## Course Syllabus

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<th>Course Name:</th>
<th>MAT130: Elementary Functions - FA17</th>
<th>Course Code:</th>
<th>KFU44-HG6VA</th>
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<td>Instructor:</td>
<td>130</td>
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<td>Course Content:</td>
<td>607 Topics (606 goal + 1 prerequisite) / 324 accessible topics</td>
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<tr>
<td>Textbook:</td>
<td>Coburn: Algebra and Trigonometry, 2nd Ed. (McGraw-Hill)</td>
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### Dates and Objective

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### Prerequisite Topics (1 topic)

- Multiplication involving binomials and trinomials in one variable

### Ch.R-A Review of Basic Concepts and Skills (184 topics, due on 09/14/2017)

#### Section R.1 (17 topics)

- Fractional position on a number line
- Plotting rational numbers on a number line
- Ordering real numbers
- Identifying numbers as integers or non-integers
- Identifying numbers as rational or irrational
- Signed fraction addition or subtraction: Basic
- Signed fraction subtraction involving double negation
- Signed fraction multiplication: Basic
- Signed fraction division
- Exponents and integers: Problem type 1
- Exponents and integers: Problem type 2
- Exponents and signed fractions
- Order of operations with integers
- Order of operations with integers and exponents
- Square root of a rational perfect square
- Cube root of an integer
- Writing an inequality for a real-world situation

#### Section R.2 (6 topics)
Section R.3  (34 topics)

- Product rule with positive exponents: Univariate
- Product rule with positive exponents: Multivariate
- Introduction to the power of a product rule of exponents
- Power rules with positive exponents: Multivariate products
- Power rules with positive exponents: Multivariate quotients
- Power and product rules with positive exponents
- Simplifying a ratio of multivariate monomials: Basic
- Simplifying a ratio of univariate monomials
- Simplifying a ratio of multivariate monomials: Advanced
- Power and quotient rules with positive exponents
- Evaluating expressions with exponents of zero
- Evaluating an expression with a negative exponent: Whole number base
- Evaluating an expression with a negative exponent: Positive fraction base
- Evaluating an expression with a negative exponent: Negative integer base
- Rewriting an algebraic expression without a negative exponent
- Introduction to the product rule with negative exponents
- Quotient rule with negative exponents: Problem type 1
- Quotient rule with negative exponents: Problem type 2
- Power of a power rule with negative exponents
- Power rules with negative exponents
- Power and quotient rules with negative exponents: Problem type 1
- Converting between scientific notation and standard form in a real-world situation
- Degree and leading coefficient of a univariate polynomial
- Simplifying a sum or difference of two univariate polynomials
- Multiplying a univariate polynomial by a monomial with a positive coefficient
- Multiplying a univariate polynomial by a monomial with a negative coefficient
- Multiplying a multivariate polynomial by a monomial
- Multiplying binomials with leading coefficients of 1
- Multiplying binomials with leading coefficients greater than 1
- Multiplying binomials in two variables
- Multiplying conjugate binomials: Multivariate
- Squaring a binomial: Multivariate
- Multiplying binomials with negative coefficients
- Multiplication involving binomials and trinomials in two variables

Section R.4  (17 topics)

- Greatest common factor of 2 numbers
- Greatest common factor of two multivariate monomials
- Factoring out a monomial from a polynomial: Multivariate
- Factoring out a binomial from a polynomial: GCF factoring, basic
- Factoring a univariate polynomial by grouping: Problem type 1
- Factoring a univariate polynomial by grouping: Problem type 2
- 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 leading coefficient greater than 1: Problem type 2
- Factoring a quadratic with a negative leading coefficient
- Factoring a perfect square trinomial with leading coefficient 1
- Factoring a perfect square trinomial with leading coefficient greater than 1
- Factoring a difference of squares in one variable: Basic
- Factoring a difference of squares in one variable: Advanced
- Factoring a product of a quadratic trinomial and a monomial
- Factoring a sum or difference of two cubes

Section R.5  (35 topics)

- Complex fraction with negative exponents: Problem type 1
- Adding rational expressions with denominators ax-b and b-ax
- Simplifying a ratio of factored polynomials: Linear factors
- Simplifying a ratio of polynomials using GCF factoring
Section R.6 (53 topics*)

- Simplifying a product of radical expressions: Multivariate, fractional expressions
- Simplifying products or quotients of higher radicals with different indices: Univariate
- Square roots of perfect squares with signs
- Square roots of integers raised to even exponents
- Introduction to simplifying a radical expression with an even exponent
- Square root of a perfect square monomial
- Introduction to solving an absolute value equation
- Cube root of an integer
- Finding $n^{th}$ roots of perfect $n^{th}$ powers with signs
- Finding the $n^{th}$ root of a perfect $n^{th}$ power fraction
- Finding the $n^{th}$ root of a perfect $n^{th}$ power monomial
- Using absolute value to simplify higher radical expressions
- Converting between radical form and exponent form
- Rational exponents: Unit fraction exponents and whole number bases
- Rational exponents: Unit fraction exponents and bases involving signs
- Rational exponents: Non-unit fraction exponent with a whole number base
- Rational exponents: Negative exponents and fractional bases
- Rational exponents: Power of a power rule
- Rational exponents: Powers of powers with negative exponents
- Simplifying the square root of a whole number less than 100
- Simplifying the square root of a whole number greater than 100
- Simplifying a radical expression with an even exponent
- Introduction to simplifying a radical expression with an odd exponent
- Simplifying a radical expression with two variables
- Simplifying a higher root of a whole number
- Introduction to simplifying a higher radical expression
- Simplifying a higher radical expression: Multivariate
- Introduction to square root addition or subtraction
- Square root addition or subtraction
- Introduction to simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of radical expressions: Univariate
- Simplifying a sum or difference of higher roots
- Introduction to square root multiplication
- Square root multiplication: Basic
- Square root multiplication: Advanced
- Introduction to simplifying a product of radical expressions: Univariate
• Simplifying a product of radical expressions: Multivariate
• Simplifying a product of higher radical expressions
• Introduction to simplifying a product involving square roots using the distributive property
• Simplifying a product involving square roots using the distributive property: Advanced
• Special products of radical expressions: Conjugates and squaring
• Simplifying a quotient of square roots
• Simplifying a quotient involving a sum or difference with a square root
• Rationalizing a denominator: Quotient involving square roots
• Rationalizing a denominator: Square root of a fraction
• Rationalizing a denominator: Quotient involving a monomial
• Rationalizing a denominator using conjugates: Integer numerator
• Rationalizing a denominator using conjugates: Square root in numerator
• Rationalizing a denominator: Quotient involving a higher radical
• Introduction to the Pythagorean Theorem
• Word problem involving the Pythagorean Theorem
• Rational exponents: Product rule
• Rational exponents: Quotient rule

Section R.7  (15 topics*)

• Area of a triangle
• Area of a parallelogram
• Area of a trapezoid
• Circumference of a circle
• Perimeter involving rectangles and circles
• Circumference and area of a circle
• Area involving rectangles and circles
• Volume of a rectangular prism
• Volume of a cylinder
• Word problem involving the rate of filling or emptying a cylinder
• Volume of a sphere
• Surface area of a cube or a rectangular prism
• Introduction to the Pythagorean Theorem
• Word problem involving the Pythagorean Theorem
• Word problem on proportions: Problem type 1

Chapter R Supplementary Topics  (10 topics)

• Properties of addition
• Properties of real numbers
• Multiplying numbers written in scientific notation: Basic
• Multiplying numbers written in scientific notation: Advanced
• Dividing numbers written in scientific notation: Basic
• Dividing numbers written in scientific notation: Advanced
• Degree of a multivariate polynomial
• Factoring a polynomial involving a GCF and a difference of squares: Univariate
• Factoring with repeated use of the difference of squares formula
• Finding all square roots of a number

(*) Some topics in this section are also covered in a previous section of this Objective. Topics are only counted once towards the total number of topics for this Objective.

Ch.1-Equations and Inequalities  (117 topics, due on 09/26/2017)

Section 1.1  (26 topics)

• Additive property of equality with signed fractions
• Multiplicative property of equality with signed fractions
• Solving a multi-step equation given in fractional form
• Solving a linear equation with several occurrences of the variable: Variables on the same side and distribution
• Solving a linear equation with several occurrences of the variable: Variables on both sides and distribution
• Solving a linear equation with several occurrences of the variable: Fractional forms with monomial numerators
• Solving a two-step equation with signed fractions
• Solving a linear equation with several occurrences of the variable: Fractional forms with binomial numerators
• Solving equations with zero, one, or infinitely many solutions
• Solving for a variable in terms of other variables using addition or subtraction: Basic
• Solving for a variable in terms of other variables using addition or subtraction: Advanced
• Solving for a variable in terms of other variables using multiplication or division: Basic
• Solving for a variable in terms of other variables using multiplication or division: Advanced
• Solving for a variable in terms of other variables using addition or subtraction with division
• Solving for a variable inside parentheses in terms of other variables
- Solving for a variable in terms of other variables in a linear equation with fractions
- Translating a sentence into a one-step equation
- Translating a sentence into a multi-step equation
- Solving a word problem with two unknowns using a linear equation
- Solving a decimal word problem using a linear equation of the form \( Ax + B = C \)
- Solving a word problem involving consecutive integers
- Solving a value mixture problem using a linear equation
- Solving a one-step word problem using the formula \( d = rt \)
- Solving a distance, rate, time problem using a linear equation
- Finding the sale price given the original price and percent discount
- Computing a percent mixture

**Section 1.2** (19 topics)

- Solving a compound linear inequality: Interval notation
- Solving a two-step linear inequality with a fractional coefficient
- Solving a decimal word problem using a two-step linear inequality
- Solving a compound linear inequality: Graph solution, basic
- Solving inequalities with no solution or all real numbers as solutions
- Solving a linear inequality with multiple occurrences of the variable: Problem type 2
- Solving a linear inequality with multiple occurrences of the variable: Problem type 1
- Solving a two-step linear inequality: Problem type 2
- Identifying solutions to a two-step linear inequality in one variable
- Union and intersection of finite sets
- Set builder and interval notation
- Writing a compound inequality given a graph on the number line
- Graphing a compound inequality on the number line
- Writing an inequality given a graph on the number line
- Graphing a linear inequality on the number line
- Writing an inequality for a real-world situation
- Translating a sentence into a one-step inequality
- Finding the value for a new score that will yield a given mean
- Multiplicative property of inequality with signed fractions

**Section 1.3** (8 topics)

- 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 inequality: Problem type 1
- Solving an absolute value inequality: Problem type 3
- Solving an absolute value inequality: Problem type 4
- Solving an absolute value inequality: Problem type 5

**Section 1.4** (6 topics)

- Using \( i \) to rewrite square roots of negative numbers
- Simplifying a product and quotient involving square roots of negative numbers
- Adding or subtracting complex numbers
- Multiplying complex numbers
- Dividing complex numbers
- Simplifying a power of \( i \)

**Section 1.5** (19 topics)

- Finding the perimeter or area of a rectangle given one of these values
- 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
- Roots of a product of polynomials
- Finding the zeros of a quadratic function given its equation
- Writing a quadratic equation given the roots and the leading coefficient
- Solving a word problem using a quadratic equation with rational roots
- 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
- Completing the square
Solving a quadratic equation by completing the square: Exact answers
Applying the quadratic formula: Exact answers
Solving a quadratic equation with complex roots
Discriminant of a quadratic equation
Solving a word problem using a quadratic equation with irrational roots

Section 1.6 (34 topics*)

- Restriction on a variable in a denominator: Linear
- Solving a proportion of the form \((x+a)/b = c/d\)
- Solving a proportion of the form \(a/(x+b) = c/x\)
- Solving a rational equation that simplifies to linear: Denominator \(x+a\)
- Solving a rational equation that simplifies to linear: Denominators \(ax\) and \(bx\)
- Solving a rational equation that simplifies to linear: Unlike binomial denominators
- Solving for a variable in terms of other variables in a rational equation: Problem type 1
- Solving for a variable in terms of other variables in a rational equation: Problem type 2
- Solving for a variable in terms of other variables in a rational equation: Problem type 3
- Word problem involving multiple rates
- Solving a word problem using a rational equation
- Solving a word problem using a quadratic equation with irrational roots
- Solving an equation using the odd-root property: Problem type 1
- Solving an equation using the odd-root property: Problem type 2
- Restriction on a variable in a denominator: Quadratic
- Solving a rational equation that simplifies to linear: Factorable quadratic denominator
- Solving a rational equation that simplifies to quadratic: Denominator \(x\)
- Solving a rational equation that simplifies to quadratic: Binomial denominators and numerators
- Solving a rational equation that simplifies to quadratic: Factorable quadratic denominator
- Introduction to solving a radical equation
- Solving a radical equation that simplifies to a linear equation: One radical, basic
- Solving a radical equation that simplifies to a linear equation: One radical, advanced
- Solving a radical equation that simplifies to a linear equation: Two radicals
- Solving a radical equation that simplifies to a quadratic equation: One radical, advanced
- Solving a radical equation with two radicals that simplifies to \(sqrt(x) = a\)
- Algebraic symbol manipulation with radicals
- Word problem involving radical equations: Advanced
- Solving an equation with a root index greater than 2: Problem type 1
- Solving an equation with exponent \(1/a\): Problem type 1
- Solving an equation with exponent \(1/a\): Problem type 2
- Solving an equation with positive rational exponent
- Solving an equation that can be written in quadratic form: Problem type 1
- Solving an equation that can be written in quadratic form: Problem type 2

Chapter 1 Supplementary Topics (6 topics)

- Identifying properties used to solve a linear equation
- Writing a multi-step equation for a real-world situation
- Solving a percent mixture problem using a linear equation
- Converting a repeating decimal to a fraction
- Solving an absolute value equation of the form \(|ax+b| = |cx+d|\)
- Union and intersection of intervals

(*) Some topics in this section are also covered in a previous section of this Objective. Topics are only counted once towards the total number of topics for this Objective.

Ch.2-Relations, Functions, and Graphs (113 topics, due on 10/12/2017)

Section 2.1 (13 topics)

- Reading a point in the coordinate plane
- Plotting a point in the coordinate plane
- Table for a linear equation
- Distance between two points in the plane: Exact answers
- Midpoint of a line segment in the plane
- Identifying solutions to a linear equation in two variables
- Finding a solution to a linear equation in two variables
- Identifying the center and radius to graph a circle given its equation in standard form
- Identifying the center and radius to graph a circle given its equation in general form: Basic
- Identifying the center and radius to graph a circle given its equation in general form: Advanced
- 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
Section 2.2 (15 topics)

- Domain and range from ordered pairs
- 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
- Finding \( x \)- and \( y \)-intercepts of a line given the equation: Basic
- Finding \( x \)- and \( y \)-intercepts of a line given the equation: Advanced
- Graphing a line given its \( x \)- and \( y \)-intercepts
- Graphing a line by first finding its \( x \)- and \( y \)-intercepts
- Finding slope given the graph of a line on a grid
- Finding slope given two points on the line
- Writing the equations of vertical and horizontal lines through a given 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

Section 2.3 (20 topics*)

- Graphing a line given its equation in slope-intercept form: Fractional slope
- Finding \( x \)- and \( y \)-intercepts of a line given the equation: Basic
- Finding \( x \)- and \( y \)-intercepts of a line given the equation: Advanced
- Graphing a line given its slope and \( y \)-intercept
- Graphing a line through a given point with a given slope
- 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 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
- 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
- Interpreting the parameters of a linear function that models a real-world situation
- Application problem with a linear function: Finding a coordinate given two points
- Choosing a graph to fit a narrative: Basic
- Choosing a graph to fit a narrative: Advanced

Section 2.4 (23 topics)

- Solving a decimal word problem using a linear equation of the form \( Ax + B = C \)
- Identifying functions from relations
- Vertical line test
- Table for a linear function
- Evaluating functions: Linear and quadratic or cubic
- Evaluating a rational function: Problem type 1
- Evaluating a rational function: Problem type 2
- Table for a square root function
- Evaluating a cube root function
- Evaluating functions: Absolute value, rational, radical
- Variable expressions as inputs of functions: Problem type 1
- Domain of a rational function: Excluded values
- Domain of a square root function: Basic
- Domain of a square root function: Advanced
- Finding the domain of a fractional function involving radicals
- 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
- 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
- Domain and range from the graph of a continuous function
- Interpreting the graphs of two functions

Section 2.5 (8 topics*)
- Finding intercepts of a nonlinear function given its graph
- Finding a difference quotient for a linear or quadratic function
- Domain and range from the graph of a continuous function
- Finding where a function is increasing, decreasing, or constant given the graph
- Finding where a function is increasing, decreasing, or constant given the graph: Interval notation
- Finding local maxima and minima of a function given the graph
- Even and odd functions: Problem type 1
- Finding the average rate of change of a function

**Section 2.6** (19 topics)

- Graphing an absolute value equation of the form \( y = A|x| \)
- Graphing a cubic function of the form \( y = ax^3 \)
- Graphing a function of the form \( f(x) = ax + b: \) Integer slope
- Graphing a function of the form \( f(x) = ax + b: \) Fractional slope
- 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 \( y = (x-h)^2 + k \)
- Graphing a square root function: Problem type 1
- Graphing a cube root function
- Translating the graph of a parabola: One step
- Translating the graph of an absolute value function: One step
- Translating the graph of an absolute value function: Two steps
- 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
- Finding the vertex, intercepts, and axis of symmetry from the graph of a parabola
- Domain and range from the graph of a quadratic function

**Section 2.7** (2 topics)

- Evaluating a piecewise-defined function
- Graphing a piecewise-defined function: Problem type 1

**Section 2.8** (6 topics)

- 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

**Chapter 2 Supplementary Topics** (11 topics)

- Classifying slopes given graphs of lines
- Graphing a line given its equation in point-slope form
- Graphing an absolute value equation in the plane: Basic
- Graphing an absolute value equation in the plane: Advanced
- Graphing a square root function: Problem type 2
- Graphing a square root function: Problem type 3
- Finding the average rate of change of a function given its graph
- How the leading coefficient affects the shape of a parabola
- How the leading coefficient affects the graph of an absolute value function
- Writing an equation for a function after a vertical translation
- Composition of two functions: Domain and range

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**Ch.3-Polynomial and Rational Functions** (60 topics, due on 11/04/2017)

**Section 3.1** (10 topics)

- Solving a word problem using a quadratic equation with irrational roots
- Graphing a parabola of the form \( y = x^2 + bx + c \)
- Graphing a parabola of the form \( y = a(x-h)^2 + k \)
- Graphing a parabola of the form \( y = ax^2 + bx + c: \) Integer coefficients

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Graphing a parabola of the form $y = ax^2 + bx + c$: Rational coefficients
Finding the x-intercept(s) and the vertex of a parabola
Rewriting a quadratic function to find its vertex and sketch its graph
Finding the maximum or minimum of a quadratic function
Word problem involving the maximum or minimum of a quadratic function
Word problem involving optimizing area by using a quadratic function

Section 3.2  (9 topics)
- Finding zeros of a polynomial function written in factored form
- Finding a polynomial of a given degree with given zeros: Real zeros
- Polynomial long division: Problem type 1
- Polynomial long division: Problem type 2
- Polynomial long division: Problem type 3
- Synthetic division
- Using the remainder theorem to evaluate a polynomial
- The Factor Theorem
- Using a given zero to write a polynomial as a product of linear factors: Real zeros

Section 3.3  (11 topics)
- Finding all possible rational zeros using the rational zeros theorem: Problem type 1
- Finding all possible rational zeros using the rational zeros theorem: Problem type 2
- Descartes’ Rule of Signs
- Using the rational zeros theorem to find all zeros of a polynomial: Rational zeros
- Using the rational zeros theorem to find all zeros of a polynomial: Irrational zeros
- 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
- Multiplying expressions involving complex conjugates
- Finding a polynomial of a given degree with given zeros: Complex zeros
- Using a given zero to write a polynomial as a product of linear factors: Complex zeros
- Using the rational zeros theorem to find all zeros of a polynomial: Complex zeros

Section 3.4  (4 topics)
- 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

Section 3.5  (7 topics)
- Writing the equation of a rational function given its graph
- Matching graphs with rational functions: Two vertical asymptotes
- Graphing a rational function: Linear over linear
- Graphing a rational function: Constant over linear
- Finding horizontal and vertical asymptotes of a rational function: Quadratic numerator or denominator
- Finding the asymptotes of a rational function: Linear over linear
- Finding the asymptotes of a rational function: Constant over linear

Section 3.6  (2 topics)
- Graphing a rational function: Quadratic over linear
- Graphing rational functions with holes

Section 3.7  (7 topics)
- Solving a quadratic inequality written in factored form
- Solving a quadratic inequality
- Solving a polynomial inequality: Problem type 1
- Solving a polynomial inequality: Problem type 4
- Solving a polynomial inequality: Problem type 3
- Solving a rational inequality: Problem type 1
- Solving a rational inequality: Problem type 2

Section 3.8  (6 topics)
- Writing a direct variation equation
- Word problem on direct variation
- Writing an inverse variation equation
- Word problem on inverse variation
- Writing an equation that models variation
- Word problem on combined variation

Chapter 3 Supplementary Topics  (4 topics)

- Classifying the graph of a function
- Using the conjugate zeros theorem to find all zeros of a polynomial
- Finding the intercepts, asymptotes, domain, and range from the graph of a rational function
- Word problem on inverse proportions

Ch.4-Exponential and Logarithmic Functions  (47 topics, due on 11/16/2017)

Section 4.1  (6 topics)

- Horizontal line test
- Determining whether two functions are inverses of each other
- Inverse functions: Linear, discrete
- Inverse functions: Quadratic, square root
- Inverse functions: Cubic, cube root
- Inverse functions: Rational

Section 4.2  (9 topics)

- Graphically solving a system of linear equations
- Table for an exponential function
- Graphing an exponential function and its asymptote: f(x)=b^x or f(x)=-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
- Finding a final amount in a word problem on exponential growth or decay
- Solving an exponential equation by finding common bases: Linear exponents

Section 4.3  (7 topics)

- Converting between logarithmic and exponential equations
- Converting between natural logarithmic and exponential equations
- Evaluating logarithmic expressions
- 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

Section 4.4  (17 topics)

- Evaluating an exponential function with base e that models a real-world situation
- Solving an equation of the form log_b(x) = c
- Basic properties of logarithms
- Expanding a logarithmic expression: Problem type 1
- Expanding a logarithmic expression: Problem type 2
- Expanding a logarithmic expression: Problem type 3
- Writing an expression as a single logarithm
- Change of base for logarithms: Problem type 1
- Solving a multi-step equation involving a single logarithm: Problem type 1
- Solving a multi-step equation involving a single logarithm: Problem type 2
- 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 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

Section 4.5  (8 topics)

- Finding simple interest without a calculator
- Introduction to compound interest
- Finding the final amount in a word problem on compound interest
- Finding the time to reach a limit in a word problem on exponential growth or decay
Finding the final amount in a word problem on continuous compound interest
Finding the final amount in a word problem on continuous exponential growth or decay
Finding the initial amount in a word problem on continuous compound interest
Finding the rate or time in a word problem on continuous exponential growth or decay

Ch.5-An Introduction to Trigonometric Functions  (46 topics, due on 11/30/2017)

Section 5.1  (9 topics)
- Indirect measurement
- 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
- Arc length and central angle measure
- Area of a sector of a circle
- Angular and linear speed

Section 5.2  (11 topics)
- Sine, cosine, and tangent ratios: Numbers for side lengths
- Sine, cosine, and tangent ratios: Variables for side lengths
- Using a calculator to approximate sine, cosine, and tangent values
- 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
- 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 cofunction identities

Section 5.3  (10 topics*)
- Coterminal angles
- Trigonometric functions and special angles: Problem type 1
- Trigonometric functions and special angles: Problem type 2
- Trigonometric functions and special angles: Problem type 3
- 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
- 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

Section 5.4  (10 topics*)
- Sketching an angle in standard position
- Finding coordinates on the unit circle for special angles
- Finding a point on the unit circle given one coordinate
- 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
- Using a calculator to approximate sine, cosine, and tangent values
- Reference angles: Problem type 1
- Reference angles: Problem type 2

Section 5.5  (4 topics)
- Sketching the graph of $y = a \sin(bx)$ or $y = a \cos(bx)$
- Amplitude and period of sine and cosine functions
- Writing the equation of a sine or cosine function given its graph: Problem type 1
- Matching graphs and equations for secant, cosecant, tangent, and cotangent functions

Section 5.6  (1 topic)
- Domains and ranges of trigonometric functions
Section 5.7  (7 topics)

- Sketching the graph of \( y = \sin(x) + d \) or \( y = \cos(x) + d \)
- 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 \( y = a \sin(bx+c) \) or \( y = a \cos(bx+c) \)
- Sketching the graph of \( y = a \sin(bx) + d \) or \( y = a \cos(bx) + d \)
- Amplitude, period, and phase shift of sine and cosine functions
- Writing the equation of a sine or cosine function given its graph: Problem type 2

Chapter 5 Supplementary Topics  (1 topic)

- Special right triangles: Exact answers

(*) Some topics in this section are also covered in a previous section of this Objective. Topics are only counted once towards the total number of topics for this Objective.

Ch.6-Trigonometric Identities, Inverses, and Equations  (38 topics, due on 12/10/2017)

Section 6.1  (4 topics)

- 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
- Simplifying trigonometric expressions
- Verifying a trigonometric identity

Section 6.2  (4 topics*)

- Verifying a trigonometric identity
- Proving trigonometric identities: Problem type 1
- Proving trigonometric identities: Problem type 2
- Proving trigonometric identities: Problem type 3

Section 6.3  (5 topics)

- Sum and difference identities: Problem type 1
- Sum and difference identities: Problem type 2
- Sum and difference identities: Problem type 3
- Proving trigonometric identities using sum and difference properties: Problem type 1
- Proving trigonometric identities using sum and difference properties: Problem type 2

Section 6.4  (5 topics)

- Double-angle identities: Problem type 1
- Double-angle identities: Problem type 2
- Half-angle identities: Problem type 1
- Half-angle identities: Problem type 2
- Proving trigonometric identities using double-angle properties

Section 6.5  (5 topics)

- Values of inverse trigonometric functions
- Composition of a trigonometric function with its inverse trigonometric function: Problem type 1
- Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 1
- Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 2
- Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 3

Section 6.6  (12 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
- Solving a basic trigonometric equation using a calculator
- Solving a basic trigonometric equation involving sine or cosine
- Solving a basic trigonometric equation involving tangent, cotangent, secant, or cosecant
- 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
- Solving a trigonometric equation involving a squared function: Problem type 1
- Solving a trigonometric equation involving a squared function: Problem type 2
- Solving a trigonometric equation involving an angle multiplied by a constant
- Finding solutions in an interval for a trigonometric equation with an angle multiplied by a constant
Section 6.7 (4 topics)

- 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
- Solving a trigonometric equation modeling a real-world situation
- Finding solutions in an interval for an equation with sine and cosine using sum and difference identities

(*) Some topics in this section are also covered in a previous section of this Objective. Topics are only counted once towards the total number of topics for this Objective.

Ch.7-Applications of Trigonometry (6 topics, due on 12/12/2017)

Section 7.1 (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 7.2 (3 topics)

- Solving a triangle with the law of cosines
- Solving a word problem using the law of cosines
- Finding the area of a triangle using trigonometry