PA Core Standards For Mathematics
Curriculum Framework
Algebra 1

Grade	Big Idea	Essential Questions	Concepts	Competencies	Standard	Eligible Content	Vocabulary
ALG 1	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. Patterns exhibit relationships that can be extended, described, and generalized.	How is mathematics used to quantify, compare, represent, and model numbers? How can mathematics support effective communication? How are relationships represented mathematically? What does it mean to estimate or analyze numerical quantities? How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations? What makes a tool and/or strategy appropriate for a given task? How can patterns be used to describe relationships in mathematical situations?	Rational and Irrational Numbers	Represent and/or use numbers in equivalent forms (integers, fractions, decimals, percent's, square roots, exponents).	CC.2.1.HS.F.1 CC.2.1.HS.F.2	A1.1.1.1.1 A1.1.1.1.2 A1.1.1.3.1	Absolute Value Additive Inverse Additive Property of Equality Algorithm Arithmetic Sequence Associative Property Asymptote Bar Graph Binomial Bivariate Data Boundary Line Bounded Region Circle Graph Coefficient Commutative Property Composite Number Compound Event Compound Inequality Degree (of polynomial) Dependent Events Domain (of Relation or Function) Equivalent Exponential Equation Exponential Expression Exponential Function Exponential Growth/Decay Extrapolate Frequency Function Geometric Sequence Half-Plane Independent Events Independent Variable Index Interpolate

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							Interquartile Range Inverse (of a Relation) Inverse Operation Maximum Value (of a Graph) Measure of Central Tendencies Measure of Dispersion Minimum Value (of a Graph) Multiplicative Inverse Multiplicative Property of Equality Multiplicative Property of Zero Mutually Exclusive Event Negative Exponent Odds Outlier Point-Slope Form Polynomial Function Positive Exponents Probability of Compound Events Quadrants Quadratic Functions Quartile Radical Expression Range Rate (of Change) Relation Repeating Decimal Scatterplot Simple Event Simplest form (of an Expression) Slope-Intercept Form

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							Standard Form (of a Linear Equation) Substitution Method Systems of Linear Equations Systems of Linear Inequalities Terminating Decimal Test Point Trinomial Unbounded Region
ALG 1	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.	How is mathematics used to quantify, compare, represent, and model numbers? How can mathematics support effective communication? How are relationships represented mathematically? How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations? What does it mean to estimate or analyze numerical quantities? What makes a tool and/or strategy appropriate for a given task?	Real Number System	Apply and extend the properties of exponents to solve problems with rational exponents. Apply number theory concepts to show relationships between real numbers in problem-solving settings. Use exponents, roots, and/or absolute values to solve problems.	CC.2.1.HS.F.1 CC.2.1.HS.F.2 CC.2.1.HS.F.3	A1.1.1.1.1 A1.1.1.1.2 A1.1.1.3.1 A1.1.2.1.1 A1.1.2.1.2 A1.1.2.1.3 A1.2.1.2.1 A1.2.1.2.2	
ALG 1	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as	How is mathematics used to quantify, compare, represent, and model numbers? How can mathematics support effective communication? How are relationships represented	Equations and Inequalities	Interpret solutions to linear equations and inequalities. Interpret solutions to linear systems of equations and inequalities.	CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.1.HS.F.5	A1.1.2.1.1 A1.1.2.1.2 A1.1.2.1.3 A1.2.1.2.1 A1.2.1.2.2 A1.1.2.2.1 A1.1.2.2.2	

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	expressions, equations and inequalities in mathematical situations. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.	mathematically? How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations? What makes a tool and/or strategy appropriate for a given task?				A1.1.3.1.1 A1.1.3.1.2 A1.1.3.1.3 A1.1.3.2.1 A1.1.3.2.2	
ALG 1	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.	How is mathematics used to quantify, compare, represent, and model numbers? How can mathematics support effective communication?	Polynomial and Rational Expressions	Simplify/factor expressions involving polynomials. Use polynomial identities. Perform arithmetic operations on polynomials. Apply and extend previous understandings of arithmetic to algebraic expressions.	CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.5 CC.2.2.HS.D.6	A1.1.1.5.1 A1.1.1.5.2 A1.1.1.5.3	
ALG 1	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.	How is mathematics used to quantify, compare, represent, and model numbers? How can mathematics support effective communication? How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?	Equations and Inequalities	Write, solve, and/or graph linear equations and inequalities using various methods. Write, solve, and/or graph systems of linear equations and inequalities using various methods. Use and/or identify algebraic properties.	CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3	A1.2.1.1.1 A1.2.1.1.2 A1.2.1.1.3 A1.2.2.1.1 A1.2.2.1.2 A1.2.2.1.3 A1.2.2.1.4 A1.2.1.2.1 A1.2.1.2.2 A1.1.2.1.1 A1.1.2.1.2 A1.1.2.1.3	
ALG 1	Mathematical relationships among numbers can be represented, compared, and	How is mathematics used to quantify, compare, represent, and model numbers?	Equations and Inequalities	Understand and apply the Pythagorean Theorem. Write, solve, and/or graph	CC.2.2.HS.C3 CC.2.2.HS.C5 CC.2.2.HS.D7 CC.2.2.HS.D9	A1.1.2.1.1 A1.1.2.1.2 A1.1.2.1.3 A1.2.1.1.1	

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	communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.	How can mathematics support effective communication? How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?		compound inequalities. Write and/or identify linear equations in various forms (slope-intercept, point-slope, standard, etc.). Describe, compute, and/or use linear rate of change (slope).	CC.2.2.HS.D10	A1.2.1.1.2 A1.2.1.1.3 A1.2.1.2.1 A1.2.1.2.2 A1.2.2.1.1 A1.2.2.1.2 A1.2.2.1.3 A1.2.2.1.4 A1.1.2.2.1 A1.1.2.2.2 A1.1.3.1.1 A1.1.3.1.2 A1.1.3.1.3 A1.1.3.2.1 A1.1.3.2.2	
ALG 1	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations. Patterns exhibit relationships that can be extended, described, and generalized. Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions. Data can be modeled and	How is mathematics used to quantify, compare, represent, and model numbers? How are relationships represented mathematically? How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations? How can recognizing repetition or regularity assist in solving problems more efficiently? How can patterns be used to describe relationships in mathematical situations? How can data be organized and represented to provide insight into	Patterns, Relations, and Functions	Define, evaluate, and compare functions. Use the concept and notation of function to interpret and apply them in terms of their context. Construct and compare linear, quadratic, and exponential models and solve problems. Create a function and/or sequence that model relationships between two quantities. Create and/or analyze functions using multiple representations (graph, table, and equation). Create new functions from existing functions (transformations of graphs).	CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.6	A1.2.1.1.1 A1.2.1.1.2 A1.2.1.1.3 A1.2.2.1.1 A1.2.2.1.2 A1.2.2.1.3 A1.2.2.1.4 A1.2.1.2.1 A1.2.1.2.2 A1.1.2.1.1 A1.1.2.1.2 A1.1.2.1.3	

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	used to make inferences.	the relationship between quantities? How does the type of data influence the choice of display? How can probability and data analysis be used to make predictions?					
ALG 1	Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. Measurement attributes can be quantified, and estimated using customary and non-customary units of measure. Patterns exhibit relationships that can be extended, described, and generalized. Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions. Data can be modeled and used to make inferences.	In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted? How precise do measurements and calculations need to be? How can patterns be used to describe relationships in mathematical situations? How can recognizing repetition or regularity assist in solving problems more efficiently? How can data be organized and represented to provide insight into the relationship between quantities? How does the type of data influence the choice of display? How can probability and data analysis be used to make predictions?	Categorical and Quantitative Data	Analyze a set of data for a pattern, and represent the pattern with an algebraic rule and/or a graph. Summarize, represent, and interpret single-variable data and two-variable data. Use measures of dispersion to describe a set of data (range, quartiles, interquartile range). Analyze and/or interpret data displays and/or use them to make predictions (circle graph, line graph, bar graph, box-and-whisker plot, stem-and-leaf plot, scatter plot). Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.	CC.2.4.HS.B.1 CC.2.4.HS.B.2 CC.2.4.HS.B.3 CC.2.4.HS.B.5	A1.2.3.1.1 A1.2.3.2.1 A1.2.3.2.2 A1.2.3.2.3 A1.2.1.1.1 A1.2.1.1.2 A1.2.1.1.3 A1.2.1.2.1 A1.2.1.2.2 A1.2.2.2.1	
ALG 1	Numerical quantities, calculations, and measurements can be estimated or analyzed by	In what ways are the mathematical attributes of objects or processes measured, calculated and/or	Probability	Calculate and/or make predictions based upon measures of central tendency.	CC.2.4.HS.B.4 CC.2.4.HS.B.7	A1.2.3.3.1	

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	using appropriate strategies and tools. Measurement attributes can be quantified, and estimated using customary and non-customary units of measure. Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions. Data can be modeled and used to make inferences.	interpreted? How precise do measurements and calculations need to be? How can data be organized and represented to provide insight into the relationship between quantities? How does the type of data influence the choice of display? How can probability and data analysis be used to make predictions?		Apply probability to practical situations, including compound events. Recognize and evaluate random processes underlying statistical experiments Apply the rules of probability to compute probabilities of compound events in a uniform probability model.			