Algebra 1 (8)

Mathematics

<div align="right">Grade(s) 8th, Duration 1 Year, 1 Credit
Required Course</div>

Course Overview

Students will develop skills in using variables, evaluating algebraic expressions using order of operations, solving equations and inequalities, graphing linear equations, functions and linear inequalities, writing linear equations, and using functions. Problem solving skills will be emphasized and developed.

Scope And Sequence

Timeframe	Unit	Instructional Topics
28 Day(s)	Relationships between Quantities	1. Expressions, Equations, and Functions 2. Linear Equations
52 Day(s)	Linear Relationships	1. Linear Functions 2. Equations of Linear Functions 3. Linear Inequalities 4. Systems of Linear Equations and Inequalities
46 Day(s)	Exponential and Quadratic Relationships	1. Exponents and Exponential Functions 2. Quadratic Expressions and Equations 3. Quadratic Functions and Equations
25 Day(s)	Advanced Functions and Equations	1. Radical Functions and Geometry 2. Rational Functions and Equations
11 Day(s)	Data Analysis	1. Statistics and Probability

Materials and Resources

Algebra 1 Glencoe 2012
Kuta Software
Study Island

Prerequisites

Teacher Recommendation, successful completion of 7th grade mathematics

Course Details

Unit: Relationships between Quantities

Duration: 28 Day(s)

Unit Overview

Write and solve one-step equations, multi-step equations, and equations involving absolute value using order of operations, the distributive property, and number properties.

Materials and Resources

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Academic Vocabulary

Algebraic Expressions
Variable
Term
Exponent
Evaluate
Additive identity
Multiplicative identity
Multiplicative Inverse
Reciprocal
Like Terms
Coefficient
Replacement Set
Solution Set
Equation
Function
x-intercept
y-intercept
Percent of change
Literal equation
Symmetry
Independent Variable
Dependent Variable

Summative Assessment

Chapter Test

Topic: Expressions, Equations, and Functions

Duration: 14 Day(s)

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Topic Overview

Students will learn the similarities and differences between expressions, equations, and functions. Students will also practice using order of operations and the distributive property to simplify expressions and equations.

Learning Targets

Section 1-1a
Write verbal expressions for algebraic expressions

Section 1-1b
Write algebraic expressions for verbal expressions.

Section 1-2a
Evaluate numerical expressions by using the order of operations.

Section 1-2b
Evaluate algebraic expressions by using the order of operations.

Section 1-3
Recognize the number properties.
Reflexive Property, Symmetric Property, Transitive Property, Substitution Property, Additive Identity, Additive Inverse, Multiplicative Identity, Multiplicative Property of Zero, Multiplicative Inverse, Commutative Property, Associative Property

Section 1-4
Distributive Property
evaluate and simplify expressions

Section 1-5 a
One-Step Equations

Section 1-5 b
Two-Step Equations

Section 1-6 a
Represent Relations
Graph, Table, and Mapping

Section 1-6 b
Interpret graphs of relations
Story Graphs

Section 1-7
Determine whether a relation is a function.

Section 1-8 a
Interpret Graphs
Intercepts, Symmetry of graphs of functions

Section 1-8 b
Interpret Graphs
Positive, Negative, Increasing and Decreasing behavior, Extrema, and End behavior

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Topic: Linear Equations   **Duration:** 14 Day(s)

Topic Overview

Solve one-step, multi-step, and equations involving absolute value. Compare ratios and solve proportions involving equations and solve equations for given variables.

Learning Targets

Section 2-1
Translate sentences into equations and equations into sentences.

Section 2-2 a
Solve one-step equations using addition and subtraction.

Section 2-2 b
Solve equations by using multiplication and division.

Section 2-3 a
Solve equations involving more than one operation.

Section 2-3 b
Solve equations involving consecutive integers.

Section 2-4 a
Solve equations with the variable on each side.

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Section 2-4 b
Solve equations involving grouping symbols.

Section 2-5
Solve absolute value equations.

Section 2-6
Solve proportions involving expressions.

Section 2-7 a
Find the percent of change.

Section 2-7 b
Solve problems involving percent of change.

Section 2-8
Literal Equations

Section 2-9
Solve problems involving weighted averages.

Unit: Linear Relationships

Duration: 52 Day(s)

Unit Overview
Graphing linear functions and inequalities. Learn standard. slope-intercept, and point-slope forms of lines. Graph and solve systems of equations using substitution and elimination.

Materials and Resources
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Study Island

Academic Vocabulary
Rate of Change
Slope
Standard Form
Arithmetic Sequence
Slope-Intercept Form
Point-Slope Form
Bivariate Data
Scatter Plot
Inequality,
System of Equations
Substitution
Elimination

Summative Assessment
Chapter Tests

Topic: Linear Functions

Duration: 11 Day(s)

Topic Overview
Students will graph functions using the x and y intercepts. Students will solve linear equations algebraically and by graphing. Students will discover slope and rate of change.

Learning Targets
Section 3-1
Identify linear equations, intercepts, and zeros.
  Put equations into standard form

Section 3-1 b
Graph linear equations.
  Use x and y intercepts to graph linear equations.

Section 3-2
Solve linear equation by graphing.
  Use zeros and function tables to graph linear equations.

Section 3-3 a
Use rate of change to solve problems.

Section 3-3 b
Find the slope of a line.

Section 3-4 a
Write and graph direct variation equations.

Section 3-4 b
Solve problems involving direct variation.

Section 3-5
Recognize and relate arithmetic sequences to linear functions.

Section 3-6 a
Write an equation for a proportional relationship.

Section 3-6 b
Write an equation for a non-proportional relationship.

Topic: Equations of Linear Functions	**Duration:** 15 Day(s)

Topic Overview
Students will write equations in slope-intercept form and point-slope form. Students will also determine lines of best fit on scatter plots and determine regression and median-fit lines.

Learning Targets

Section 4-1 a
Write and graph linear equations in slope-intercept form.

Section 4-1 b
Model real-world data with equations in slope-intercept form.

Section 4-2 a
Write an equation of a line in slope-intercept form given the slope and one point.

Section 4-2 b
Write an equation of a line in slope-intercept form given two points.

Section 4-3 a
Write equations of lines in point-slope form.

Section 4-3 b
Write linear equations in different forms.
   Standard Form, Slope-intercept Form, Point-slope Form

Section 4-4
Write an equation of the line that passes through a given point, parallel or perpendicular to a given line.

Section 4-5 a
Investigate relationships between quantities by using points on scatter plots.

Section 4-5 b
Use lines of fit to make and evaluate predictions.

Section 4-6
Write equations of best-fit lines using linear regression.

Section 4-7
Find the inverse of a relation and a linear function.

Topic: Linear Inequalities	**Duration:** 11 Day(s)

Topic Overview
Solve multi-step & compound inequalities and inequalities involving absolute value. Graph inequalities in two variables.

Learning Targets

Section 5-1
Solve linear inequalities by using addition or subtraction.

Section 5-2
Solve linear inequalities by using multiplication or division.

Section 5-3 a
Solve linear inequalities involving more than one operation.

Section 5-3 b
Solve linear inequalities involving the Distributive Property.

Section 5-4 a
Solve compound inequalities containing the word and, and graph their solution set.

Section 5-4 b
Solve compound inequalities containing the word or, and graph their solution set.

Section 5-5 a
Solve and graph absolute value inequalities (<).

Section 5-5 b
Solve and graph absolute value inequalities (>).

Section 5-6 a
Graph linear inequalities on the coordinate plane.

Section 5-6 b
Solve inequalities by graphing.

Topic: Systems of Linear Equations and Inequalities | **Duration:** 15 Day(s)

Topic Overview
Students will solve systems of linear equations using elimination and substitution.

Learning Targets

Section 6-1 a
Determine the number of solutions a system of linear equations has.

Section 6-1 b
Solve systems of linear equations by graphing.

Section 6-2
Solve systems of equations by using substitution.

Section 6-3 a
Solve systems of equations by using elimination with addition.

Section 6-3 b
Solve systems of equations by using elimination with subtraction.

Section 6-4
Solve systems of equations by using elimination with multiplication.

Section 6-5
Determine and apply the best method for solving systems of equations.

Section 6-6
Solve systems of linear inequalities by graphing.

Unit: Exponential and Quadratic Relationships | **Duration:** 46 Day(s)

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Required Course

Unit Overview
Learn properties of exponents and exponential functions. Add, subtract, and multiply polynomials. Solve quadratic equations.

Materials and Resources
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Academic Vocabulary
Monomial
Cube root
Exponential equation
Scientific notation
Polynomial
Binomial
Trinomial
Degree of monomial and polynomial
FOIL method
Quadratic expression/ equation
Factoring

Summative Assessment
Chapter Tests

Topic: Exponents and Exponential Functions	**Duration:** 15 Day(s)

Topic Overview
Students will simplify polynomial expressions and apply the laws of exponents in problem-solving situations. They will also graph and analyze exponential functions including exponential growth and decay.

Learning Targets
Section 7-1 a
Multiply monomials using the properties of exponents.

Section 7-1 b
Simplify expressions using the multiplication properties of exponents.

Section 7-2 a
Divide monomials using the properties of exponents.

Section 7-2 b
Simplify expressions containing negative and zero exponents.

Section 7-3 a
Evaluate and rewrite expressions involving rational exponents.

Section 7-3 b
Solve equations involving expressions with rational exponents.

Section 7-4 a
Express numbers in scientific notation.

Section 7-4 b
Find products and quotients of numbers expressed in scientific notation.

Section 7-5
Graph exponential functions and identify data that display exponential behavior.

Section 7-6
Solve problems involving exponential growth and decay.

Section 7-7 a
Identify and generate geometric sequences.

Section 7-7 b
Relate geometric sequences to exponential functions.

Section 7-8
Use and write recursive formulas to list terms in a sequences.

Topic: Quadratic Expressions and Equations	**Duration:** 16 Day(s)

Topic Overview
Students will add, subtract, and multiply polynomials. Students will factor when necessary and solve quadratic equations.

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Learning Targets

Section 8-1a
Write polynomials in standard form.

Section 8-1 b
Add and subtract polynomials.

Section 8-2 a
Multiply a polynomial by a monomial.

Section 8-2 b
Solve equations involving the products of monomials and polynomials.

Section 8-3 a
Multiply binomials by using the FOIL method.

Section 8-3 b
Multiply polynomials by using the Distributive Property.

Section 8-4
Find squares and products of sums and differences.

Section 8-5 a
Use the Distributive Property to factor polynomials.

Section 8-5 b
Solve equations of the form $ax^2 + bx = 0$

Section 8-6
Factor and solve trinomials of the form $x^2 + bx + c = 0$

Section 8-7
Factor and solve trinomials of the form $ax^2 + bx + c = 0$

Section 8-8 a
Factor binomials that are the difference of squares.

Section 8-8 b
Use the difference of squares to solve equations.

Section 8-9
Factor and Solve equations involving perfect squares.

Topic: Quadratic Functions and Equations	**Duration:** 15 Day(s)

Topic Overview
Students will analyze and solve quadratic equation/ functions.

Learning Targets

Section 9-1
Analyze the characteristics of quadratic functions and graph.

Section 9-2
Estimate and solve quadratic equations by graphing.

Section 9-3 a
Apply translations of quadratic functions.

Section 9-3 b
Apply dilations and reflections to quadratic functions.

Section 9-4 a
Complete the square to write perfect square trinomials.

Section 9-4 b
Solve quadratic equations by completing the square.

Section 9-5 a
Solve quadratic equations by using the Quadratic Formula.

Section 9-5 b
Use the discriminant to determine the number of solutions to a quadratic equation.

Section 9-6
Identify and write linear, quadratic, and exponential functions from given data.

Section 9-7 a

Identify and graph step functions.

Section 9-7 b
Identify and graph absolute value and piecewise-defined functions.

Unit: Advanced Functions and Equations

Duration: 25 Day(s)

Unit Overview
Simplify and solve radical expressions/ equations. Learn and apply the Pythagorean Theorem. Simplify, add, subtract, multiply, and divide rational expressions.

Materials and Resources
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Academic Vocabulary
Square Root Function
Radical Function
Radicand
Radical expression
Rationalizing the denominator
Hypotenuse
Legs
Pythagoerean Theorem
Trigonometry
Sine
Cosine
Tangent
Inverse Variation
Rational Expression/ Equation

Summative Assessment
Chapter Tests

Topic: Radical Functions and Geometry

Duration: 12 Day(s)

Topic Overview
Students will add, subtract, multiply, simplify, and solve radical expressions/ equations. Students will also learn and apply the Pythagorean Theorem and trigonometric ratios to solve problems.

Learning Targets

Section 10-1 a
Graph and analyze dilations of radical functions.

Section 10-1 b
Graph and analyze reflections and translations of radical functions.

Section 10-2
Simplify radical expressions by using the Product/ Quotient Property of Square Roots.

Section 10-3 a
Add and subtract radical expressions.

Section 10-3 b
Multiply radical expressions.

Section 10-4 a
Solve radical equations.

Section 10-4 b
Solve radical equations with extraneous solutions.

Section 10-5 a
Solve problems by using the Pythagorean Theorem.

Section 10-5 b
Determine whether a triangle is a right triangle.

Section 10-6 a
Find trigonometric ratios of angles.

Section 10-6 b
Use trigonometry to solve triangles.

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Topic: Rational Functions and Equations	**Duration:** 13 Day(s)

Topic Overview
Students will simplify, add, subtract, multiply and divide rational expressions/ equations.

Learning Targets

Section 11-1
Identify and graph inverse variations.

Section 11-2 a
Identify excluded values for rational functions.

Section 11-2 b
Identify and use asymptotes to graph rational functions.

Section 11-3 a
Identify values excluded from the domain of a rational expressions.

Section 11-3 b
Simplify rational expressions.

Section 11-4
Multiply and divide rational expressions.

Section 11-5 a
Divide a polynomial by a monomial.

Section 11-5 b
Divide a polynomial by a binomial.

Section 11-6
Add and subtract rational expressions with like and unlike denominators.

Section 11-7
Simplify mixed expressions and complex fractions.

Section 11-8a
Solve rational equations.

Section 11-8 b
Use rational equations to solve problems.

Unit: Data Analysis   **Duration:** 11 Day(s)

Unit Overview
Study statistics, distributions of data, and permutations & combinations.

Materials and Resources
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Academic Vocabulary
Stastic
Variance
Standard Deviation
Bias
Theoretical Probability
Experimental Probability
Permutation
Combination
Compound Event

Summative Assessment
Chapter Test

Topic: Statistics and Probability	**Duration:** 11 Day(s)

Topic Overview
Students will use combinations and permutations to determine probabilities. Students will compute probability and use probability distributions.

Learning Targets
Section 12-1

Classify and analyze samples and studies.

Section 12-2a
Identify sample statistics and population parameters.

Section 12-2 b
Analyze data sets using statistics.

Section 12-3
Describe the shape of a distribution and use the shape to select appropriate statistics.

Section 12-4 a
Determine the effect that transformations of data have on measures of central tendency and variation.

Section 12-4 b
Compare data using measures of central tendency and variation.

Section 12-5 a
Calculate experimental probabilities.

Section 12-5 b
Design simulations and summarize data from simulations.

Section 12-6 a
Use permutations.

Section 12-6 b
Use combinations.

Section 12-7 a
Find probabilities of independent and dependent events.

Section 12-7 b
Find probabilities of mutually exclusive events.

Section 12-8 a
Find probabilities by using random variables.

Section 12-8 b
Find the expected value of a probability distribution.