Advanced Algebra II
Mathematics

Grade(s) 10th - 11th, Duration 1 Year, 1 Credit
Required Course

Course Overview

GENERAL DESCRIPTION: This course is an extension of Algebra I, with more emphasis placed on material for the advanced college track student. Students will solve linear and quadratic equations and inequalities. Advanced solving techniques will be taught in this class. Matrices and probability will be covered in this class.

HOMEWORK OR READING NECESSARY: Homework will be assigned daily with some class time allotted towards its completion

FORMAT: Some time will be allotted each day toward discussion of previous assignment, lecture and independent or group work time.

TESTS: Assessment will be given at the end of each unit.

Scope And Sequence

Timeframe	Unit	Instructional Topics
8 Week(s)	Linear Relations and Functions	1. 1-1 Expressions and Formulas 2. 1-2 Properties of Real Numbers 3. 1-3 Solving Equations 4. 1-4 Solving Absolute Value Equations 5. 1-5 Solving Inequalities 6. 1-6 Solving Compound and Absolute Value Inequalities 7. 2-1 Relations and Functions 8. 2-2 Linear Relations and Functions 9. 2-3 Rate of Change and Slope 10. 2-4 Writing Linear Equations 11. 2-5 Scatter Plots and Lines of Regression 12. 2-6 Special Functions 13. 2-7 Parent Functions and Transformations 14. 3-1 Solving Systems of Equations 15. 3-2 Solving Systems of Inequalities by Graphing 16. 3-3 Optimization with Linear Programming 17. 3-4 Systems of Equations in Three Variables 18. 3-5 Operations with Matrices 19. 3-6 Multiplying Matrices 20. 3-7 Solving Systems of Equations Using Cramer's Rule 21. 3-8 Solving Systems of Equations Using Inverse Matrices
9 Week(s)	Quadratic, Polynomial, and Radical Functions and Relations	1. 4-1 Graphing Quadratic Functions 2. 4-2 Solving Quadratic Equations by Graphing 3. 4-3 Solving Quadratic Equations by Factoring 4. 4-4 Complex Numbers 5. 4-5 Completing the Square 6. 4-6 The Quadratic Formula and the Discriminant 7. 4-7 Transformations of Quadratic Graphs 8. 4-8 Quadratic Inequalities 9. 5-1 Operations with Polynomials 10. 5-2 Dividing Polynomials 11. 5-3 Polynomial Functions 12. 5-4 Analyzing Graphs of Polynomial Functions 13. 5-5 Solving Polynomial Equations 14. 5-6 The Remainder and Factor Theorem 15. 5-7 Roots and Zeros 16. 5-8 Rational Zero Theorem 17. 6-1 Operations on Functions 18. 6-2 Inverse Functions and Relations 19. 6-3 Square Root Functions and Inequalities 20. 6-4 nth Roots 21. 6-5 Operations with Radical Expressions 22. 6-6 Rational Exponents 23. 6-7 Solving Radical Equations and Inequalities

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Duration	Unit	Topics
9 Week(s)	Advanced Functions and Relations	1. 7-1 Graphing Exponential Functions 2. 7-2 Solving Exponential Equations and Inequalities 3. 7-3 Logarithms and Logarithmic Functions 4. 7-4 Solving Logarithmic Equations and Inequalities 5. 8-1 Multiplying and Dividing Rational Expressions 6. 8-2 Adding and Subtracting Rational Expressions 7. 8-3 Graphing Reciprocal Functions 8. 8-4 Graphing Rational Functions 9. 8-5 Variation Functions 10. 8-6 Solving Rational Equations and Inequalities 11. 9-1 Midpoint and Distance Formulas 12. 9-2 Parabolas 13. 9-3 Circles 14. 9-4 Ellipses 15. 9-5 Hyperbolas 16. 9-6 Identifying Conic Sections 17. 9-7 Solving Linear-Nonlinear Systems
6 Week(s)	Discrete Mathematics	1. 10-1 Sequences as Functions 2. 10-2 Arithmetic Sequences and Series 3. 10-3 Geometric Sequences and Series 4. 10-4 Infinite Geometric Series 5. 11-1 Designing a Study 6. 11-2 Distributions of Data 7. 11-3 Probability Distributions 8. 11-4 The Binomial Distribution 9. 11-5 The Normal Distribution 10. 11-6 Confidence Intervals and Hypothesis Testing
4 Week(s)	Trigonometry	1. 12-1 Trig Functions in Right Triangles 2. 12-2 Angles and Angle Measure 3. 12-3 Trig Functions of General Angles 4. 12-4 Law of Sines 5. 12-5 Law of Cosines 6. 12-6 Circular and Periodic Functions 7. 13-1 Trig Identities 8. 13-2 Verifying Trig Identities

Materials and Resources

SUPPLIES: Each student will be charged a $5 calculator rental feel, unless the student chooses to purchase the calculator required for the class.

Prerequisites

PREREQUISITES: Must have a B or better in Geometry and teacher recommendation. This class is designed for the advanced math student.

Course Details

Unit: Linear Relations and Functions   **Duration:** 8 Week(s)

Unit Overview

Equations and Inequalities: Simplify and evaluate algebraic expressions. Solve linear and absolute value equations. Solve and graph inequalities. (1-1, 1-2, 1-3, 1-4, 1-5, 1-6)

Linear Relations and Functions: Use equations and relations and functions. Determine the slope of a line. Use scatter plots and prediction equations. Graph linear inequalities. (2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 2-7)

Systems of Equations and Inequalities: Solve systems of linear equations and linear inequalities. Solve problems by using linear programming. Perform operations with matrices and determinants. (3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-7, 3-8)

Materials and Resources

Textbook
Online Resources

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Required Course

Academic Vocabulary

Equations and Inequalities
absolute value
algebraic expressions
compound inequality
constraint
empty set
equation
extraneous solution
formula
infinity
integers
intersection
interval notation
irrational numbers
natural numbers
open sentences
order of operations
rational numbers
real numbers
set-builder notation
solution union
variables
whole numbers
Linear Relations and Functions
absolute value function
bivariate data
continuos relation
correlation coefficent
depdent variable
dilation
direct variation
discrete relation
family of graphs
greatest integer function
independent variable
linea equation
linear function
linear inequlaity
line of fit
negative correlation
nonlinear relation
parent function
piecewise-defined function
point-slope form
positive correlation
predication equation
quadratic function
rate of change
reflection
regression line
scatter plot
slope
slope-intercept form
standard form
step function
translation
vertical line test
Systems of Equations and Inequalities
bounded
break-even point
coneefficient matrix
consistent
constant matrix
Cramer's Rule
dependent
determinant
diagonal rule

dimensions
elimination method
feasible region
identity matrix
inconsistent
independent
inverse matrices
matrix
matrix equation
optimize
ordered triple
scalar
scalar multiplication
substitution method
unbounded
variable matrix

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Summative Assessment
Equations and Inequalities Assessment
Linear Relations and Functions Assessment
Systems of Equations and Inequalities Assessment

Topic: 1-1 Expressions and Formulas	**Duration:** 2 Day(s)

Topic Overview
Use the order of operations to evaluate expressions. Use formulas.

Learning Targets
Use the order of operations to evaluate expressions. Use formulas.

Topic: 1-2 Properties of Real Numbers	**Duration:** 2 Day(s)

Topic Overview
Classify real numbers. Use the properties of real numbers to evaluate expressions.

Learning Targets
Classify real numbers. Use the properties of real numbers to evaluate expressions.

Topic: 1-3 Solving Equations	**Duration:** 2 Day(s)

Topic Overview
Translate verbal expressions into algebraic expressions and equations, and vice versa. Solve equations using the properties of equality.

Learning Targets
Translate verbal expressions into algebraic expressions and equations, and vice versa. Solve equations using the properties of equality.

Topic: 1-4 Solving Absolute Value Equations	**Duration:** 2 Day(s)

Topic Overview
Evaluate expressions involving absolute values. Solve absolute value equations.

Learning Targets
Evaluate expressions involving absolute values. Solve absolute value equations.

Topic: 1-5 Solving Inequalities	**Duration:** 2 Day(s)

Topic Overview
Solve one-step inequalities. Solve multi-step inequalities.

Learning Targets
Solve one-step inequalities. Solve multi-step inequalities.

Topic: 1-6 Solving Compound and Absolute Value Inequalities	**Duration:** 2 Day(s)

Topic Overview
Solve compound inequalities. Solve absolute value inequalities.

Learning Targets
Solve compound inequalities. Solve absolute value inequalities.

Topic: 2-1 Relations and Functions	**Duration:** 2 Day(s)

Topic Overview
Analyze relations and functions. Use equations of relations and functions.

Learning Targets
Analyze relations and functions. Use equations of relations and functions.

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Topic: 2-2 Linear Relations and Functions	**Duration:** 2 Day(s)

Topic Overview
Identify linear relations and functions and write linear equations in standard form.

Learning Targets
Identify linear relations and functions and write linear equations in standard form.

Topic: 2-3 Rate of Change and Slope	**Duration:** 2 Day(s)

Topic Overview
Find rate of change and determine the slope of a line.

Learning Targets
Find rate of change and determine the slope of a line.

Topic: 2-4 Writing Linear Equations	**Duration:** 2 Day(s)

Topic Overview
Write an equation of a line given the slope and a pont on the line and write an equation of a line parallel or perpendicular to a given line.

Learning Targets
Write an equation of a line given the slope and a pont on the line and write an equation of a line parallel or perpendicular to a given line.

Topic: 2-5 Scatter Plots and Lines of Regression	**Duration:** 2 Day(s)

Topic Overview
Use scatter plots and prediction equations. Model data using lines of regression.

Learning Targets
Use scatter plots and prediction equations. Model data using lines of regression.

Topic: 2-6 Special Functions	**Duration:** 2 Day(s)

Topic Overview
Write and graph piecewise-defined functions and write and graph step and absolute value functions.

Learning Targets
Write and graph piecewise-defined functions and write and graph step and absolute value functions.

Topic: 2-7 Parent Functions and Transformations	**Duration:** 2 Day(s)

Topic Overview
Identify and use parent functions and describe transformation of functions.

Learning Targets
Identify and use parent functions and describe transformation of functions.

Topic: 3-1 Solving Systems of Equations	**Duration:** 2 Day(s)

Topic Overview
Solve systems of linear equations with tables, graphically, and algebraically.

Learning Targets
Solve systems of linear equations with tables, graphically, and algebraically.

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Topic: 3-2 Solving Systems of Inequalities by Graphing	**Duration:** 2 Day(s)

Topic Overview

Solve systems of inequalities by graphing. Determine the coordinates of the vertices of a region formed by the graph of a system of inequalities.

Learning Targets

Solve systems of inequalities by graphing. Determine the coordinates of the verticies of a region formed by the graph of a system of inequalities.

Topic: 3-3 Optimization with Linear Programming	**Duration:** 2 Day(s)

Topic Overview

Find the maximum and minimum values of a function over a region. Solve real-world optimzation problems using linear programming.

Learning Targets

Find the maximum and minimum values of a function over a region. Solve real-world optimzation problems using linear programming.

Topic: 3-4 Systems of Equations in Three Variables	**Duration:** 2 Day(s)

Topic Overview

Solve systems of linear equations in three variables. Solve real-world problems using systems of linear equations in three variables.

Learning Targets

Solve systems of linear equations in three variables. Solve real-world problems using systems of linear equations in three variables.

Topic: 3-5 Operations with Matrices	**Duration:** 2 Day(s)

Topic Overview

Analyze data in matrices. Perform algebraic operations with matrices.

Learning Targets

Solve systems of linear equations in three variables. Solve real-world problems using systems of linear equations in three variables.

Topic: 3-6 Multiplying Matrices	**Duration:** 2 Day(s)

Topic Overview

Multiply matrices. Use the properties of matrix multiplication.

Learning Targets

Multiply matrices. Use the properties of matrix multiplication.

Topic: 3-7 Solving Systems of Equations Using Cramer's Rule	**Duration:** 2 Day(s)

Topic Overview

Evaluate determinants. Solve systems of linear equations by using Cramer's Rule.

Learning Targets

Evaluate determinants. Solve systems of linear equations by using Cramer's Rule.

Topic: 3-8 Solving Systems of Equations Using Inverse Matrices	**Duration:** 2 Day(s)

Topic Overview

Find the inverse of a 2x2 matrix. Write and solve matrix equations for a system of equations.

Learning Targets

Find the inverse of a 2x2 matrix. Write and solve matrix equations for a system of equations.

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Required Course

Unit: Quadratic, Polynomial, and Radical Functions and Relations | **Duration:** 9 Week(s)

Unit Overview

Quadratic Functions and Relations: Graph quadratic functions. Solve quadratic equations. Perform operations with complex numbers. Graph and solve quadratic inequalities. (4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8)

Polynomials and Polynomial Functions: Add, subtract, multiply, divide and factor polynomials. Analyze and graph polynomial functions. Evaluate polynomial functions and solve polynomial equations. Find factors and zeros of polynomial functions. (5-1, 5-2, 5-3, 5-4, 5-5, 5-6, 5-7, 5-8)

Inverses and Radical Functions and Relations: Find compositions and inverses of functions. Graph and analyze square roots functions and inequalities. Simplify and solve equations involving roots, radicals and rational exponents. (6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-7)

Materials and Resources

Textbook
Online resources

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Required Course

Academic Vocabulary
Quadratic Functions and Relations
axis of symmetry
completing the square
complex conjugates
complex numbers
constant term
discriminant
factored form
FOIL method
imaginary unit
linear term
maximum value
minimum value
parabola
pure imaginary numbers
quadratic equation
Quadratic Formula
quadratic function
quadratic inequality
quadratic term
root
Square Root Property
standard form
vertex
vertex form
zero
Polynomials and Polynomial Functions
degree of a polynomial
depressed polynomial
end behavior
extrema
leading coefficient
Location principle
polynomial function
polynomial in one variable
power function
prime polynomials
quadratic form
relative maximum
relative minimum
simplify
synthetic division
synthetic substitution
turning points
Inverses and Radical Functions and Relations
composition of function
conjugates
extraneious solution
index
inverse function
inverse relation
like radical expressions
nth root
principal root
radical equation
radical function
radical inequality
radical sign
radicand
rationalizing the denominator
square root function
square root inequality

Summative Assessment
Quadratic Functions and Relations Assessment
Polynomials and Polynomial Functions Assessment
Inverses and Radical Functions and Relations Assessment

Topic: 4-1 Graphing Quadratic Functions	**Duration:** 2 Day(s)

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                                                                    Required Course

Topic Overview
  Graph quadratic functions. Find and interpret the maximum and minimum values of quadratic functions.

Learning Targets
  Graph quadratic functions. Find and interpret the maximum and minimum values of quadratic functions.

Topic: 4-2 Solving Quadratic Equations by Graphing   **Duration:** 2 Day(s)

Topic Overview
  Solve quadratic equations by graphing. Estimate solutions of quadratic equations by graphing.

Learning Targets
  Solve quadratic equations by graphing. Estimate solutions of quadratic equations by graphing.

Topic: 4-3 Solving Quadratic Equations by Factoring   **Duration:** 2 Day(s)

Topic Overview
  Write quadratic equations in intercept form. Solve quadratic equations by factoring.

Learning Targets
  Write quadratic equations in intercept form. Solve quadratic equations by factoring.

Topic: 4-4 Complex Numbers   **Duration:** 2 Day(s)

Topic Overview
  Perform operations with pure imaginary numbers. Perform operations with complex numbers.

Learning Targets
  Perform operations with pure imaginary numbers. Perform operations with complex numbers.

Topic: 4-5 Completing the Square   **Duration:** 2 Day(s)

Topic Overview
  Solve quadratic equations by using the Square Root Property. Solve quadratic equations by completing the square.

Learning Targets
  Solve quadratic equations by using the Square Root Property. Solve quadratic equations by completing the square.

Topic: 4-6 The Quadratic Formula and the Discriminant   **Duration:** 2 Day(s)

Topic Overview
  Solve quadratic equations by using the Quadratic Formula. Use the discriminant to detemrine the numbers and type of roots of a quadratic equation.

Learning Targets
  Solve quadratic equations by using the Quadratic Formula. Use the discriminant to detemrine the numbers and type of roots of a quadratic equation.

Topic: 4-7 Transformations of Quadratic Graphs   **Duration:** 2 Day(s)

Topic Overview
  Write a quadratic function in the form $y = a(x - h)2 + k$. Transform graphs of quadratic functions of the form $y = a(x - h)2 + k$.

Learning Targets
  Write a quadratic function in the form $y = a(x - h)2 + k$. Transform graphs of quadratic functions of the form $y = a(x - h)2 + k$.

Topic: 4-8 Quadratic Inequalities   **Duration:** 2 Day(s)

Topic Overview

Graph quadratic inequalities in two variables. Solve quadratic inequalities in one variable.

Learning Targets

Graph quadratic inequalities in two variables. Solve quadratic inequalities in one variable.

Topic: 5-1 Operations with Polynomials   **Duration:** 2 Day(s)

Topic Overview

Multiply, divide and simplify monomials and expressions involving powers. Add, subtract, and multiply polynomials.

Learning Targets

Multiply, divide and simplify monomials and expressions involving powers. Add, subtract, and multiply polynomials.

Topic: 5-2 Dividing Polynomials   **Duration:** 2 Day(s)

Topic Overview

Divide polynomials using long division. Divide polynomils using synthetic division.

Learning Targets

Divide polynomials using long division. Divide polynomils using synthetic division.

Topic: 5-3 Polynomial Functions   **Duration:** 2 Day(s)

Topic Overview

Evaluate polynomial functions. Identify general shapes of graphs of polynomial functions.

Learning Targets

Evaluate polynomial functions. Identify general shapes of graphs of polynomial functions.

Topic: 5-4 Analyzing Graphs of Polynomial Functions   **Duration:** 2 Day(s)

Topic Overview

Graph polynomial functions and locate their zeros. Find the relative maxima and minima of polynomial functions.

Learning Targets

Graph polynomial functions and locate their zeros. Find the relative maxima and minima of polynomial functions.

Topic: 5-5 Solving Polynomial Equations   **Duration:** 2 Day(s)

Topic Overview

Factor polynomials. Solve polynomial equations by factoring.

Learning Targets

Factor polynomials. Solve polynomial equations by factoring.

Topic: 5-6 The Remainder and Factor Theorem   **Duration:** 2 Day(s)

Topic Overview

Evaluate functions by using synthetic substitution. Determine whether a binomial is a factor of a polynomial by using synthetic substitution.

Learning Targets

Evaluate functions by using synthetic substitution. Determine whether a binomial is a factor of a polynomial by using synthetic substitution.

Topic: 5-7 Roots and Zeros   **Duration:** 2 Day(s)

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Topic Overview

Determine the numbers and type of roots for a polynomial equation. Find the zeros of a polynomial function.

Learning Targets

Determine the numbers and type of roots for a polynomial equation. Find the zeros of a polynomial function.

Topic: 5-8 Rational Zero Theorem

Duration: 2 Day(s)

Topic Overview

Identify possible rational zeros of a polynomial function. Find all of the rational zeros of a polynomial function.

Learning Targets

Identify possible rational zeros of a polynomial function. Find all of the rational zeros of a polynomial function.

Topic: 6-1 Operations on Functions

Duration: 2 Day(s)

Topic Overview

Find the sum, difference, product and quotient of functions. Find the composition of functions.

Learning Targets

Find the sum, difference, product and quotient of functions. Find the composition of functions.

Topic: 6-2 Inverse Functions and Relations

Duration: 2 Day(s)

Topic Overview

Find the inverse of a function or relation. Determine whether two functions or relations are inverses.

Learning Targets

Find the inverse of a function or relation. Determine whether two functions or relations are inverses.

Topic: 6-3 Square Root Functions and Inequalities

Duration: 2 Day(s)

Topic Overview

Graph and analyze square root functions. Graph square root inequalities.

Learning Targets

Graph and analyze square root functions. Graph square root inequalities.

Topic: 6-4 nth Roots

Duration: 2 Day(s)

Topic Overview

Simplify radicals. Use a calcalator to approximate radicals.

Learning Targets

Simplify radicals. Use a calcalator to approximate radicals.

Topic: 6-5 Operations with Radical Expressions

Duration: 2 Day(s)

Topic Overview

Simplify radical expressions. Add, subtract, multiply and divide radical expressions.

Learning Targets

Simplify radical expressions. Add, subtract, multiply and divide radical expressions.

Topic: 6-6 Rational Exponents

Duration: 2 Day(s)

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Topic Overview

Write expressions with rational exponents in radical form and vice versa. Simplify expressions in exponential or radical form.

Learning Targets

Write expressions with rational exponents in radical form and vice versa. Simplify expressions in exponential or radical form.

Topic: 6-7 Solving Radical Equations and Inequalities	**Duration:** 2 Day(s)

Topic Overview

Solve equations containing radicals. Solve inequalities containing radicals.

Learning Targets

Solve equations containing radicals. Solve inequalities containing radicals.

Unit: Advanced Functions and Relations

Duration: 9 Week(s)

Unit Overview

Exponential and Logarithmic Functions and Relations: Graph exponential and log functions. Solve exponential and log equations and inequalities. Solve problems involving exponential growth and decay. (7-1, 7-2, 7-3, 7-4)

Rational Function and Relations: Simplify rational expressions. Graph rational functions. solve direct, joint and inverse variation problems. Solve rational equations and inequalities. (8-1, 8-2, 8-3, 8-4, 8-5, 8-6)

Conic Sections: Use the Midpoint and Distance Formulas. Write and graph equations of parabolas, cricles, ellipses, and hyperbolas. Identify conic sections. Solve systems of quadratic equations and inequalities. (9-1, 9-2, 9-3, 9-4, 9-5, 9-6, 9-7)

Materials and Resources

Textbook
Online resources

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Required Course

Academic Vocabulary
Exponential and Logarithmic Functions and Relations
asymptote
Change of Base Formula
common logarithm
compound interest
decay factor
exponential decay
exponential equation
exponential function
exponential growth
exponential inequality
growth factor
logarithm
logarithmic equation
logarithmic function
logarithmic inequality
logistic growth model
natural base, e
natural base exponential function
natural logarithm
rate of continuous decay
rate of continuous growth
Rational Function and Relations
combined variation
complex fraction
constant of variation
direct variation
horizontal asymptote
hyperbola
inverse variation
joint variation
oblique asymptote
point discontinuity
rational equation
rational expression
rational function
rational inequality
reciprocal function
vertical asymptote
weighted average
Conic Sections
center of a circle
center of an ellipse
circle
conjugate axis
constant difference
constant sum
co-vertices of a hyperbola
co-vertices of an ellipse
directix
ellipse
foci of a hyperbola
foci of an ellipse
focus
hyperbola
latus rectum
major axis
minor axis
parabola
radiu
transverse axis
vertices of a hyperbola
vertices of an ellipse

Summative Assessment
Exponential and Logarithmic Functions and Relations Assessment
Rational Function and Relations Assessment
Conic Sections Assessment

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Topic: 7-1 Graphing Exponential Functions   **Duration:** 2 Day(s)

Topic Overview
Graph exponential growth functions. Graph exponential decay functions.

Learning Targets
Graph exponential growth functions. Graph exponential decay functions.

Topic: 7-2 Solving Exponential Equations and Inequalities   **Duration:** 2 Day(s)

Topic Overview
Solve exponential equations. Solve exponential inequalities.

Learning Targets
Solve exponential equations. Solve exponential inequalities.

Topic: 7-3 Logarithms and Logarithmic Functions   **Duration:** 2 Day(s)

Topic Overview
Evaluate logarithmic expressions. Graph logarithmic functions.

Learning Targets
Evaluate logarithmic expressions. Graph logarithmic functions.

Topic: 7-4 Solving Logarithmic Equations and Inequalities   **Duration:** 2 Day(s)

Topic Overview
Solve logarithmic equations. Solve logarithmic inequalities.

Learning Targets
Solve logarithmic equations. Solve logarithmic inequalities.

Topic: 8-1 Multiplying and Dividing Rational Expressions   **Duration:** 2 Day(s)

Topic Overview
Simplify rational expressions. Simplify complex fractions.

Learning Targets
Simplify rational expressions. Simplify complex fractions.

Topic: 8-2 Adding and Subtracting Rational Expressions   **Duration:** 2 Day(s)

Topic Overview
Determine the LCM of polynomials. Add and subtract rational expressions.

Learning Targets
Determine the LCM of polynomials. Add and subtract rational expressions.

Topic: 8-3 Graphing Reciprocal Functions   **Duration:** 2 Day(s)

Topic Overview
Determine properties of reciprocal functions. Graph transformations of reciprocal functions.

Learning Targets
Determine properties of reciprocal functions. Graph transformations of reciprocal functions.

Topic: 8-4 Graphing Rational Functions   **Duration:** 2 Day(s)

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Topic Overview

Graph rational functions with vertical and horizontal asymptotes. Graph rational functions with oblique asymptotes and point discontinuity.

Learning Targets

Graph rational functions with vertical and horizontal asymptotes. Graph rational functions with oblique asymptotes and point discontinuity.

Topic: 8-5 Variation Functions | **Duration:** 2 Day(s)

Topic Overview

Recognize and solve direct and joint variation problems. Recognize and solve inverse and combined variation problems.

Learning Targets

Recognize and solve direct and joint variation problems. Recognize and solve inverse and combined variation problems.

Topic: 8-6 Solving Rational Equations and Inequalities | **Duration:** 2 Day(s)

Topic Overview

Solve rational equations. Solve rational inequalities.

Learning Targets

Solve rational equations. Solve rational inequalities.

Topic: 9-1 Midpoint and Distance Formulas | **Duration:** 2 Day(s)

Topic Overview

Find the midpoint of a segment on the coordinate plane. Find the distance between two points on the coordinate plane.

Learning Targets

Find the midpoint of a segment on the coordinate plane. Find the distance between two points on the coordinate plane.

Topic: 9-2 Parabolas | **Duration:** 2 Day(s)

Topic Overview

Write equations of parabolas in standard form. Graph parabolas.

Learning Targets

Write equations of parabolas in standard form. Graph parabolas.

Topic: 9-3 Circles | **Duration:** 2 Day(s)

Topic Overview

Write equations of circles. Graph circles.

Learning Targets

Write equations of circles. Graph circles.

Topic: 9-4 Ellipses | **Duration:** 2 Day(s)

Topic Overview

Write equations of ellipses. Graph ellipses.

Learning Targets

Write equations of ellipses. Graph ellipses.

Topic: 9-5 Hyperbolas | **Duration:** 2 Day(s)

Topic Overview

Write equations of hyperbolas. Graph hyperbolas.

Learning Targets

Write equations of hyperbolas. Graph hyperbolas.

Topic: 9-6 Identifying Conic Sections

Duration: 2 Day(s)

Topic Overview

Write equations of conic sections in standard form. Identify conic sections from their equations.

Learning Targets

Write equations of conic sections in standard form. Identify conic sections from their equations.

Topic: 9-7 Solving Linear-Nonlinear Systems

Duration: 2 Day(s)

Topic Overview

Solve systems of linear and nonlinear equations algebraically and graphically. Solve systems of linear and nonlinear inequalities graphically.

Learning Targets

Solve systems of linear and nonlinear equations algebraically and graphically. Solve systems of linear and nonlinear inequalities graphically.

Unit: Discrete Mathematics

Duration: 6 Week(s)

Unit Overview

Sequences and Series: Use arithmetic ande geometric sequences and series. Use special sequences and iterate functions. Expand powers by using the Binomial Theorem. Prove statements by using mathematical induction. (10-1, 10-2, 10-3, 10-4)

Statistics and Probability: Evaluate surveys, studies and experiments. Create and use graphs of probability distributions. Use the Empirical Rule to find probabilities. Compare sample statistics and population statistics. (11-1, 11-2, 11-3, 11-4, 11-5, 11-6)

Materials and Resources

Textbook
Online resources

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Academic Vocabulary
Sequences and Series
arithmetic means
arithmetic sequence
arithmetic series
common difference
common ratio
convergent series
divergent series
explicit formula
fibonacci sequence
finite sequence
geometric means
geometric sequence
geometric series
induction hypothesis
infinite geometric series
infinite sequence
infinity
iteration
mathematical indcuation
partial sum
Pascal's triangle
recursive formula
recursive sequence
sequence
seies
sigma notation
term
Statistics and Probability
alternate hypothesis
bias
binomial distribution
confidence interval
continuous random variable
discrete random variable
Empirical Rule
expected value
experiment
experimental probability distribution
hypothesis test
inferential statistics
maximum error of estimate
negatively skewed distribution
normal distribution
null hypothesis
observational study
parameter
positively skewed distribution
probability distribution
random variable
standard normal distribution
statistic
statistical inference
survey
symmetric distribution
theoretical probability distribution
z-value

Summative Assessment
Sequences and Series Assessment
Statistics and Probability Assessment

Topic: 10-1 Sequences as Functions   **Duration:** 2 Day(s)

Topic Overview
Relate arithmetic sequences to linear functions. Relate geometric sequences to exponential functions.

Learning Targets
Relate arithmetic sequences to linear functions. Relate geometric sequences to exponential functions.

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Topic: 10-2 Arithmetic Sequences and Series	**Duration:** 2 Day(s)

Topic Overview
Use arithmetic sequences. Find sums of arithmetic series.

Learning Targets
Use arithmetic sequences. Find sums of arithmetic series.

Topic: 10-3 Geometric Sequences and Series	**Duration:** 2 Day(s)

Topic Overview
Use geometric sequences. Find sums of geometric series.

Learning Targets
Use geometric sequences. Find sums of geometric series.

Topic: 10-4 Infinite Geometric Series	**Duration:** 2 Day(s)

Topic Overview
Find sums of infinite geometric series. Write repeating decimas as fractions.

Learning Targets
Find sums of infinite geometric series. Write repeating decimas as fractions.

Topic: 11-1 Designing a Study	**Duration:** 2 Day(s)

Topic Overview
Classify study types. Design statistical studies.

Learning Targets
Classify study types. Design statistical studies.

Topic: 11-2 Distributions of Data	**Duration:** 2 Day(s)

Topic Overview
Use the shapes of distributions to select appropriate statistics. Use the shapes of distributions to compare data.

Learning Targets
Use the shapes of distributions to select appropriate statistics. Use the shapes of distributions to compare data.

Topic: 11-3 Probability Distributions	**Duration:** 2 Day(s)

Topic Overview
Construct a probability distribution. Analyze a probability distribution and its summary statistics.

Learning Targets
Construct a probability distribution. Analyze a probability distribution and its summary statistics.

Topic: 11-4 The Binomial Distribution	**Duration:** 2 Day(s)

Topic Overview
Identify and conduct a binomial experiment. Find probabilities using binomial distributions.

Learning Targets
Identify and conduct a binomial experiment. Find probabilities using binomial distributions.

Advanced Algebra II

Mathematics

Grade(s) 10th - 11th, Duration 1 Year, 1 Credit
Required Course

Topic: 11-5 The Normal Distribution   **Duration:** 2 Day(s)

Topic Overview
Use the Emperical Rule to analyze normally distributed variables. Apply the standard normal distribution and z-values.

Learning Targets
Use the Emperical Rule to analyze normally distributed variables. Apply the standard normal distribution and z-values.

Topic: 11-6 Confidence Intervals and Hypothesis Testing   **Duration:** 2 Day(s)

Topic Overview
Find confidence intervals for normally distributed data. Perform hypthesis tests on normally distributed data.

Learning Targets
Find confidence intervals for normally distributed data. Perform hypthesis tests on normally distributed data.

Unit: Trigonometry   **Duration:** 4 Week(s)

Advanced Algebra II

Mathematics

Grade(s) 10th - 11th, Duration 1 Year, 1 Credit
Required Course

Unit Overview

Trigonometric Functions: Find values of trig functions. Solve problems by using right triangle trigonometry. Solve triangles by using the Law of Sines and Law of Cosines. Graph tronometric functions. (12-1, 12-2, 12-3, 12-4, 12-5, 12-6)

Trigonometric Identities and Equations: Use and verify trigonometric identities. Use the sum and difference of angle identities. (13-1, 13-2)

Materials and Resources

Textbook
Online resources

Academic Vocabulary

Trigonometric Functions
ambiguous case
amplitude
angle of depression
angle of elevation
Arccosine function
Arctangent function
central angle
circular function
cosecant
cosine
cotangent
coterminal angles
cycle
frequence
initial side
Law of Cosines
Law of Sines
midline
period
periodica function
phase shift
principal values
quadrantal angle
radian
reference angle
secant
sine
solving a triangle
standard position
tangent
terminal side
trigonometric function
trigonometric ratio
trigonometry
unit circle
vertical shift
Trigonometric Identities and Equations
cofunction identity
negative angle identity
Pythagorean identity
quotient identity
reciprocal identity
trigonometric equation
trigonometric identity

Summative Assessment

Trigonometric Functions Assessment
Trigonometric Identities and Equations Assessment

Topic: 12-1 Trig Functions in Right Triangles	**Duration:** 2 Day(s)

Topic Overview

Find values of trig functions for acute angles. Use trig functions to find side lengths and angle measures of right triangles.

Learning Targets

Find values of trig functions for acute angles. Use trig functions to find side lengths and angle measures of right triangles.

Topic: 12-2 Angles and Angle Measure	**Duration:** 2 Day(s)

Topic Overview

Draw and find angles in standard position. Convert between degree measures and radian measures.

Learning Targets

Draw and find angles in standard position. Convert between degree measures and radian measures.

Topic: 12-3 Trig Functions of General Angles

Duration: 2 Day(s)

Topic Overview

Find values of trig functions for general angles. Find values of trig functions by using reference angles.

Learning Targets

Find values of trig functions for general angles. Find values of trig functions by using reference angles.

Topic: 12-4 Law of Sines

Duration: 2 Day(s)

Topic Overview

Find the area of a triangle using two sides and an included angles. Use the Law of Sines to solve triangles.

Learning Targets

Find the area of a triangle using two sides and an included angles. Use the Law of Sines to solve triangles.

Topic: 12-5 Law of Cosines

Duration: 2 Day(s)

Topic Overview

Use the Law of Cosines to solve triangles. Choose methods to solve triangles.

Learning Targets

Use the Law of Cosines to solve triangles. Choose methods to solve triangles.

Topic: 12-6 Circular and Periodic Functions

Duration: 2 Day(s)

Topic Overview

Find values of trig functions based on the unit circle. Use the properties of periodic functions to evaluate trig functions.

Learning Targets

Find values of trig functions based on the unit circle. Use the properties of periodic functions to evaluate trig functions.

Topic: 13-1 Trig Identities

Duration: 2 Day(s)

Topic Overview

Use trig identities to find trig values. Use trig indentities to simplify expressions.

Learning Targets

Use trig identities to find trig values. Use trig indentities to simplify expressions.

Topic: 13-2 Verifying Trig Identities

Duration: 2 Day(s)

Topic Overview

Verify trig identities by transforming one side of of an equation into the form of the other side. Verify trig identities by transforming each side of the equation into the same form.

Learning Targets

Verify trig identities by transforming one side of of an equation into the form of the other side. Verify trig identities by transforming each side of the equation into the same form.