

ALEKS[®] Course Syllabus

Course Name: MATH 1204 Fall 2015	Course Code: N/A
ALEKS Course: College Algebra	Instructor: Master Templates
Course Dates: Begin: 08/22/2015 End: 12/19/2015	Course Content: 271 Topics (261 goal + 10 prerequisite)
Textbook: Miller/Gerken: College Algebra, 1st Ed. (McGraw-Hill) - ALEKS 360	

Dates	Objective
	Prerequisite Topics (10 topics)
08/22/2015 - 08/30/2015	1. The Basics (19 topics)
08/31/2015 - 09/06/2015	2. Functions (27 topics)
09/07/2015 - 09/13/2015	3. Absolute Value Functions (12 topics)
09/14/2015 - 09/16/2015	4. Linear Functions (41 topics)
09/17/2015 - 09/27/2015	5. Quadratic Functions (35 topics)
09/28/2015 - 10/04/2015	6. Transformations (17 topics)
10/05/2015 - 10/11/2015	7. Polynomial Functions (15 topics)
10/12/2015 - 10/25/2015	8. Rational Functions (11 topics)
10/26/2015 - 10/28/2015	9. Function Operations (12 topics)
10/29/2015 - 11/08/2015	10. Exponential Functions (16 topics)
11/09/2015 - 11/18/2015	11. Logarithmic Functions (28 topics)
11/19/2015 - 11/29/2015	12. Systems of Equations (30 topics)

Prerequisite Topics (10 topics)

- Exponents and integers: Problem type 1
- Rewriting an algebraic expression without a negative exponent
- Factoring a quadratic with leading coefficient 1
- Factoring out a constant before factoring a quadratic
- Factoring a quadratic with leading coefficient greater than 1: Problem type 1
- Factoring a quadratic with a negative leading coefficient
- Factoring a difference of squares in one variable: Basic
- Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution
- Solving a word problem with three unknowns using a linear equation
- Graphing a circle given its equation in standard form

The Basics (19 topics, due on 08/30/2015)

- Order of operations with integers
- Translating a sentence into a one-step equation
- Translating a sentence into a multi-step equation
- Translating a sentence into a one-step inequality
- Translating a sentence into a multi-step inequality
- Writing an inequality for a real-world situation
- Graphing a linear inequality on the number line

- Writing an inequality given a graph on the number line
- Graphing a compound inequality on the number line
- Writing a compound inequality given a graph on the number line
- Set builder notation
- Set builder and interval notation
- Introduction to solving a radical equation
- Algebraic symbol manipulation with radicals
- Reading a point in the coordinate plane
- Plotting a point in the coordinate plane
- Table for a linear equation
- Identifying solutions to a linear equation in two variables
- Finding a solution to a linear equation in two variables

Functions (27 topics, due on 09/06/2015)

- Finding x- and y-intercepts given the graph of a line on a grid
- Finding x- and y-intercepts of a line given the equation: Basic
- Finding intercepts of a nonlinear function given its graph
- Identifying functions from relations
- Vertical line test
- Table for a linear function
- Evaluating a rational function: Problem type 1
- Evaluating a rational function: Problem type 2
- Table for a square root function
- Evaluating functions: Absolute value, rational, radical
- Evaluating a piecewise-defined function
- Variable expressions as inputs of functions: Problem type 1
- Domain and range from ordered pairs
- Domain of a square root function: Basic
- Domain of a square root function: Advanced
- Determining whether an equation defines a function: Basic
- Finding outputs of a one-step function that models a real-world situation: Function notation
- Finding outputs of a two-step function with decimals that models a real-world situation: Function notation
- Finding inputs and outputs of a two-step function that models a real-world situation: Function notation
- Domain and range of a linear function that models a real-world situation
- Finding an output of a function from its graph
- Finding inputs and outputs of a function from its graph
- Domain and range from the graph of a discrete relation
- Finding where a function is increasing, decreasing, or constant given the graph
- Choosing a graph to fit a narrative: Basic
- Choosing a graph to fit a narrative: Advanced
- Graphing an integer function and finding its range for a given domain

Absolute Value Functions (12 topics, due on 09/13/2015)

- Introduction to solving an absolute value equation
- Solving an absolute value equation: Problem type 1
- Solving an absolute value equation: Problem type 2
- Solving an absolute value equation: Problem type 3
- Solving an absolute value equation: Problem type 4
- Solving an absolute value equation of the form $|ax+b| = |cx+d|$
- Solving an absolute value inequality: Problem type 1
- Writing an absolute value inequality given a graph on the number line
- Solving an absolute value inequality: Problem type 2
- Solving an absolute value inequality: Problem type 3
- Solving an absolute value inequality: Problem type 4
- Solving an absolute value inequality: Problem type 5

Linear Functions (41 topics, due on 09/16/2015)

- Graphing a linear equation of the form $y = mx$
- Graphing a line given its equation in slope-intercept form: Integer slope
- Graphing a line given its equation in slope-intercept form: Fractional slope
- Graphing a line given its equation in standard form
- Graphing a vertical or horizontal line
- Finding x- and y-intercepts given the graph of a line on a grid
- Graphing a line by first finding its x- and y-intercepts
- Classifying slopes given graphs of lines
- Finding slope given the graph of a line on a grid

- Finding slope given two points on the line
- Finding the slope of horizontal and vertical lines
- Finding the coordinate that yields a given slope
- Graphing a line given its slope and y-intercept
- Graphing a line through a given point with a given slope
- Identifying linear functions given ordered pairs
- Rewriting a linear equation in the form $Ax + By = C$
- Finding the slope and y-intercept of a line given its equation in the form $y = mx + b$
- Finding the slope and y-intercept of a line given its equation in the form $Ax + By = C$
- Graphing a line by first finding its slope and y-intercept
- Writing an equation of a line given its slope and y-intercept
- Writing an equation in slope-intercept form given the slope and a point
- Writing an equation in point-slope form given the slope and a point
- Writing an equation of a line given the y-intercept and another point
- Writing the equation of the line through two given points
- Writing the equations of vertical and horizontal lines through a given point
- Finding slopes of lines parallel and perpendicular to a line given in slope-intercept form
- Finding slopes of lines parallel and perpendicular to a line given in the form $Ax + By = C$
- Identifying parallel and perpendicular lines from equations
- Writing equations of lines parallel and perpendicular to a given line through a point
- Writing and evaluating a function that models a real-world situation: Advanced
- Writing an equation and drawing its graph to model a real-world situation: Advanced
- Interpreting the parameters of a linear function that models a real-world situation
- Solving a linear equation by graphing
- Graphing a function of the form $f(x) = ax + b$: Integer slope
- Graphing a function of the form $f(x) = ax + b$: Fractional slope
- Finding the average rate of change of a function
- Finding the average rate of change of a function given its graph
- Identifying solutions to a linear inequality in two variables
- Graphing a linear inequality in the plane: Vertical or horizontal line
- Graphing a linear inequality in the plane: Slope-intercept form
- Graphing a linear inequality in the plane: Standard form

Quadratic Functions (35 topics, due on 09/27/2015)

- Solving an equation written in factored form
- Finding the roots of a quadratic equation of the form $ax^2 + bx = 0$
- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1
- Solving a quadratic equation needing simplification
- Solving a word problem using a quadratic equation with rational roots
- Using the Pythagorean Theorem and a quadratic equation to find side lengths of a right triangle
- Solving an equation of the form $x^2 = a$ using the square root property
- Solving a quadratic equation using the square root property: Exact answers, basic
- Solving a quadratic equation using the square root property: Exact answers, advanced
- Applying the quadratic formula: Exact answers
- Applying the quadratic formula: Decimal answers
- Solving a word problem using a quadratic equation with irrational roots
- Graphing a parabola of the form $y = ax^2$
- Graphing a parabola of the form $y = ax^2 + c$
- Graphing a function of the form $f(x) = ax^2$
- Graphing a function of the form $f(x) = ax^2 + c$
- Graphing a parabola of the form $y = (x-h)^2 + k$
- Finding the vertex, x-intercepts, and axis of symmetry from the graph of a parabola
- Graphing a parabola of the form $y = x^2 + bx + c$
- Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients
- Graphing a parabola of the form $y = ax^2 + bx + c$: Rational coefficients
- Finding the x-intercept(s) and the vertex of a parabola
- Using a graphing calculator to find the x-intercept(s) and vertex of a quadratic function
- Finding the maximum or minimum of a quadratic function
- Word problem involving the maximum or minimum of a quadratic function
- Domain and range from the graph of a parabola
- Range of a quadratic function
- Writing the equation of a quadratic function given its graph
- Solving a quadratic equation by graphing
- Comparing properties of quadratic functions given in different forms
- Solving a quadratic inequality written in factored form
- Solving a quadratic inequality

- Graphing a quadratic inequality: Problem type 1
- Graphing a quadratic inequality: Problem type 2

Transformations (17 topics, due on 10/04/2015)

- Graphing an absolute value equation of the form $y = A|x|$
- Determining whether an equation defines a function: Advanced
- Domain and range from the graph of a continuous function
- Graphing an absolute value equation in the plane: Basic
- Graphing an absolute value equation in the plane: Advanced
- Translating the graph of a parabola: One step
- How the leading coefficient affects the shape of a parabola
- Translating the graph of an absolute value function: One step
- Translating the graph of an absolute value function: Two steps
- How the leading coefficient affects the graph of an absolute value function
- Writing an equation for a function after a vertical translation
- Translating the graph of a function: One step
- Translating the graph of a function: Two steps
- Transforming the graph of a function by reflecting over an axis
- Transforming the graph of a function by shrinking or stretching
- Transforming the graph of a function using more than one transformation
- Writing an equation for a function after a vertical and horizontal translation

Polynomial Functions (15 topics, due on 10/11/2015)

- Degree and leading coefficient of a univariate polynomial
- Roots of a product of polynomials
- Graphing a cubic function of the form $y = ax^3$
- Finding local maxima and minima of a function given the graph
- Classifying the graph of a function
- Finding zeros of a polynomial function written in factored form
- Finding a polynomial of a given degree with given zeros: Real zeros
- Finding x- and y-intercepts given a polynomial function
- Determining the end behavior of the graph of a polynomial function
- Matching graphs with polynomial functions
- Inferring properties of a polynomial function from its graph
- Using a graphing calculator to find local extrema of a polynomial function
- Using a graphing calculator to solve a word problem involving a local extremum of a polynomial function
- Using a graphing calculator to find zeros of a polynomial function
- Using a graphing calculator to solve a word problem involving a polynomial of degree 3

Rational Functions (11 topics, due on 10/25/2015)

- Restriction on a variable in a denominator: Linear
- Restriction on a variable in a denominator: Quadratic
- Domain of a rational function: Excluded values
- Finding the asymptotes of a rational function: Constant over linear
- Finding the asymptotes of a rational function: Linear over linear
- Finding horizontal and vertical asymptotes of a rational function: Quadratic numerator or denominator
- Graphing a rational function: Constant over linear
- Graphing a rational function: Linear over linear
- Matching graphs with rational functions: Two vertical asymptotes
- Writing the equation of a rational function given its graph
- Solving a rational inequality: Problem type 1

Function Operations (12 topics, due on 10/28/2015)

- Combining functions to write a new function that models a real-world situation
- Sum, difference, and product of two functions
- Quotient of two functions: Basic
- Combining functions: Advanced
- Composition of two functions: Basic
- Expressing a function as a composition of two functions
- Composition of two functions: Advanced
- Horizontal line test
- Determining whether two functions are inverses of each other
- Inverse functions: Problem type 1
- Inverse functions: Problem type 2

- Inverse functions: Problem type 3

Exponential Functions (16 topics, due on 11/08/2015)

- Table for an exponential function
- Graphing an exponential function: $f(x) = a^x$
- Graphing an exponential function: $f(x) = a(b)^x$
- Graphing an exponential function and its asymptote: $f(x) = a(b)^x$
- Translating the graph of an exponential function
- The graph, domain, and range of an exponential function
- Graphing an exponential function and its asymptote: $f(x) = a(e)^{x-b} + c$
- Evaluating an exponential function that models a real-world situation
- Evaluating an exponential function with base e that models a real-world situation
- Introduction to compound interest
- Finding a final amount in a word problem on exponential growth or decay
- Finding the final amount in a word problem on compound interest
- Finding the initial amount and rate of change given an exponential function
- Writing an equation that models exponential growth or decay
- Writing an exponential function rule given a table of ordered pairs
- Comparing linear, polynomial, and exponential functions

Logarithmic Functions (28 topics, due on 11/18/2015)

- Converting between logarithmic and exponential equations
- Converting between natural logarithmic and exponential equations
- Evaluating a logarithmic expression
- Solving an equation of the form $\log_b a = c$
- Translating the graph of a logarithmic function
- Graphing a logarithmic function: Basic
- The graph, domain, and range of a logarithmic function
- Domain of a logarithmic function: Advanced
- Graphing a logarithmic function: Advanced
- Basic properties of logarithms
- Expanding a logarithmic expression: Problem type 1
- Expanding a logarithmic expression: Problem type 2
- Writing an expression as a single logarithm
- Change of base for logarithms: Problem type 1
- Change of base for logarithms: Problem type 2
- Solving a multi-step equation involving a single logarithm
- Solving a multi-step equation involving natural logarithms
- Solving an equation involving logarithms on both sides: Problem type 1
- Solving an equation involving logarithms on both sides: Problem type 2
- Solving an exponential equation by finding common bases: Linear exponents
- Solving an exponential equation by finding common bases: Linear and quadratic exponents
- Solving an exponential equation by using logarithms: Decimal answers, basic
- Solving an exponential equation by using natural logarithms: Decimal answers
- Solving an exponential equation by using logarithms: Exact answers in logarithmic form
- Solving an exponential equation by using substitution and quadratic factoring
- Finding the time to reach a limit in a word problem on exponential growth or decay
- Finding the initial or final amount in a word problem on exponential growth or decay
- Finding the rate or time in a word problem on continuous exponential growth or decay

Systems of Equations (30 topics, due on 11/29/2015)

- Solving a quadratic equation needing simplification
- Identifying solutions to a system of linear equations
- Classifying systems of linear equations from graphs
- Graphically solving a system of linear equations
- Solving a system of linear equations using substitution
- Solving a system of linear equations using elimination with addition
- Solving a system of linear equations using elimination with multiplication and addition
- Solving a system of linear equations with fractional coefficients
- Solving a system of linear equations with decimal coefficients
- Solving a 2x2 system of linear equations that is inconsistent or consistent dependent
- Creating an inconsistent system of linear equations
- Identifying the operations used to create equivalent systems of equations
- Consistency and independence of a system of linear equations
- Solving a 3x3 system of linear equations: Problem type 1

- Interpreting the graphs of two functions
- Solving a word problem involving a sum and another basic relationship using a system of linear equations
- Solving a word problem using a system of linear equations of the form $Ax + By = C$
- Solving a word problem using a system of linear equations of the form $y = mx + b$
- Solving a value mixture problem using a system of linear equations
- Solving a percent mixture problem using a system of linear equations
- Solving a word problem using a 3x3 system of linear equations: Problem type 1
- Graphically solving a system of linear and quadratic equations
- Using a graphing calculator to solve a system of equations
- Using a graphing calculator to solve an exponential or logarithmic equation
- Solving a system of linear and quadratic equations
- Solving a system of nonlinear equations
- Graphing a system of two linear inequalities: Basic
- Graphing a system of two linear inequalities: Advanced
- Graphing a system of three linear inequalities
- Graphing a system of nonlinear inequalities: Problem type 1