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Grade Level: 8 Subject: Algebra

Chapter #: 1	Expressions, Equations, and Functions	Duration: Quarter 1	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.4	1-1: Variables and Expressions	• Write verbal expressions for algebraic expressions. • Write algebraic expressions for verbal expressions.	• Algebraic expression • Variable • Term • Factor • Product • Power • Exponent base
PS.7	1-2: Order of Operations	• Evaluate numerical expressions by using the order of operations. • Evaluate algebraic expressions by using the order of operations.	• Evaluate • Order of operations
PS.2, PS.3	1-3: Properties of Numbers	• Recognize the properties of equality and identity. • Recognize the Commutative and Associative Properties.	• Equivalent expression • Additive identity • Multiplicative identity • Multiplicative inverse • reciprocal
PS.8, AI.RNE.6	1-4: The Distributive Property	• Use the Distributive Property to evaluate expressions. • Use the Distributive Property to simplify expressions.	• Like terms • Simplest form • coefficient
AI.F.1, AI.F.2, AI.F.3, AI.F.4	1-6: Relations	• Represent relations. • Interpret graphs of relations.	• Coordinate system • Coordinate plane • X- and y-axes • Origin • Ordered pair • X- and y-coordinates

			• Relation • Mapping • Domain • Range • Independent variable • Dependent variable
AI.F.1, AI.F.2, AI.F.3, AI.F.4	1-7: Functions	• Determine whether a relation is a function. • Find function values	• Function • Discrete function • Continuous function • Vertical line test • Function notation • Nonlinear function

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Chapter #: 2	Linear Equations	Duration: Quarter 1	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.2, AI.L.2	2-1: Writing Equations	• Translate sentences into equations. • Translate equations into sentences.	• formula
AI.L.1, AI.L.2	2-2: Solving One-Step Equations	• Solve equations by using addition or subtraction. • Solve equations by using multiplication and division.	• Solve an equation • Equivalent equations
AI.L.1, AI.L.2	2-3: Solving Multi-Step Equations	• Solve equations involving more than one operation. • Solve equations involving consecutive integers.	• Multi-step equation • Consecutive integers • Number theory
PS.1, PS.5, AI.L.1, AI.L.2	2-4: Solving Equations with the Variable on Each Side	• Solve equations with the variable on each side. • Solve equations involving grouping symbols.	• identity
PS.3, PS.7, AI.L.9	2-5: Solving Equations Involving Absolute Value	• Evaluate absolute value expressions. • Solve absolute value equations	
AI.L.3	2-6: Ratios and Proportions	• Compare ratios. • Solve proportions.	• Ratio • Proportion • Means • Extremes • Rate • Unit rate • Scale • Scale model
PS.8, AI.L.1, AI.L.2	2-7: Percent of Change	• Find the percent of change. • Solve problems involving percent of change.	• Percent of change • Percent of increase • Percent of decrease

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PS.6, A.CED.4, A.REI.3, AI.L.11	2-8: Literal Equations and Dimensional Analysis	• Solve equations for given variables. • Use formulas to solve real-world problems	• Literal equation • Dimensional analysis • Unit analysis
PS.4, A.REI.1, A.REI.3	2-9: Weighted Averages	• Solve mixture problems. • Solve uniform motion problems.	• Weighted average • Mixture problem • Uniform motion problem • Rate problem

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Chapter #: 3	Linear Functions	Duration: Quarter 1	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.8	3-1: Graphing Linear Equations	• Identify linear equations, intercepts, and zeros. • Graph linear equations.	• Linear equation • Standard form • Constant • X-intercept • Y-intercept
PS.4	3-2: Solving Linear Equations by Graphing	• Solve linear equations by graphing. • Estimate solutions to an equation by graphing.	• Linear function • Parent function • Family of graphs • Root • zeros
PS.2, AI.F.4, AI.L.5	3-3: Rate of Change and Slope	• Use rate of change to solve problems. • Find the slope of a line.	• Rate of change • slope
PS.1, PS.6, AI.L.1, AI.L.2	3-4: Direct Variation	• Write and graph direct variation equations. • Solve problems involving direct variation.	• Direct variation • Constant of variation • Constant of proportionality
	3-5: Arithmetic Sequences as Linear Functions	• Recognize arithmetic sequences. • Relate arithmetic sequences to linear functions.	• Sequence • Terms • Arithmetic sequence • Common difference
PS.7, AI.F.4, AI.L.3	3-6: Proportional and Nonproportional Relationships	• Write an equation for a proportional relationship. • Write an equation for a nonproportional relationship.	

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Chapter #:	Name of Topic	Duration: Quarter 1	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.2, PS.8, AI.L.4, AI.L.5, AI.L.6	4-1: Graphing Equations in Slope-Intercept Form	• Write and graph linear equations in slope-intercept form. • Model real-world data with equations in slope-intercept form.	• Slope-intercept form • Constant function
PS.3, PS.6, AI.L.4, AI.L5, AI.L.6	4-2: Writing Equations in Slope-Intercept Form	• Write an equation of a line in slope-intercept form given the slope and one point. • Write an equation of a line in slope-intercept form given two points.	• Constraint • Linear extrapolation
AI.L.4, AI.L.5, AI.L6	4-3: Writing Equations in Point-Slope Form	• Write equations of lines in point-slope form. • Write linear equations in different forms.	• Point-slope form
PS.5	4-4: Parallel and Perpendicular Lines	• Write an equation of the line that passes through a given point, parallel to a given line. • Write an equation of the line that passes through a given point, perpendicular to a given line.	• Parallel lines • Perpendicular lines
PS.1, PS.4, AI.L.4, AI.L.5, AI.DS.2, AI.DS.3	4-5: Scatter Plots and Lines of Fit	• Investigate relationships between quantities by using points on scatter plots. • Use lines of fit to make and evaluate predictions.	• Bivariate data • Scatter plot • Line of fit • Linear interpolation
AI.L.4, AI.L5, AI.DS.6	4-6: Regression and Median-Fit Lines	• Write equations of best-fit lines using linear regression. • Write equations of median-fit lines.	• Best-fit line • Linear regression • Correlation coefficient • Residual • Median-fit line

	4-7: Inverse Linear Functions	• Find the inverse of a relation. • Find the inverse of a linear function.	• Inverse relation • Inverse function

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Chapter #: 5	Linear Inequalities	Duration: Quarter 2	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.2, PS.4, AI.L.1, AI.L.2	5-1: Solving Inequalities by Addition and Subtraction	• Solve linear inequalities by using addition. • Solve linear inequalities by using subtraction.	• Set-builder notation
PS.6, AI.L.1, AI.L.2	5-2: Solving Inequalities by Multiplication and Division	• Solve linear inequalities by using multiplication. • Solve linear inequalities by using division.	
AI.L.1, AI.L.2	5-3: Solving Multi-Step Inequalities	• Solve linear inequalities involving more than one operation. • Solve linear inequalities involving the Distributive Property	
PS.1, PS.8, AI.L.8	5-4: Solving Compound Inequalities	• Solve compound inequalities containing the word *and* and graph their solution set. • Solve compound inequalities containing the word *or* and graph their solution set.	• Compound inequality • Intersection • union
PS.3, PS.7	5-5: Inequalities Involving Absolute Value	• Solve and graph absolute value inequalities (<). • Solve and graph absolute value inequalities (>).	
AI.L.7	5-6: Graphing Inequalities in Two Variables	• Graph linear inequalities on the coordinate plane. • Solve inequalities by graphing.	• Boundary • Half-plane closed (open) half-plane

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Chapter #: 6	Systems of Linear Equations and Inequalities	Duration: Quarter 2	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.3, PS.8, AI.SEI.1, AI.SEI.3	6-1: Graphing Systems of Equations	• Determine the number of solutions a system of linear equations has, if any. • Solve systems of linear equations by graphing.	• System of equations • Consistent • Independent • Dependent • Inconsistent
AI.SEI.2, AI.SEI.3	6-2: Substitution	• Solve systems of equations by using substitution. • Solve real-world problems involving systems of equations by using substitution.	• Substitution
PS.7, AI.SEI.2, AI.SEI.3	6-3: Elimination Using Addition and Subtraction	• Solve systems of equations by using elimination with addition. • Solve systems of equations by using elimination with subtraction.	• elimination
PS.1, AI.SEI.3, AI.SEI.3	6-4: Elimination Using Multiplication	• Solve systems of equations by using elimination with multiplication. • Solve real-world problems involving systems of equations.	
PS.2, PS.4, AI.SEI.3	6-5: Applying Systems of Linear Equations	• Determine the best method for solving systems of equations. • Apply systems of equations.	
PS.6, AI.SEI.4	6-6: Systems of Inequalities	• Solve systems of linear inequalities by graphing. • Apply systems of linear inequalities	• Systems of inequalities

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Chapter #: 7	Exponents and Exponential Functions	Duration: Quarter 2	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.8, AI.RNE.3	7-1: Multiplication Properties of Exponents	• Multiply monomials using the properties of exponents. • Simplify expressions using the multiplication properties of exponents.	• Monomial • constant
PS.2, AI.RNE.3	7-2: Division Properties of Exponents	• Divide monomials using the properties of exponents. • Simplify expressions containing negative and zero exponents.	• Zero exponents • Negative exponent • Order of magnitude
AI.RNE.3	7-3: Rational Exponents	• Evaluate and rewrite expressions involving rational exponents. • Solve equations involving expressions with rational exponents.	• Rational exponent • Cube root • *n*th root • exponential equation
PS.3, PS.6	7-4: Scientific Notation	• Express numbers in scientific notation. • Find products and quotients of numbers expressed in scientific notation.	• Scientific notation
PS.1, AI.F.4, AI.QE.2, AI.QE.3	7-5: Exponential Functions	• Graph exponential functions. • Identify data that display exponential behavior.	• Exponential function • Exponential growth function • Exponential decay function
PS.4, AI.QE.2	7-6: Growth and Decay	• Solve problems involving exponential growth. • Solve problems involving exponential decay.	• Compound interest
PS.7	7-7: Geometric Sequences as Exponential Functions	• Identify and generate geometric sequences. • Relate geometric sequences to exponential functions.	• Geometric sequence • Common ratio

	7-8: Recursive Formulas	• Use a recursive formula to list the terms in a sequence. • Write recursive formulas for arithmetic and geometric sequences.	• Recursive formula

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Chapter #: 8	Adding and Subtracting Polynomials	Duration: Quarter 3	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.3, AI.RNE.7	8-1: Adding and Subtracting Polynomials	• Write polynomials in standard form. • Add and subtract polynomials.	• Polynomial • Binomial • Trinomial • Degree of a monomial • Degree of a polynomial • Leading coefficient
PS.5, AI.RNE.7	8-2: Multiplying a Polynomial by a Monomial	• Multiply a polynomial by a monomial. • Solve equations involving the products of monomials and polynomials.	
AI.RNE.7	8-3: Multiplying Polynomials	• Multiply binomials by using the FOIL method. • Multiply polynomials by using the Distributive Property	• FOIL method • Quadratic expression
PS.8, AI.RNE.7	8-4: Special Products	• Find squares of sums and differences. • Find the product of a sum and a difference.	
PS.2, AI.RNE.6, AI.QE.4, AI.QE.5	8-5: Using the Distributive Property	• Use the Distributive Property to factor polynomials. • Solve quadratic equations of the form $ax^2 + bx = 0$	• Factoring • Factoring by grouping • Zero product property
PS.7, AI.RNE.6, AI.QE.4, AI.QE.5	8-6: Solving $x^2 + bx + c = 0$	• Factor trinomials of the form $x^2 + bx + c$ • Solve equations of the form $x^2 + bx + c = 0$	• Quadratic equation
PS.4, AI.RNE.6,	8-7: Solving $ax^2 + bx + c = 0$	• Factor trinomials of the form $ax^2 + bx + c$	• Prime polynomial

AI.QE.4, AI.QE.5		• Solve equations of the form *ax^2 + bx + c =0*	
PS.1, AI.RNE.6, AI.QE.4, AI.QE.5	8-8: Differences of Squares	• Factor binomials that are the difference of squares. • Use the difference of squares to solve equations.	• Difference of two squares
PS.6, AI.RNE.6, AI.QE.4, AI.QE.5	8-9: Perfect Squares	• Factor perfect square trinomials. • Solve equations involving perfect squares.	• Perfect square trinomial

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Chapter #: 9	Quadratic Functions and Equations	Duration: Quarter 3	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.2, AI.F.4, AI.QE.3, AI.QE.5	9-1: Graphing Quadratic Functions	• Analyze the characteristics of the graphs of quadratic functions. • Graph quadratic functions.	• Quadratic function • Standard form • Parabola • Axis of symmetry • Vertex • Minimum • Maximum
PS.3, AI.QE.3, AI.QE.4, AI.QE.5, AI.QE.6, AI.QE.7	9-2: Solving Quadratic Equations by Graphing	• Solve quadratic equations by graphing. • Estimate solutions of quadratic equations by graphing.	• Double root
PS.1, PS.8, AI.QE.6, AI.QE.7	9-3: Transformations of Quadratic Functions	• Apply translations of quadratic functions. • Apply dilations and reflections to quadratic functions.	• Transformation • Translation • Dilation • Reflection • Vertex form
AI.QE.4, AI.QE.5, AI.QE.6, AI.QE.7	9-4: Solving Quadratic Equations by Completing the Square	• Complete the square to write perfect square trinomials. • Solve quadratic equations by completing the square.	• Completing the square
PS.6, AI.QE.4, AI.QE.5	9-5: Solving Quadratic Equations by Using the Quadratic Formula	• Solve quadratic equations by using the Quadratic Formula. • Use the discriminant to determine the number of solutions to a quadratic equation.	• Quadratic Formula • Discriminant

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PS.7, AI.QE.1	9-6: Analyzing Functions with Successive Differences	• Identify linear, quadratic, and exponential functions from given data. • Write equations that model data.	

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Chapter #: 10	Radical Functions and Geometry	Duration: Quarter 4	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
PS.6	10-1: Square Root Function	• Graph and analyze dilations of radical functions. • Graph and analyze reflections and translations of radical function.	• Square root function • Radical function • Radicand
PS.7, PS.8, AI.RNE.4	10-2: Simplifying Radical Expressions	• Simplify radical expressions by using the Product Property of Square Roots. • Simplify radical expressions by using the Quotient Property of Square Roots.	• Radical expression • Rationalizing the denominator • Conjugate
PS.2, AI.RNE.4	10-3: Operations with Radical Expressions	• Add and subtract radical expressions. • Multiply radical expressions.	
PS.3, PS.4	10-4: Radical Equations	• Solve radical equations. • Solve radical equations with extraneous solutions.	• Radical equations • Extraneous solutions
PS.1	10-5: The Pythagorean Theorem	• Solve problems by using the Pythagorean Theorem. • Determine whether a triangle is a right triangle	• Hypotenuse • Legs • Converse • Pythagorean triple

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Chapter #: 12	Statistics and Probability	Duration: Quarter 4	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
	12-7: Probability of Compound Events	• Find probabilities of independent and dependent events. • Find probabilities of mutually exclusive events.	• Compound event • Joint probability • Independent events • Dependent events • Mutually exclusive events
PS.7	12-8: Probability Distributions	• Find probabilities by using random variables. • Find the expected value of a probability distribution.	• Random variable • Discrete random variable • Probability distribution • Probability graph • Expected value

Chapter #: 11	Name of Topic	Duration: Quarter 4	
Standard(s)	**Lesson**	**Objective**	**Vocabulary**
AI.RNE.5	11-3: Simplifying Rational Expressions	• Identify values excluded from the domain of a rational expression. • Simplify rational expressions.	• Rational expression
AI.RNE.5	11-4: Multiplying and Dividing Rational Expressions	• Multiply rational expressions • Divide rational expressions.	