

ALEKS[®] Course Syllabus

Course Name: Math 112 Credit Exam – LA Tech University	Course Code:
ALEKS Course: Trigonometry	Instructor:
Course Dates:	Course Content: 159 topics

Algebra and Geometry Review (61 topics, no due date)

Properties and Signed Numbers (10 topics)

- Ordering integers
- Operations with absolute value
- Exponents and integers: Problem type 1
- Exponents and integers: Problem type 2
- Evaluating a linear expression in two variables
- Evaluating a quadratic expression in one variable
- Signed fraction addition: Basic
- Signed fraction multiplication: Advanced
- Complex fractions without variables: Problem type 2
- Plotting a point in the coordinate plane

Linear Equations and Applications (8 topics)

- Simple absolute value equation
- Solving an equation involving absolute value: Basic
- Solving an equation involving absolute value: Advanced
- Algebraic symbol manipulation: Problem type 1
- Algebraic symbol manipulation: Problem type 2
- Solving a decimal word problem using a linear equation with the variable on both sides
- Solving a fraction word problem using a linear equation with the variable on both sides
- Solving a word problem involving a sum and another simple relationship using a system of linear equations

Linear Inequalities and Applications (3 topics)

- Solving a linear inequality: Problem type 4
- Solving an inequality involving absolute value: Basic
- Solving an inequality involving absolute value

Polynomial Expressions and Factoring (10 topics)

- Combining like terms: Advanced
- Simplifying a sum or difference of two univariate polynomials
- Multiplying a monomial and a polynomial: Univariate with positive leading coefficients
- Multiplying binomials with leading coefficients of 1
- Squaring a binomial: Univariate
- Multiplying conjugate binomials: Univariate
- Factoring out a monomial from a polynomial: Univariate
- Factoring a product of a quadratic trinomial and a monomial
- Factoring a polynomial by grouping: Problem type 1
- Factoring a polynomial by grouping: Problem type 2

Rational Expressions (5 topics)

- Adding rational expressions with common denominators
- Multiplying rational expressions: Problem type 1
- Multiplying rational expressions: Problem type 2

- Complex fraction: Problem type 3
- Solving a rational equation that simplifies to a linear equation: Problem type 4

Integer Exponents (10 topics)

- Evaluating expressions with exponents of zero
- Evaluating numbers with negative exponents
- Product rule with negative exponents
- Quotient rule with negative exponents: Problem type 1
- Introduction to the power rule of exponents
- Power rule with negative exponents: Problem type 1
- Power rule with negative exponents: Problem type 2
- Using the power and product rules to simplify expressions with positive exponents
- Converting between decimal numbers and numbers written in scientific notation
- Multiplying and dividing numbers written in scientific notation

Radicals and Rational Exponents (13 topics)

- Cube root of an integer
- Square root simplification
- Square root of a perfect square monomial
- Simplifying a radical expression: Problem type 2
- Square root addition
- Simplifying a sum of radical expressions
- Square root multiplication
- Simplifying a product of radical expressions
- Rationalizing the denominator of a radical expression using conjugates Solving
- a radical equation that simplifies to a linear equation: One radical Solving a
- radical equation that simplifies to a quadratic equation: One radical Solving a
- radical equation that simplifies to a quadratic equation: Two radicals Rational
- exponents: Negative exponents and fractional bases

Geometry (2 topics)

- Pythagorean Theorem
- Circumference and area of a circle

Functions and Graphs (17 topics, no due date)

Sets, Relations, and Functions (4 topics)

- Identifying functions from relations
- Evaluating functions: Problem type 1
- Evaluating functions: Problem type 2
- Variable expressions as inputs of functions

Linear Functions and Graphs (4 topics)

- Finding x- and y-intercepts of a line given the equation: Advanced
- Finding slope given the graph of a line on a grid
- Writing an equation of a line given the y-intercept and another point
- Slopes of parallel and perpendicular lines: Problem type 1

Graphs and Transformations (7 topics)

- Finding intercepts and zeros of a function given the graph
- Finding where a function is increasing, decreasing, or constant given the graph
- Domain and range from the graph of a continuous function
- Translating the graph of a function: One step
- Translating the graph of a function: Two steps
- Graphing a simple cubic function
- Graphing an equation involving absolute value in the plane: Advanced

Combining Functions, Composite Functions, and Inverse Functions (2 topics)

- Quotient of two functions
- Horizontal line test

Quadratic Functions (10 topics, no due date)

Quadratic Equations (4 topics)

- Solving a quadratic equation needing simplification
- Solving a quadratic equation using the square root property: Problem type 1
- Solving a word problem using a quadratic equation with rational roots
- Solving a word problem using a quadratic equation with irrational roots

Graphing Quadratic Functions (2 topics)

- Finding the x-intercept(s) and the vertex of a parabola
- Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients

Complex Numbers (3 topics)

- Using i to rewrite square roots of negative numbers
- Dividing complex numbers
- Solving a quadratic equation with complex roots

Graphs of Polynomial Functions (1 topic)

- Using a graphing calculator to find zeros of a polynomial function

Unit Circle and Right Triangle Trigonometry (24 topics, no due date)

Angles (7 topics)

- Converting degrees-minutes-seconds to decimal degrees
- Converting a decimal degree to degrees-minutes-seconds
- Converting between degree and radian measure: Problem type 1
- Converting between degree and radian measure: Problem type 2
- Coterminal angles
- Sketching an angle in standard position
- Reference angles: Problem type 1

Unit Circle Trigonometry (2 topics)

- Finding coordinates on the unit circle for special angles
- Finding trigonometric ratios from a point on the unit circle

Right Triangle Trigonometry (8 topics)

- Special right triangles
- Sine, cosine, and tangent ratios
- Finding trigonometric ratios given a right triangle
- Using a trigonometric ratio to find a side length in a right triangle
- Using trigonometry to find distances
- Using a trigonometric ratio to find an angle measure in a right triangle
- Using trigonometry to find angles of elevation or depression
- Solving a right triangle

Trigonometric Values (7 topics)

- Determining the location of a terminal point given the signs of trigonometric values
- Trigonometric functions and special angles: Problem type 1
- Trigonometric functions and special angles: Problem type 2
- Trigonometric functions and special angles: Problem type 3
- Finding values of trigonometric functions given information about an angle: Problem type 1
- Finding values of trigonometric functions given information about an angle: Problem type 2
- Finding values of trigonometric functions given information about an angle: Problem type 3

Trigonometric Graphs and Inverse Functions (10 topics, no due date)

Properties and Applications (1 topic)

- Amplitude and period of sine and cosine functions

Graphing Sine and Cosine Functions (3 topics)

- Sketching the graph of a sine or cosine function: Problem type 1
- Sketching the graph of a sine or cosine function: Problem type 2
- Sketching the graph of a sine or cosine function: Problem type 3

Graphing Tangent, Cotangent, Secant, and Cosecant Functions (2 topics)

- Sketching the graph of a tangent or cotangent function: Problem type 2
- Matching graphs and equations for secant, cosecant, tangent, and cotangent functions

Inverse Trigonometric Functions (4 topics)

- Values of inverse trigonometric functions
- Composition of a trigonometric function and an inverse trigonometric function: Problem type 1
- Composition of a trigonometric function and an inverse trigonometric function: Problem type 2
- Composition of a trigonometric function and an inverse trigonometric function: Problem type 3

Trigonometric Identities and Equations (16 topics, no due date)

Trigonometric Identities (4 topics)

- Simplifying trigonometric expressions
- Using cofunction identities
- Sum and difference identities: Problem type 1
- Double-angle identities: Problem type 1

Solving Equations in an Interval (7 topics)

- Finding solutions in an interval for a basic equation involving sine or cosine
- Finding solutions in an interval for a basic tangent, cotangent, secant, or cosecant equation
- 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
- Using a graphing calculator to solve a trigonometric equation

General Solutions of Equations (5 topics)

- Solving a basic trigonometric equation involving sine or cosine
- Solving a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
- Solving a trigonometric equation involving a squared function: Problem type 1
- Solving a trigonometric equation involving more than one function
- Solving a trigonometric equation involving an angle multiplied by a constant

Applications of Trigonometry (2 topics, no due date)

Laws of Sines and Cosines (1 topic)

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

Vectors (1 topic)

- Vector addition and scalar multiplication

Conic Sections (7 topics, no due date)

Parabolas (1 topic)

- Graphing a parabola with a horizontal or a vertical axis

Circles (6 topics)

- Midpoint of a line segment in the plane
- Distance between two points in the plane
- Graphing a circle given its equation in standard form
- Graphing a circle given its equation in general form
- Writing an equation of a circle given its center and a point on the circle

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

Exponential and Logarithmic Functions (12 topics, no due date)

Properties of Logarithms (3 topics)

- Converting between logarithmic and exponential equations
- Evaluating a logarithmic expression
- Basic properties of logarithms

Logarithmic and Exponential Equations (3 topics)

- Solving a logarithmic equation: Problem type 1
- Solving an exponential equation: Problem type 1
- Solving an exponential equation: Problem type 2

Applications (2 topics)

- Solving a word problem using an exponential equation: Problem type 1
- Solving a word problem using an exponential equation: Problem type 2

Graphing Logarithmic and Exponential Functions (4 topics)

- Sketching the graph of an exponential function: Basic
- Sketching the graph of an exponential function: Advanced
- Sketching the graph of a logarithmic function
- Translating the graph of a logarithmic or exponential function