

MAT 109

COLLEGE TRIGONOMETRY

3 cr. (3-0)

COURSE DESCRIPTION:

MAT 109 in conjunction with MAT 108 will fulfill the prerequisites for MAT 131, Calculus I. This course covers trigonometric functions and inverse trigonometric functions; solutions of right triangles and oblique triangles; trigonometric identities; trigonometric equations; vectors; conic sections; sequences, series and the binomial theorem. The Texas Instruments TI-83 or TI-84 graphing calculator or a graphing calculator approved by the instructor is required for this course.

PREREQUISITES:

MAT 108 with a grade of “C” or higher or assessment

COURSE OBJECTIVES:

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

1. Describe angles using degree measure and radian measures.
2. Convert between degree and radian measure.
3. Use angles to model and solve real-life problems.
4. Evaluate trigonometric functions of any angle.
5. Use trigonometric functions to model and solve real-life problems.
6. Sketch translations, reflections, etc., of sine, cosine, tangent, cotangent, cosecant, secant functions.
7. Evaluate inverse trigonometric functions.
8. Evaluate compositions of trigonometric functions.
9. Solve real-life problems involving directional bearings.
10. Recognize and use fundamental trigonometric identities.
11. Verify trigonometric identities.
12. Use standard algebraic techniques to solve trigonometric equations.
13. Solve trigonometric equations of quadratic type.
14. Solve trigonometric equations involving multiple angles.
15. Use inverse trigonometric functions to solve trigonometric equations.
16. Use sum, difference, multiple-angle, half-angle, product-to-sum, and sum-to-product formulas to rewrite and evaluate trigonometric functions, verify identities, and solve trigonometric equations.
17. Use Law of Sines to solve oblique triangles.
18. Use Law of Cosines to solve oblique triangles.
19. Use Heron’s formula or Law of Sines to find area of oblique triangles.
20. Use Law of Sines, Law of Cosines to model and solve real-life problems.
21. Write the component form of a vector.
22. Perform basic vector operations.

23. Write vectors as a linear combination of unit vectors.
24. Use vectors to model and solve real-life problems.
25. Find the angle between vectors.
26. Write a vector as the sum of two vector components.
27. Use vectors to find work done by a constant force.
28. Write trigonometric form of a complex number.
29. Use DeMoivre's Theorem to find powers of complex numbers.
30. Find n^{th} roots of complex number.
31. Recognize and write arithmetic sequences.
32. Find a partial sum of an arithmetic sequence.
33. Recognize and write geometric sequences.
34. Find a partial sum and infinite sum of a geometric sequence.
35. Use the Binomial Theorem and Pascal's Triangle to calculate binomial expansions.

COURSE OUTLINE:

Tentatively, topics to be covered include:

A. Rational Functions and Conics

- A. Conics

B. Trigonometry

- A. Angles and Their Measure
- B. Right Triangle Trigonometry
- C. Trigonometric Functions of Any Angle
- D. Graphs of Sine and Cosine Functions
- E. Graphs of Other Trigonometric Functions
- F. Inverse Trigonometric Functions
- G. Applications and Models

C. Analytic Trigonometry

- A. Using Fundamental Identities
- B. Verifying Trigonometric Identities
- C. Solving Trigonometric Equations
- D. Sum and Difference Formulas
- E. Multiple-Angle and Product-to-Sum Formulas

D. Additional Topics in Trigonometry

- A. Law of Sines
- B. Law of Cosines
- C. Vectors in the Plane
- D. Trigonometric Form of a Complex Number

E. Sequences, Series, and Probability

- A. Sequences and Series
- B. Arithmetic Sequences and Partial Sums
- C. Geometric Sequences and Series
- D. The Binomial Theorem

***F. Matrices and Determinants**

- A. Matrices and Systems of Equations
- B. The Determinant of a Square Matrix
- C. Applications of Matrices and Determinants

***If time permits**

COURSE REQUIREMENTS:

Required Materials. The textbook, along with the usual notebook, paper, pencils, straightedge, etc., represent the required material for the class. Also, a TI-83 or TI-84 graphing calculator (or a graphing calculator approved by the instructor) is required for this course.

Homework. Homework will be assigned for each section of the text that is covered. The student should realize that, as a general college rule of thumb, a minimum of two hours of study outside of class is required for every one hour of class time. This course will require between 6 and 9 hours per week of outside class work.

Attendance. Attendance to this class is both expected and required. John A. Logan College's attendance policy will be enforced:

1. Students are expected to attend all scheduled class periods for the courses in which they are enrolled unless they are participating in a scheduled, supervised college trip or function. There are no excused absences or minimum number of class "cuts." All absences must be made up in a manner acceptable to the instructor.
2. A student who is absent from a class for three consecutive meetings or who is excessively absent as defined by the instructor (more than 4 absences), without prior approval, may be required by the instructor to meet with the department chair before being readmitted to the class. Students who claim illness as a cause for excessive absences may be required to present a physician's statement before being readmitted to class.
3. Each student is expected to be in class on time. Repeated or consistent tardiness will not be tolerated. Failure to comply with this requirement could result in the student's grade being lowered or the student being asked to drop the course.

Student Success Center. Tutors may be obtained through the Student Success Center. Contact the staff in C219 if this service is desired. John A. Logan College will make reasonable accommodations for students with documented disabilities under Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Act of 1990. Any student with a disability that may have some impact on work in this class, who feels she/he needs an accommodation, should make an appointment with the Coordinator of Services for Students with Disabilities on campus, Jennifer Frost, room C219B, extension 8516. Before services can be provided, this advisor must determine eligibility and arrange appropriate academic adjustments. **It is the student's responsibility to register in advance of a school term with this office and to turn in a schedule each term to ensure that there is every opportunity for success in this class.**

English Writing Center/Tutoring: For assistance with writing assignments in any college course, students are encouraged to visit "The Write Place" in E109. English instructors are available for one-on-one tutoring each semester during hours posted at the center.

Financial Aid. Students who receive financial assistance and completely withdraw from classes prior to 60% of the semester being completed (approximately 2-3 weeks after midterm) could be responsible to return a portion of their Federal Pell Grant award. Prior to withdrawing from courses, students should contact the Financial Aid Office.

Course Withdrawal Information. It is expected that you will attend this class regularly. If you stop attending for any reason, you should contact your advisor and withdraw officially to avoid the posting of a failing grade (an E) to your transcript. It is also advisable to discuss the situation with your instructor before dropping.

METHODS OF EVALUATION:

Evaluation will be on the basis of 4 or 5 hourly tests. Each test will count 100 points. There will also be a quiz over conics, which will count 50 points. A comprehensive final exam worth 200 points will be given. All students are required to take the final exam.

No make-ups will be given on the tests. If a student will be taking a school-sponsored trip, he/she may take the test before leaving on the trip. The student is responsible for giving the instructor advance notice of these trips. The student's lowest test grade will be dropped in the computation of his/her grade.

The grading scale will be as follows:

A	=	90 - 100%
B	=	80 - 89%
C	=	70 - 79%
D	=	60 - 69%
E	=	0 - 59%

METHODS OF PRESENTATION:

The primary method is lecture and class discussion involving assigned problems. Students can obtain additional help through (1) school tutoring (free), (2) videotapes keyed to each section of the textbook, or (3) the instructor during office hours or by appointment.

TEXT:

Algebra and Trigonometry, 7th Edition, Larson/Hostetler, Houghton Mifflin Company, 2007.

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West Frankfort.....	937-3438
Crab Orchard, Gorham, & Trico areas	1-800-851-4720
TTY (hearing-impaired access)	985-2752

John A. Logan College does not discriminate on the basis of race, religion, color, national origin, disability, age, sexual orientation, or gender orientation.

MAT 109 ASSIGNMENT SHEET

SECTION	PAGES	PROBLEMS
4.3	363-365	1-10 all, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 35, 37, 43, 47, 49, 51, 61, 63, 69, 71, 73, 77
6.1	456-458	1, 5, 9, 11, 13, 15, 17, 19, 21, 23, 25, 29, 33, 35, 39, 41, 43, 47, 51, 53, 55, 57, 59, 63, 67, 71, 73, 75, 77, 79
6.2	467-469	1-65 odds
6.3	479-480	1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 23, 29, 31, 33, 35, 37, 41, 43, 45, 47, 49, 51, 53, 55, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93
6.4	490-491	1, 5, 9, 13, 27, 35, 37, 39, 41, 43, 45, 47, 49, 53, 55
6.5	501	1-6 all, 7, 9, 11, 13, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35
6.6	511-512	1- 67 odds
6.7	521-523	1, 3, 5, 7, 9, 15, 17, 19, 21, 25, 27, 29, 31, 33, 35
7.1	541-542	1, 5, 7, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 77, 79, 81, 83, 85, 91
7.2	549-550	1- 37 odds, 47, 49
7.3	558-559	1, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 55, 57, 59, 61
7.4	566-567	1, 3, 7, 11, 15, 19, 21, 23, 25, 27, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 69, 71
7.5	577-578	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 63, 65, 67, 75, 77, 79, 83, 95, 97, 99
8.1	598-599	1, 5, 9, 13, 15, 19, 21, 23, 35, 39
8.2	605-606	1, 3, 7, 11, 13, 29, 31, 33, 35, 39
8.3	618-619	1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 23, 25, 29, 31, 33, 39, 41, 43, 45, 53, 55, 57, 59
8.4	629	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 25, 27, 29, 31
8.5	640-641	1, 3, 5, 7, 9, 11, 13, 17, 19, 23, 25, 31, 33, 35, 37, 39, 47, 49, 51, 53, 55, 57, 59, 71, 73, 75, 77, 79, 83, 87, 89, 91, 93, 95, 99, 101
11.4	843	5, 7, 9, 11, 12
11.5	850	1, 3, 5, 7, 15, 17, 19, 21, 23, 25, 35, 37