent and Conditional Probability	
Unit 4 Post-test	

<i>Lesson / Activity</i>	<i>Week to be Completed</i>
Unit 5 Pre-test	Week 15
Discussion 5: Applying Probability	
5.01 Lesson 1 “Interpreting Two-Way Frequency Tables” and quiz	
5.02 Lesson 2 “Using Probability to Make Fair Decisions” and quiz	Week 16
5.03 Lesson 3 “Using Probability to Analyze Decisions and Strategies” and quiz	
5.04 Lesson 4 “Applying Conditional Probability and Independence” and quiz	
5.05 Lesson 5 “Interpreting Conditional Probability” and quiz	Week 17
Graded Unit 5 Activity: Applying Probability	
Unit 5 Post-test	
End of Semester Test	