Unit Name	Chapter	Lessons	Vocabulary
UNIT 1 –Relationships between Quantities			
A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. **A.SSE.2** Use the structure of an expression to identify ways to rewrite it. **A.SSE.1b** Interpret complicated expressions by viewing one or more of their parts as a single entity. **A.CED.1** Create equations and inequalities in one variable and use them to solve problems. **A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **A.REI.10** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve. **F.IF.1** Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. **F.IF.4** For a function that models a relationship between two quantities, interpret key functions of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.	**1- EXPRESSIONS, EQUATIONS, AND FUNCTIONS**	**1.1 – 1.8**	Algebraic Expression Base Coefficient Coordinate System Dependent Variable Domain End Behavior Equation Exponent Function Independent Variable Intercept Like Terms Line Symmetry Mapping Ordered Pair Order of Operations Origin Power Range Reciprocal Relation Relative Maximum Relative Minimum Replacement Set Simplest Form Solution Term Variables Vertical Line Test

A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. **A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **N.Q.1** Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. **A.CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.	**2- LINEAR EQUATIONS**	**2.2 – 2.9**	Consecutive Integers Dimensional Analysis Equivalent Equations Extremes Formula Identity Literal Equation Means Multi-Step Equations Number Theory Percent of Change Percent of Decrease Percent of Increase Proportion Rate Ratio Scale Scale Model Solve an Equation Unit Analysis Unit Rate Weighted Average
UNIT 2 – Linear Relationships			
F.IF.4 For a function that models a relationship between two quantities, interpret key functions of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. **F.IF.7a** Graph linear and quadratic functions and show intercepts, maxima, and minima. **A.REI.10** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve. **F.IF.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	**3 –GRAPHING LINEAR EQUATIONS**	**3.1 - 3.6**	Arithmetic Sequence Common Difference Constant Constant of Variation Deductive Reasoning Direct Variation Inductive Reasoning Linear Equation Linear Function Rate of Change Root Sequence Slope Standard Form Terms of the Sequence X-Intercept Y-Intercept Zero of a Function

F.LE.1a Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. **F.BF.2** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. **F.LE.2** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). **F.LE.1b** Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.			
F-BF.1 Write a function that describes a relationship between two quantities. F-BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. F-IF.7.a Graph linear and quadratic functions and show intercepts, maxima, and minima. F-LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	**4 – EQUATIONS OF LINEAR FUNCTIONS**	**4.1 - 4.6**	Best-Fit Line Bivariate Data Constant Function Constraint Correlation Coefficient Identity Function Linear Extrapolation Linear Interpolation Linear Regression Line of Fit Median-Fit Line Parallel Lines Perpendicular Lines Point-Slope Form Scatter Plot Slope-Intercept Form

S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. S-ID.6.a Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. S-ID.6.c Fit a linear function for a scatter plot that suggests a linear association. S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. S-ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit. S-ID.9 Distinguish between correlation and causation.			
A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. A-REI.12 Graph the solutions to a linear inequality in two variables as a halfplane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	**5 – LINEAR INEQUALITIES**	**5.1 - 5.6**	Boundary Closed Half-Plane Compound Inequality Half-Plane Inequality Intersection Open Half-Plane Set-Builder Notation Union

A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. A-REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.			
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A-REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.			

UNIT 3 – Exponential and Quadratic Relationships			
A-REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. A-SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see x4 - y4 as (x2)2 - (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 - y2)(x2 + y2). A-SSE.3.c Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15t can be rewritten as (1.151/12)12t ≈ 1.01212tto reveal the approximate equivalent monthly interest rate if the annual rate is 15%. F-BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. F-BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing	**7- EXPONENTS AND EXPONENTIAL FUNCTIONS**	**7.1 - 7.8**	Common Ratio Compound Interest Constant Cube Root Exponential Decay Exponential Equation Exponential Function Exponential Growth Geometric Sequence Monomial Negative Exponent Rational Exponent Recursive Formula Scientific Notation Zero Exponent

even and odd functions from their graphs and algebraic expressions for them. F-IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$. F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. F-IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. F-LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). N-RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define $51/3$ to be the cube root of 5 because we want $(51/3)3 = 5(1/3)3$ to hold, so $(51/3)3$ must equal 5. N-RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.			

A-APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. A-REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. A-REI.4 Solve quadratic equations in one variable. A-SSE.1 Interpret expressions that represent a quantity in terms of its context. A-SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see x4 - y4 as (x2)2 - (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 - y2)(x2 + y2). A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	**8 – QUADRATIC EXPRESSIONS AND EQUATIONS**	**8.1 - 8.9**	Binomial Degree of a Monomial Degree of a Polynomial Difference of Two Squares Factoring Factoring by Grouping Leading Coefficient Perfect Square Trinomial Polynomial Quadratic Equation Square Root Property Standard Form Trinomial
A-REI.4 Solve quadratic equations in one variable. A-REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = -3x and the circle x2 + y2 = 3. A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. F-BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic	**9 – QUADRATIC FUNCTIONS AND EQUATIONS**	**9.1 - 9.7**	Absolute Value Function Axis of Symmetry Completing the Square Dilation Discriminant Maximum Minimum Parabola Piecewise-Defined Function Quadratic Formula Reflection Step Function Transformation Translation Vertex

expressions for them. F-IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. F-IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. F-IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.			
UNIT 4 – Advanced Functions and Equations			
A-REI.4 Solve quadratic equations in one variable. F-IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. F-IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	**10 – RADICAL FUNCTIONS AND GEOMETRY**	**10.1 - 10.2**	Square Root Function Radical Function Radicand Radical Expression Rationalizing the Denominator

N-RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.			
A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.	**11 – RATIONAL FUNCTIONS AND EQUATIONS**	**11.2, 11.8**	Rational Function Excluded Value Asymptote Rational Equation Extraneous Solution
UNIT 5 – Data Analysis			
S-ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots). S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. S-ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). S-ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.	**12 – STATISTICS AND PROBABILITY**	**12.2 - 12.4 12.7**	Statistic Parameter Mean Absolute Deviation Standard Deviation Variance Distribution Negatively Skewed Distribution Symmetric Distribution Positively Skewed Distribution Histogram Box and Whisker Plot Two-Way Tables Joint Frequencies Marginal Frequencies Relative Frequency