

Higher Education Math Placement

This course covers the topics shown below.

Curriculum (314 topics)

- Whole Numbers, Fractions, and Decimals (37 topics)
 - Operations with Whole Numbers (9 topics)
 - Adding 2-digit numbers with regrouping a ten
 - Subtraction of 2-digit numbers with regrouping
 - Multiplying with regrouping
 - Introduction to multiplication of large numbers
 - Division with regrouping
 - Introduction to exponents
 - Order of operations with whole numbers
 - Order of operations with whole numbers and grouping symbols
 - Order of operations with whole numbers and exponents: Basic
 - Equivalent Fractions and Ordering (8 topics)
 - Equivalent fractions
 - Simplifying a fraction
 - Fractional position on a number line
 - Plotting fractions on a number line
 - Writing an improper fraction as a mixed number
 - Writing a mixed number as an improper fraction
 - Ordering fractions with the same denominator
 - Using a common denominator to order fractions
 - Operations with Fractions (9 topics)
 - Addition or subtraction of fractions with the same denominator
 - Introduction to addition or subtraction of fractions with different denominators
 - Addition or subtraction of fractions with different denominators
 - Product of a fraction and a whole number: Problem type 1
 - Introduction to fraction multiplication
 - Fraction multiplication
 - Fraction division
 - Division involving a whole number and a fraction
 - Mixed arithmetic operations with fractions
 - Decimal Place Value (2 topics)
 - Rounding decimals
 - Ordering decimals
 - Operations with Decimals (9 topics)
 - Addition of aligned decimals
 - Decimal addition with 3 numbers
 - Subtraction of aligned decimals
 - Multiplication of a decimal by a power of ten
 - Multiplying a decimal by a whole number
 - Decimal multiplication: Problem type 1
 - Division of a decimal by a power of ten
 - Division of a decimal by a whole number
 - Converting a fraction to a terminating decimal
- Percents, Proportions, and Geometry (32 topics)

- Percentages (8 topics)
 - Converting between percentages and decimals
 - Converting a percentage to a fraction in simplest form
 - Converting a fraction to a percentage: Denominator of 20, 25, or 50
 - Writing a ratio as a percentage without a calculator
 - Finding a percentage of a whole number without a calculator: Basic
 - Applying the percent equation
 - Finding the sale price without a calculator given the original price and percent discount
 - Finding the original price given the sale price and percent discount
- Proportions (4 topics)
 - Solving a proportion of the form $x/a = b/c$
 - Solving a word problem on proportions using a unit rate
 - Word problem on proportions: Problem type 1
 - Word problem on proportions: Problem type 2
- Perimeter and Area (11 topics)
 - Perimeter of a square or a rectangle
 - Finding the missing length in a figure
 - Finding a side length given the perimeter and side lengths with variables
 - Area of a square or a rectangle
 - Area of a piecewise rectangular figure
 - Area of a triangle
 - Area of a parallelogram
 - Finding the side length of a rectangle given its perimeter or area
 - Circumference and area of a circle
 - Perimeter involving rectangles and circles
 - Area involving inscribed figures
- Volume and Surface Area (4 topics)
 - Volume of a rectangular prism
 - Volume of a cylinder
 - Surface area of a cube or a rectangular prism
 - Surface area of a cylinder: Exact answers in terms of pi
- Angles and Triangles (3 topics)
 - Solving equations involving vertical angles
 - Finding an angle measure of a triangle given two angles
 - Finding an angle measure for a triangle with an extended side
- Similar Figures (2 topics)
 - Similar polygons
 - Indirect measurement
- Signed Numbers, Linear Equations and Inequalities (53 topics)
 - Integers (7 topics)
 - Absolute value of a number
 - Integer addition: Problem type 1
 - Integer addition: Problem type 2
 - Integer subtraction: Problem type 1
 - Integer subtraction: Problem type 2
 - Integer subtraction: Problem type 3
 - Integer multiplication and division
 - Signed Fractions and Decimals (5 topics)
 - Signed fraction addition or subtraction: Basic
 - Signed fraction addition or subtraction: Advanced
 - Signed fraction multiplication: Basic
 - Signed fraction multiplication: Advanced

- Signed decimal addition and subtraction with 3 numbers
- Signed Numbers and Exponents (3 topics)
 - Exponents and integers: Problem type 1
 - Exponents and signed fractions
 - Order of operations with integers and exponents
- Algebraic Expressions (3 topics)
 - Writing a one-step expression for a real-world situation
 - Evaluating a linear expression: Integer multiplication with addition or subtraction
 - Evaluating a quadratic expression: Integers
- Properties of Real Numbers (4 topics)
 - Distributive property: Whole number coefficients
 - Distributive property: Integer coefficients
 - Combining like terms: Integer coefficients
 - Combining like terms: Advanced
- Solving a Linear Equation with One Occurrence of the Variable (9 topics)
 - Additive property of equality with decimals
 - Additive property of equality with integers
 - Additive property of equality with a negative coefficient
 - Multiplicative property of equality with whole numbers
 - Multiplicative property of equality with decimals
 - Multiplicative property of equality with integers
 - Multiplicative property of equality with signed fractions
 - Solving a two-step equation with integers
 - Solving a two-step equation with signed fractions
- Solving a Linear Equation with Several Occurrences of the Variable (4 topics)
 - 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 binomial numerators
 - Solving equations with zero, one, or infinitely many solutions
- Applications with Linear Equations (5 topics)
 - Translating a sentence into a one-step equation
 - Translating a phrase into a two-step expression
 - Solving a one-step word problem using the formula $d = rt$
 - Solving a word problem with two unknowns using a linear equation
 - Solving a value mixture problem using a linear equation
- Solving an Inequality (8 topics)
 - Graphing a linear inequality on the number line
 - Graphing a compound inequality on the number line
 - Solving a linear inequality: Problem type 1
 - Solving a linear inequality: Problem type 2
 - Solving a linear inequality: Problem type 3
 - Solving a linear inequality: Problem type 4
 - Solving a compound linear inequality: Graph solution, basic
 - Solving a compound linear inequality: Interval notation
- Solving an Equation or Inequality with Absolute Value (2 topics)
 - Solving an absolute value equation of the form $ax + b = c$
 - Solving an absolute value inequality: Basic
- Solving a Multivariable Equation for a Variable (3 topics)
 - Introduction to algebraic symbol manipulation
 - Algebraic symbol manipulation: Problem type 1
 - Algebraic symbol manipulation: Problem type 2

- Lines and Systems of Linear Equations (27 topics)
 - Graphing Lines (5 topics)
 - Plotting a point in the coordinate plane
 - Finding a solution to a linear equation in two variables
 - Graphing a line given its equation in slope-intercept form
 - Graphing a line given its equation in standard form
 - Graphing a vertical or horizontal line
 - Slope of a Line (4 topics)
 - Finding slope given the graph of a line on a grid
 - Finding slope given two points on the line
 - Finding the slope of a line given its equation
 - Finding slopes of lines parallel and perpendicular to a line given in the form $Ax + By = C$
 - Equation of a Line (3 topics)
 - Finding x- and y-intercepts of a line given the equation: Advanced
 - Writing the equation of a line given the slope and a point on the line
 - Writing the equation of the line through two given points
 - Solving a System of Linear Equations (4 topics)
 - Graphically solving a system of linear equations
 - Solving a system of linear equations using substitution
 - Solving a system of linear equations using elimination with multiplication and addition
 - Solving a 2×2 system of linear equations that is inconsistent or consistent dependent
 - Graphing Linear Inequalities in the Plane (3 topics)
 - Graphing a linear inequality in the plane: Standard form
 - Graphing a linear inequality in the plane: Vertical or horizontal line
 - Graphing a system of two linear inequalities: Basic
 - Applications with Lines and Systems (8 topics)
 - Interpreting a line graph
 - Interpreting the graphs of two functions
 - Writing an equation and drawing its graph to model a real-world situation: Advanced
 - Application problem with a linear function: Finding a coordinate given the slope and a point
 - Solving a value mixture problem using a system of linear equations
 - Solving a distance, rate, time problem using a system of linear equations
 - Solving a percent mixture problem using a system of linear equations
 - Solving a word problem using a 3×3 system of linear equations: Problem type 1
- Relations and Functions (22 topics)
 - Sets and Intervals (2 topics)
 - Set-builder and interval notation
 - Union and intersection of finite sets
 - Evaluating Functions (4 topics)
 - Evaluating functions: Linear and quadratic or cubic
 - Evaluating a piecewise-defined function
 - Variable expressions as inputs of functions: Problem type 1
 - Sum, difference, and product of two functions
 - Domain and Range (4 topics)
 - Domain and range from ordered pairs
 - Domain and range from the graph of a continuous function
 - Domain of a square root function: Advanced
 - Domain of a rational function: Excluded values
 - Graphs of Functions and their Transformations (9 topics)
 - Vertical line test

- Finding local maxima and minima of a function given the graph
- Translating the graph of a function: One step
- Transforming the graph of a function by reflecting over an axis
- Transforming the graph of a function by shrinking or stretching
- Writing an equation for a function after a vertical translation
- Writing an equation for a function after a vertical and horizontal translation
- Graphing a cubic function of the form $y = ax^3$
- Graphing a square root function
- Composition of Functions and Inverse Functions (3 topics)
 - Composition of two functions: Basic
 - Inverse functions: Linear, discrete
 - Inverse functions: Rational
- Integer Exponents and Factoring (30 topics)
 - Properties of Exponents (13 topics)
 - Evaluating an expression with a negative exponent: Positive fraction base
 - Evaluating an expression with a negative exponent: Negative integer base
 - Introduction to the product rule of exponents
 - Product rule with positive exponents: Multivariate
 - Product rule with negative exponents
 - Introduction to the quotient rule of exponents
 - Quotient of expressions involving exponents
 - Quotient rule with negative exponents: Problem type 1
 - Introduction to the power rules of exponents
 - Power rules with positive exponents
 - Power of a power rule with negative exponents
 - Power rules with negative exponents
 - Power and product rules with positive exponents
 - Scientific Notation (2 topics)
 - Scientific notation with positive exponent
 - Scientific notation with negative exponent
 - Operations with Polynomials (7 topics)
 - Simplifying a sum or difference of two univariate polynomials
 - Multiplying a univariate polynomial by a monomial with a positive coefficient
 - Multiplying a multivariate polynomial by a monomial
 - Multiplying binomials with leading coefficients of 1
 - Multiplying conjugate binomials: Univariate
 - Squaring a binomial: Univariate
 - Multiplication involving binomials and trinomials in two variables
 - Factoring Polynomials (8 topics)
 - Greatest common factor of two multivariate monomials
 - Factoring out a monomial from a polynomial: Univariate
 - Factoring out a monomial from a polynomial: Multivariate
 - Factoring a quadratic with leading coefficient 1
 - Factoring a quadratic with leading coefficient greater than 1
 - Factoring a product of a quadratic trinomial and a monomial
 - Factoring a difference of squares
 - Factoring a polynomial by grouping: Problem type 1
- Quadratic and Polynomial Functions (21 topics)
 - Solving a Quadratic Equation (9 topics)
 - Solving an equation written in factored form
 - Completing the square
 - 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
- Applying the quadratic formula: Exact answers
- Discriminant of a quadratic equation
- Solving a word problem using a quadratic equation with rational roots
- Solving a word problem using a quadratic equation with irrational roots
- Solving a Quadratic Inequality (1 topics)
 - Solving a quadratic inequality written in factored form
- Graphing a Quadratic Function (5 topics)
 - Graphing a parabola of the form $y = ax^2$
 - Graphing a parabola of the form $y = (x-h)^2 + k$
 - Graphing a parabola of the form $y = ax^2 + bx + c$: Integer coefficients
 - Rewriting a quadratic function to find the vertex of its graph
 - Finding the x-intercept(s) and the vertex of a parabola
- Polynomial Functions (4 topics)
 - Finding zeros of a polynomial function written in factored form
 - Finding x- and y-intercepts given a polynomial function
 - Determining the end behavior of the graph of a polynomial function
 - Inferring properties of a polynomial function from its graph
- Circles (2 topics)
 - Graphing a circle given its equation in standard form
 - Graphing a circle given its equation in general form
- Rational Expressions and Functions (23 topics)
 - Simplifying Rational Expressions (12 topics)
 - Least common multiple of two monomials
 - Simplifying a ratio of polynomials: Problem type 1
 - Simplifying a ratio of multivariate polynomials
 - Adding rational expressions with common denominators and binomial numerators
 - Adding rational expressions with different denominators: ax, bx
 - Adding rational expressions with different denominators: $x+a, x+b$
 - Multiplying rational expressions involving multivariate monomials
 - Multiplying rational expressions involving quadratics with leading coefficients of 1
 - Dividing rational expressions involving multivariate monomials
 - Complex fraction without variables: Problem type 1
 - Complex fraction involving multivariate monomials
 - Complex fraction: GCF and quadratic factoring
 - Division of Polynomials (2 topics)
 - Dividing a polynomial by a monomial: Univariate
 - Polynomial long division: Problem type 1
 - Solving Rational Equations (4 topics)
 - Solving a rational equation that simplifies to linear: Denominator x
 - Solving a rational equation that simplifies to linear: Denominator $x+a$
 - Solving a rational equation that simplifies to linear: Unlike binomial denominators
 - Solving a rational equation that simplifies to quadratic: Binomial denominators and numerators
 - Direct and Inverse Variations (3 topics)
 - Word problem on direct variation
 - Word problem on inverse variation
 - Writing an equation that models variation
 - Graphing Rational Functions (2 topics)
 - Sketching the graph of a rational function: Constant over linear

- Sketching the graph of a rational function: Linear over linear
- Radicals and Rational Exponents (20 topics)
 - Simplifying Expressions with Radicals (8 topics)
 - Square root of a rational perfect square
 - Simplifying the square root of a whole number less than 100
 - Square root of a perfect square monomial
 - Simplifying a radical expression with an even exponent
 - Simplifying a sum or difference of radical expressions: Multivariate
 - Simplifying a product of radical expressions: Multivariate
 - Rationalizing the denominator of a radical expression
 - Rationalizing the denominator of a radical expression using conjugates
 - Solving Equations with Radicals (3 topics)
 - Solving a radical equation that simplifies to a linear equation: One radical, basic
 - Solving a radical equation that simplifies to a linear equation: Two radicals
 - Solving a radical equation that simplifies to a quadratic equation: One radical
 - Pythagorean Theorem and the Distance Formula (2 topics)
 - Pythagorean Theorem
 - Distance between two points in the plane: Exact answers
 - Higher Roots (3 topics)
 - Cube root of an integer
 - Simplifying a higher root of a whole number
 - Simplifying a higher radical expression: Multivariate
 - Rational Exponents (4 topics)
 - Rational exponents: Non-unit fraction exponent with a whole number base
 - Rational exponents: Negative exponents and fractional bases
 - Rational exponents: Powers of powers with negative exponents
 - Rational exponents: Products and quotients with negative exponents
- Exponentials and Logarithms (20 topics)
 - Properties of Logarithms (7 topics)
 - Converting between logarithmic and exponential equations
 - Converting between natural logarithmic and exponential equations
 - Evaluating a logarithmic expression
 - Basic properties of logarithms
 - Expanding a logarithmic expression: Problem type 1
 - Writing an expression as a single logarithm
 - Change of base for logarithms: Problem type 1
 - Solving Logarithmic and Exponential Equations (8 topics)
 - Solving an equation of the form $\log_b a = c$
 - Solving an equation involving logarithms on both sides: Problem type 1
 - 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 2
 - Solving an exponential equation by using logarithms: Exact answers in logarithmic form
 - Solving an exponential equation by finding common bases: Linear and quadratic exponents
 - Solving exponential equations by using logarithms and natural logarithms: Decimal answers
 - Graphing Logarithmic and Exponential Functions (3 topics)
 - The graph, domain, and range of an exponential function
 - The graph, domain, and range of a logarithmic function
 - Translating the graph of a logarithmic or exponential function
 - Applications with Exponential Functions (2 topics)

- Evaluating an exponential function that models a real-world situation
- Finding a final amount in a word problem on exponential growth or decay
- Trigonometry (29 topics)
 - Angles (5 topics)
 - Converting between degree and radian measure: Problem type 1
 - Sketching an angle in standard position
 - Reference angles: Problem type 1
 - Coterminal angles
 - Arc length and central angle measure
 - Right Triangle Trigonometry (6 topics)
 - Sine, cosine, and tangent ratios: Variables for side lengths
 - Using a trigonometric ratio to find a side length in a right triangle
 - Using a trigonometric ratio to find an angle measure in a right triangle
 - Finding trigonometric ratios given a right triangle
 - Solving a triangle with the law of sines: Problem type 1
 - Solving a triangle with the law of cosines
 - Unit Circle (5 topics)
 - Finding coordinates on the unit circle for special angles
 - Trigonometric functions and special angles: Problem type 1
 - Trigonometric functions and special angles: Problem type 2
 - 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
 - Graphing Trigonometric Functions (4 topics)
 - Amplitude and period of sine and cosine functions
 - Amplitude, period, and phase shift of sine and cosine functions
 - Sketching the graph of $y = a \sin(x+c)$ or $y = a \cos(x+c)$
 - Sketching the graph of $y = a \sin(bx)$ or $y = a \cos(bx)$
 - Inverse Trigonometric Functions (2 topics)
 - Values of inverse trigonometric functions
 - Composition of a trigonometric function with the inverse of another trigonometric function: Problem type 2
 - Trigonometric Identities (3 topics)
 - Simplifying trigonometric expressions
 - Sum and difference identities: Problem type 2
 - Double-angle identities: Problem type 2
 - Trigonometric Equations (4 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 using Pythagorean identities: Problem type 1
 - Solving a basic trigonometric equation involving sine or cosine