Trigonometry Math 112 Internet Class Fall 2019

I**nstructor:** Vikki Maurer

**Office:** LBCC Albany CampusWOH 119

**Office Phone:** 541-917-4370

**Email**: [**maurerv@linnbenton.edu**](mailto:vmaurer@proaxis.com) I prefer to be contacted through email.

## Course:

We will learn about trigonometric functions and their graphs, identities, inverse trigonometric functions, trigonometric equations, right triangle trigonometry, polar coordinates, vectors, and conic sections. Upon completion of the course, the student will be able to:

* Calculate the exact (when possible) and approximate value of the 6 trigonometric functions using both radian and degree measure.
* Solve for all of the side lengths and angles of a right or oblique triangle, using information given.
* Graph trigonometric functions (emphasizing sine, cosine and tangent), and conic sections, transform their graphs, and state important features of their graphs.
* Verify trigonometric identities and use them to solve trigonometric equations involving one or more trigonometric functions.
* Perform calculations involving vectors and solve vector applications.

##### Required for this class:

##### 11-week ALEKS 360 access code. This code will give you access to the ebook and the adaptive course software. Through our ALEKS class you have the option to order a loose leaf version of the textbook for an additional $25. However a paper version of the book is not required.

* Scientific Calculator. We use only scientific calculators for exams.
* Access to a graphing calculator, a graphing calculator app on your phone (for in-class use but not on exams) or Desmos (for computer or tablet use). There is no need to buy a graphing calculator.

**Requirements and Grades:**

5% ALEKS Whole Pie Percentage

20% ALEKS Weekly Topics and Exam Reviews

20% Written Work and Quizzes

40% Midterm Exams (2 Written Exams)

#### 15% Final Exam

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**All of your course grades will be kept in the ALEKS gradebook only.**

**Course Grades:**

LBCC does not offer plus/minus grading. This class will have final course grades assigned according to the standard 90%, 80%, 70%, 60% grade cutoffs.

You must earn at least a C grade in Math 112 in order to move on to higher math classes for which Math 112 is a prerequisite.

**Participation**: The biggest reason why students fail to complete a math class is due to poor participation. If you put off working on math during the week, and you wait until the deadline, you will find it very difficult to finish the work and get caught up. Plan to spend at least one hour every day working on trigonometry. You will most likely need two or three hours almost every day. If you are someone who finds it hard to get motivated to do work then this is not the class for you. It will take daily discipline to complete trigonometry online.

**Incomplete Grades:**

An incomplete grade may be issued for a student who is making satisfactory progress (Grade of C or better) in the course, but who has failed to complete the final exam. Any student seeking an incomplete must discuss this option with the instructor and sign an agreement prior to the time when grades are issued.

**ALEKS Adaptive Homework Platform and Ebook:**

You will complete the majority of your assigned work through an online and adaptive program called ALEKS. You are required to purchase the ALEKS 360 access code through the bookstore or through the ALEKS website. It is through ALEKS where you will have access to an ebook and any videos or tutorials the ebook provides. It is rich in support if you use it well. You will access ALEKS through the ALEKS website. I have provided instructions for both options below.

**Access ALEKS through the ALEKS website**

Go to www.ALEKS.com or click on the ALEKS link in Moodle and sign in or create a new user account. You need the course code and you can use the free two-week access code to get started. You will need to pay for the code before the free two-week code expires.

**ALEKS Class Code: HYFD9-KLH9H**

**Free two-week access code: E081E-84E68-93655-6AAAA**

**eBook:**

Through the ALEKS site you will have access to the eBook **College Algebra with Trigonometry** 1st Edition by Miller and Gerken. The eBook contains videos and is a valuable resource. If you really want a paper copy, you can order a paper version of the text through ALEKS but really if you have ANY trigonometry book then you can study topics from that book, so there is no need to buy this exact paper book. Your ALEKS 360 access code gives you access to the adaptive learning software using the Miller book when you need explanations. Email me if you have questions about this.

**Homework and ALEKS:**

There are 134 topics in ALEKS to master in this class. You may find that you already have some topics mastered when you get into our ALEKS course. Each week there are topics assigned and the weekly deadlines are always Sunday at midnight. New topics will be added each Monday. In Moodle you will have weekly videos and written assignments but you should be getting into ALEKS each day to work on topics. This is your main homework. If you master all the topics for a particular week then you will be able to work ahead or you can go back and master topics you may not have learned from a previous week. This ALEKS program is adaptive and customizes to each student so you each will have a unique experience. If you have weekend plans that do not include homework then it is up to you to complete the ALEKS topics before the weekend. You have the freedom to decide when during the week to complete the assigned topics. However if you wait until Sunday to start learning the weekly topics you will very likely run out of time. The best plan is to work hard early in the week so you have time to get help and then finish up any last topics on Friday.

**Missing ALEKS Deadlines:**

If you do not complete your ALEKS work by the due date then you will lose points no matter why you missed the deadline. There are ten weekly deadlines that you will see in your ALEKS gradebook. No deadlines will be extended for ALEKS topics. Your goal is to always finish all the topics for a week, however, if you still have a few left then you just will move on to the next week’s topics each Monday. ALEKS will present you with missed topics if they are critical to the week’s work but we always need you working in the current topics first. In any week where you learn all of the topics, ALEKS will then open up all weeks and you can go learn topics you missed from previous weeks.

**Written Work and Quizzes:**

As often as possible, and most likely one or two times each week, you will be assigned problems to write up and turn in through Moodle so it can be graded. You will either scan and upload your written work as a pdf or you will take a photo of your work and upload the photo. There may be a quiz in Moodle or in ALEKS during the week as well. These tasks will always be listed in Moodle so on Monday of each week it is important to check Moodle so you can plan your week.

**Midterm Exams Proctored at LBCC:**

There are two written midterm exams. You will take each exam in a proctored setting. If you are taking exams at LBCC then you will print a test ticket from Moodle and go to one of the testing centers. If you are not taking tests at LBCC then you must find another community college or library where exams are proctored. There is likely a fee for this service and any fees are your responsibility. It takes time to arrange for proctoring so you need to email me during the first week of class to let me know if you will be finding a proctor. **Exams must be taken by the deadline. At most one midterm exam can be taken after the deadline but will earn at most 80%.**

**Midterm Exam Review Objectives in ALEKS:**

Prior to each midterm exam you will see an Exam Review Topics objective open up in ALEKS. These are not new topics. These topics are the ones you should have already learned and the ones the test will concentrate on. They open up all together in one objective so you can focus on what you do not already know or review any topic conveniently.

**Final Exam:**

Your final exam is cumulative and will be taken during finals week. It must also be taken in a proctored setting. After week 10 you will see a Final Exam Review Topics objective open up in ALEKS. This contains all the topics that will be stressed on the final exam. These are topics you should have already learned in previous weeks. If you learned them all then you will have nothing new to complete but all the topics will be in that objective and available for review.

**Help**:

* Ask questions by sending your instructor email.
* Post a discussion question in Moodle or use the Moodle class to chat with others from the class. Study groups are strongly encouraged.
* Make an appointment to work with a FREE tutor in the Learning Center.
* Talk with an instructional assistant at the math desk in the Learning Center.

**Cheating**:

If you cheat on an exam, you will receive a zero grade on the exam, and I will file an incident report with the Dean of Students. A second episode of cheating will guarantee an F grade for the course and more severe disciplinary action from the school. Copying project work from another student is cheating also. In those cases, you will earn no credit for the assignment or project and I will file an incident report. If you are having so many problems that you feel the only way out is to cheat, then you need to come talk with me. I am here to help you succeed. There are ways to work things out for students who are willing to try.

**Anyone With Special Needs?** LBCC is committed to inclusiveness and equal access to higher education. If you have approved accommodations through the Center for Accessibility Resources (CFAR) and would like to use your accommodations in the class, please talk to your instructor as soon as possible to discuss your needs. If you believe you may need accommodations but are not yet registered with CFAR, please visit the [CFAR Website](http://www.linnbenton.edu/cfar) for steps on how to apply for services or call 541-917-4789.

**Nondiscrimination Statement:** LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, gender, gender identity, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws. For further information see Board Policy P1015 in our [Board Policies and Administrative Rules](http://linnbenton.edu/42145BA0-3DCC-11E3-AA36782BCB47BBE7). Title II, IX, & Section 504: Scott Rolen, CC-108, [541-917-4425](about:blank); Lynne Cox, T-107B, [541-917-4806](about:blank). To report: [linnbenton-advocate.symplicity.com/public report](http://linnbenton-advocate.symplicity.com/public_report).

**Weekly Schedule:** This course has a firm schedule. The exam deadlines will not change. This is not a “self-paced” course. If you do not stay on schedule it is extremely difficult to get caught up.

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| **Weeks** | **Topics (See Weekly Topic list for detailed information.)** |
| **Week 1**  Sept 30 – Oct 6 | **The ALEKS Initial Knowledge Check is Due by Tuesday, October 1 at midnight. Students who do not complete the initial knowledge check by the deadline will be dropped from the class. After this is completed then you can begin homework for the week.**  16 Topics: Section 5.1, 5.2, and 7.1 |
| Week 2  Oct 7 – Oct 13 | 18 Topics: Sections 5.3, 5.4 |
| Week 3  Oct 14 – Oct 20 | 15 Topics: Sections 5.5, 5.7 |
| **Week 4**  Oct 21– Oct 27 | Oct 21 and 22: 46 Exam 1 Review Topics  **EXAM 1: Deadline Wednesday, October 23**  Oct 23 - Oct 27: After the exam, 8 Topics: Sections 6.1, 6.2, 6.3 (double angle identities) |
| Week 5  Oct 28 – Nov 3 | 17 Topics: Sections 6.3 (half-angle identities), 6.5, 7.1 |
| Week 6  Nov 4 – Nov 10 | 14 Topics: Sections 7.2, 7.3, 8.1, 8.2 |
| **Week 7**  Nov 11 – Nov 17 | Nov 11 and 12: 39 Exam 2 Review Topics  **EXAM 2: Deadline Wednesday, November 13**  Nov 13 - Nov 17: After the exam, 8 Topics: Sections 8.4 Geometry of Vectors and Components |
| Week 8  Nov 18 – Nov 24 | 10 Topics: Section 8.4 |
| Week 9  Nov 25 – Dec 1 | 15 Topics: Section 2.2, 8.5, 11.1 |
| Week 10  Dec 2 – Dec 8 | 12 Topics: Sections 11.2, 11.3 |
| **Finals Week**  Dec 9 – Dec 11 | 73 Final Exam Review Topics  **Final Exam: Deadline Wednesday, Dec 11**  The final exam must be taken anytime the testing center is open from Monday, Dec 9 through Wednesday, Dec 11. |

**Topics by Week, Sections Listed for Ebook Reference:**

**Week 1 (16 Topics, due on 10/06/2019 11:59 PM)**

Course Readiness (2 Topics)

Area of a triangle

Circumference and area of a circle

Section 5.1 (7 Topics)

Converting degrees-minutes-seconds to decimal degrees

Converting between degree and radian measure: Problem type 1

Converting between degree and radian measure: Problem type 2

Sketching an angle in standard position

Coterminal angles

Arc length and central angle measure

Area of a sector of a circle

Section 5.2 (7 Topics)

Using a calculator to approximate sine, cosine, and tangent values

Using a calculator to approximate cosecant, secant, and cotangent values

Sine, cosine, and tangent ratios: Numbers for side lengths

Using the Pythagorean Theorem to find a trigonometric ratio

Finding trigonometric ratios given a right triangle

Using a trigonometric ratio to find a side length in a right triangle

Using trigonometry to find a length in a word problem with one right triangle

Section 7.1 (2 Topics)

Using a trigonometric ratio to find a side length in a right triangle

Using trigonometry to find a length in a word problem with one right triangle

**Week 2 (18 Topics, due on 10/13/2019 11:59 PM)**

Section R.6 (1 Topic)

Rationalizing a denominator: Quotient involving square roots

Section 5.2 (1 Topic)

Using cofunction identities

Section 5.3 (7 Topics)

Reference angles: Problem type 1

Reference angles: Problem type 2

Determining the location of a terminal point given the signs of trigonometric values

Finding values of trigonometric functions given information about an angle: Problem type 1, 2, 3 and 4

Section 5.4 (8 Topics)

Finding coordinates on the unit circle for special angles

Trigonometric functions and special angles: Problem type 1

Finding trigonometric ratios from a point on the unit circle

Trigonometric functions and special angles: Problem type 2

Trigonometric functions and special angles: Problem type 3

Evaluating expressions involving sine and cosine

Even and odd properties of trigonometric functions

Evaluating a sinusoidal function that models a real-world situation

Chapter 5 Supplementary Topics (1 Topic)

Special right triangles: Exact answers

**Week 3 (15 Topics, due on 10/20/2019 11:59 PM)**

Section 5.5 (10 Topics)

Sketching the graph of y= a sin(x) or y= a cos(x)

Sketching the graph of y= sin(bx) or y= cos(bx)

Sketching the graph of y= sin(x+c) or y= cos(x+c)

Sketching the graph of y= a sin(x+c) or y= a cos(x+c)

Sketching the graph of y= a sin(bx) or y= a cos(bx)

Sketching the graph of y= a sin(bx+c) or y= a cos(bx+c)

Amplitude and period of sine and cosine functions

Amplitude, period, and phase shift of sine and cosine functions

Writing the equation of a sine or cosine function given its graph: Problem type 1

Writing the equation of a sine or cosine function given its graph: Problem type 2

Section 5.7 (3 Topics)

Values of inverse trigonometric functions

Composition of a trigonometric function with its inverse trigonometric function: Problem type 1

Using a calculator to approximate inverse trigonometric values

Chapter 5 Supplementary Topics (2 Topics)

Understanding trigonometric ratios through similar right triangles

Relationship between the sines and cosines of complementary angles

**Week 4 (8 Topics, due on 10/27/2019 11:59 PM)**

Section 6.1 (4 Topics)

Simplifying trigonometric expressions

Verifying a trigonometric identity

Proving trigonometric identities: Problem type 1

Proving trigonometric identities: Problem type 2

Section 6.2 (2 Topics)

Sum and difference identities: Problem type 1

Sum and difference identities: Problem type 2

Section 6.3 (2 Topics)

Double-angle identities: Problem type 1

Double-angle identities: Problem type 2

**Week 5 (17 Topics, due on 11/03/2019 11:59 PM)**

Section R.6 (1 Topic)

Rationalizing a denominator: Square root of a fraction

Section 5.2 (2 Topics)

Using a trigonometric ratio to find a side length in a right triangle

Using trigonometry to find a length in a word problem with one right triangle

Section 6.3 (2 Topics)

Half-angle identities: Problem type 1

Half-angle identities: Problem type 2

Section 6.5 (8 Topics)

Finding solutions in an interval for a basic equation involving sine or cosine

Solving a basic trigonometric equation using a calculator

Solving a basic trigonometric equation involving sine or cosine

Finding solutions in an interval for a trigonometric equation in factored form

Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 1

Finding solutions in an interval for a trigonometric equation with a squared function: Problem type 2

Finding solutions in an interval for a trigonometric equation using Pythagorean identities: Problem type 1

Finding solutions in an interval for an equation with sine and cosine using double-angle identities

Section 7.1 (6 Topics)

Using a trigonometric ratio to find a side length in a right triangle

Using trigonometry to find a length in a word problem with one right triangle

Using a trigonometric ratio to find an angle measure in a right triangle

Using trigonometry to find angles of elevation or depression in a word problem

Solving a right triangle

Using trigonometry to find a length in a word problem with two right triangles

**Week 6 (14 Topics, due on 11/10/2019 11:59 PM)**

Section 7.2 (3 Topics)

Solving a triangle with the law of sines: Problem type 1

Solving a triangle with the law of sines: Problem type 2

Solving a word problem using the law of sines

Section 7.3 (2 Topics)

Solving a triangle with the law of cosines

Solving a word problem using the law of cosines

Section 8.1 (6 Topics)

Plotting points in polar coordinates

Multiple representations of polar coordinates

Converting rectangular coordinates to polar coordinates: Special angles

Converting polar coordinates to rectangular coordinates

Converting an equation written in rectangular form to one written in polar form

Converting an equation written in polar form to one written in rectangular form: Problem type 1

Section 8.2 (3 Topics)

Graphing a polar equation: Basic

Graphing a polar equation: Circle

Matching polar equations with their graphs

**Week 7 (8 Topics, due on 11/17/2019 11:59 PM)**

Section 8.4 (8 Topics)

Magnitude of a vector given in component form

Vector addition and scalar multiplication: Component form

Linear combination of vectors: Component form

Multiplication of a vector by a scalar: Geometric approach

Vector addition: Geometric approach

Vector subtraction: Geometric approach

Finding the magnitude and direction of a vector given its graph

Finding the components of a vector given its graph

**Week 8 (10 Topics, due on 11/24/2019 11:59 PM)**

Section 8.4 (9 Topics)

Writing a position vector in ai+bj form given its graph

Magnitude of a vector given in ai+bj form

Vector addition and scalar multiplication: ai+bj form

Linear combination of vectors: ai+bj form

Unit vectors

Finding the direction angle of a vector given in ai+bj form

Writing a vector given its magnitude and direction angle

Writing a vector to represent a force pushing or pulling an object

Finding magnitudes of forces related to a sum of three vectors

Chapter 8 Supplementary Topics (1 Topic)

Finding the magnitude and direction angle of the resultant force of two vectors

**Week 9 (14 Topics, due on 12/01/2019 11:59 PM)**

Section 2.2 (3 Topics)

Identifying the center and radius to graph a circle given its equation in standard form

Writing the equation of a circle centered at the origin given its radius or a point on the circle

Writing an equation of a circle given the endpoints of a diameter

Section 8.5 (5 Topics)

Dot product of vectors given in ai+bj form

Dot product of vectors given in component form

Finding the angle between two vectors given in component form

Classifying vector relationships by finding the angle between two vectors given in ai + bj form

Finding the amount of work done given a force vector and a distance

Chapter 8 Supplementary Topics (1 Topic)

Using the dot product to find perpendicular vectors

Section 11.1 (5 Topics)

Graphing an ellipse given its equation in standard form

Finding the center, vertices, and foci of an ellipse

Writing an equation of an ellipse given the center, an endpoint of an axis, and the length of the other axis

Writing an equation of an ellipse given the foci and the major axis length

Word problem involving an ellipse

**Week 10 (12 Topics, due on 12/08/2019 11:59 PM)**

Section 11.2 (5 Topics)

Graphing a hyperbola given its equation in standard form

Graphing a hyperbola centered at the origin: Ax2 + By2 = C

Finding the center, vertices, foci, and asymptotes of a hyperbola

Writing an equation of a hyperbola given the foci and the vertices

Writing an equation of a hyperbola given the foci and the asymptotes: Basic

Section 11.3 (7 Topics)

Graphing a parabola of the form y2 = ax or x2 = ay

Graphing a parabola of the form x=a(y-k)2+h or y=a(x-h)2+k

Writing an equation of a parabola given the vertex and the focus

Writing an equation of a parabola given the focus and the directrix

Finding the vertex, focus, directrix, and axis of symmetry of a parabola

Writing an equation of a parabola given its graph

Word problem involving a parabola