Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
	The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
The Real Number System				
A1.N-RN.B.3	Recognize that the sum or product of two rational numbers is rational.	Recognize that the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational.	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.	Generalize and develops rules for the sum or product of two rational numbers being rational; the sum of a rational number and an irrational number being irrational; and the product of a nonzero rational number and an irrational number being irrational.

Quantities				
A1.N-Q.A.1	Identify units for the solution of multi-step problems; Identify units consistently in formulas; Identify the scale and the origin in graphs and data displays, include utilizing real-world context.	Choose units for the solution of multi-step problems; choose units consistently in formulas; choose the scale and the origin in graphs and data displays, include utilizing real-world context.	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.	Use units as a way to understand problems and to justify the solution of multi-step problems; choose and interpret units consistently in formulas; interpret and explain the scale and the origin in graphs and data displays, include utilizing real-world context.
A1.N-Q.A.2	Identify appropriate quantities for the purpose of descriptive modeling.	Define appropriate quantities for the purpose of descriptive modeling.	Define appropriate quantities for the purpose of descriptive modeling. Include problem-solving opportunities utilizing real-world context.	Define and use appropriate quantities for the purpose of descriptive modeling. Include problem-solving opportunities utilizing real-world context.
A1.N-Q.A.3	Identify a level of accuracy on measurement when reporting quantities utilizing real-world context.	Identify a level of accuracy appropriate to limitations on measurement when reporting quantities utilizing real-world context.	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities utilizing real-world context.	Compare the levels of accuracy appropriate to limitations on measurement when reporting quantities utilizing real-world context.

Seeing Structure in Expressions				
A1.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context. a. Identify parts of an expression, such as terms, factors, and coefficients. b. Match expressions by viewing one or more of their parts as a single entity.	Interpret expressions that represent a quantity in terms of its context. a. Define parts of an expression, such as terms, factors, and coefficients. b. Use expressions by viewing one or more of their parts as a single entity.	Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret expressions by viewing one or more of their parts as a single entity.	Interpret expressions that represent a quantity in terms of its context. a. Differentiate parts of an expression, such as terms, factors, and coefficients. b. Make observations about expressions by viewing one or more of their parts as a single entity.
A1.A-SSE.A.2	Identify equivalent numerical and polynomial expressions. Focus on polynomial multiplication patterns.	Identify ways to rewrite equivalent numerical and polynomial expressions. Focus on polynomial multiplication and factoring patterns.	Use structure to identify ways to rewrite numerical and polynomial expressions. Focus on polynomial multiplication and factoring patterns.	Assess ways to rewrite numerical and polynomial expressions. Focus on polynomial multiplication and factoring patterns.
A1.A-SSE.B.3a	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Identify a factored quadratic expression that reveals the zeros of the function it defines.	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Use a factored quadratic expression that reveals the zeros of the function it defines.	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines.	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Explain conditions forthe zeros of a quadratic function.
A1.A-SSE.B.3b	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. b. Identify a quadratic expression that reveals the maximum or minimum value of the function it defines.	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. b. Use a quadratic expression that reveals the maximum or minimum value of the function it defines.	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines and use it to solve problems

Arithmetic with Polynomials and Rational Expressions				
A1.A-APR.A.1	Add and subtract polynomials.	Add, subtract, and multiply polynomials.	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.	Explain 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.
A1.A-APR.B.3	Identify zeros of polynomials when suitable factorizations are available. Focus on quadratic and cubic polynomials in which linear and quadratic factors are available.	Use the zeros of polynomials to construct a rough graph of the function defined by the polynomial. Focus on quadratic and cubic polynomials in which linear and quadratic factors are available.	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. Focus on quadratic and cubic polynomials in which linear and quadratic factors are available.	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. Focus cubic polynomials in which quadratic factors are available.

Creating Equations				
A1.A-CED.A.1	Identify equations and inequalities in one variable that can be used to solve problems. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Use equations and inequalities in one variable to solve problems. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Create equations and inequalities in one variable and use them to solve problems. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Analyze equations and inequalities in one variable and use them to solve problems. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).
A1.A-CED.A.2	Identify equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Use equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Analyze equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
A1.A-CED.A.3	Identify constraints of equations or inequalities, and of systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	Apply constraints of equations or inequalities, and of systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	Justify constraints of equations or inequalities, and by systems of equations and/or inequalities, and justify solutions as viable or non-viable options in a modeling context.
A1.A-CED.A.4	Identify formulas that highlight a quantity of interest, using the same reasoning as in solving equations.	Apply formulas that highlight a quantity of interest, using the same reasoning as in solving equations.	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.*	Rearrange and apply formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

Reasoning with Equations and Inequalities				
A1.A-REI.A.1	Identify each step in solving linear and quadratic equations as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution.	Carry out each step in solving linear and quadratic equations as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Identify a viable argument to justify a solution method.	Explain each step in solving linear and quadratic equations 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.	Critique each step in solving linear and quadratic equations 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.
A1.A-REI.B.3	Solve one-step and two-step linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Solve two- step linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Compare different methods to solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
A1.A-REI.B.4	Solve quadratic equations in one variable. a. Identify the quadratic formula. b. Solve quadratic equations by inspection (e.g., x^2 = 49), taking square roots, as appropriate to the initial form of the equation. Focus on solutions for quadratic equations that have real roots. Include cases that recognize when a quadratic equation has no real solutions.	Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – k)^2 = q that has the same solutions where q=0. Use the quadratic formula. b. Solve quadratic equations by inspection (e.g., x^2 = 49), taking square roots, the quadratic formula and factoring, as appropriate to the initial form of the equation. Focus on solutions for quadratic equations that have real roots. Include cases that recognize when a quadratic equation has no real solutions.	Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – k)^2 = q that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., x^2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Focus on solutions for quadratic equations that have real roots. Include cases that recognize when a quadratic equation has no real solutions.	Solve quadratic equations in one variable. a. Derive the quadratic formula. b. Determine whether to solve quadratic equations by inspection (e.g., x^2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Focus on solutions for quadratic equations that have real roots. Include cases that recognize when a quadratic equation has no real solutions.
A1.A-REI.C.5	Understand 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.	Explain 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.	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.	Given two systems of two equations in two variables, verify that they have the same solutions by replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
A1.A-REI.C.6	Solve systems of linear equations approximately, focusing on pairs of linear equations in two variables.	Solve systems of linear equations approximately, focusing on pairs of linear equations in two variables. Include problem solving opportunities utilizing real-world context.	Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables. Include problem solving opportunities utilizing real-world context.	Analyzes a system of linear equations exactly and approximately, focusing on pairs of linear equations in two variables. Include problem solving opportunities utilizing real-world context.
A1.A-REI.D.10	Identify the graph of an equation in two variables.	Identify a solution given the graph of an equation in two variables.	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, which could be a line.	Explain 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, which could be a line.

A1.A-REI.D.11	Identify the x-coordinates of the points where the graphs of the equations y=f(x) and y=g(x) intersect as the solutions of the equation f(x) =g(x). Focus on cases where f(x) and/or g(x) are linear.	Identify the x-coordinates of the points where the graphs of the equations y=f(x) and y=g(x) intersect as 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). Focus on cases where f(x) and/or g(x) are linear and exponential functions.	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). Focus on cases where f(x) and/or g(x) are linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	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 exactly (e.g., using technology to graph the functions, make tables of values, or find successive approximations). Focus on cases where f(x) and/or g(x) are linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).
A1.A-REI.D.12	Identify a solution to a linear inequality in two variables as a half-plane, excluding the boundary in the case of a strict inequality.	Graph the solutions to a linear inequality in two variables as a half-plane, excluding the boundary in the case of a strict inequality.	Graph the solutions to a linear inequality in two variables as a half-plane, 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.	Create a system of linear inequalities given a graph of the solution set.

Interpreting Functions				
A1.F-IF.A.1	Understand that the graph of f is the graph of the equation y = f(x).	Understand that if f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).	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. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).	Create a function or non-function based on understanding that a function from the domain to the range assigns to each element of the domain exactly one element of the range.
A1.F-IF.A.2	Evaluate a function for an input in the domain.	Evaluate a function for inputs in the domain.	Evaluate a function for inputs in the domain, and interpret statements that use function notation in terms of a context.	Evaluate a function for inputs in the domain, and apply statements that use function notation in terms of a context.
A1.F-IF.A.3	Identify sequences or functions defined recursively, whose domain is a subset of the integers.	Use sequences or functions defined recursively, whose domain is a subset of the integers.	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	Create a function defined recursively.
A1.F-IF.B.4	For a function that models a relationship between two quantities, identify key features of graphs and tables in terms of the quantities. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums. Focus on linear and exponential and functions.	For a function that models a relationship between two quantities, identify key features of graphs and tables in terms of the quantities. Include problem-solving opportunities utilizing real-world context. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums. Focus on linear and exponential and functions.	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. Include problem-solving opportunities utilizing real-world context. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	For a function that models a relationship between two quantities, explain key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Include problem-solving opportunities utilizing real-world context. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).
A1.F-IF.B.5	Identify the domain of a function from its graph.	Identify the domain of a function from its graph and, where applicable, relate it to the quantitative relationship it describes.	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes in a real-world context.
A1.F-IF.B.6	Estimate the rate of change from a graph. Focus on linear and exponential functions.	Calculate the average rate of change of a continuous function (presented symbolically or as a table) on a closed interval. Estimate the rate of change from a graph. Include problem-solving opportunities utilizing real-world context. Focus on linear and exponential functions.	Calculate and interpret the average rate of change of a continuous function (presented symbolically or as a table) on a closed interval. Estimate the rate of change from a graph. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Analyze the average rate of change of a continuous function (presented symbolically or as a table) on a closed interval. Estimate the rate of change from a graph. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).
A1.F-IF.C.7	Identify key features of linear and exponential functions shown on a graph.	Identify key features functions shown on a graph. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Graph more than one function expressed symbolically, and compare key features of the graphs. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).

A1.F-IF.C.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring a quadratic function to show zeros.	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square of a quadratic function to show zeros, extreme values, and symmetry of the graph.	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square of a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Determine an appropriate method to rewrite a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
A1.F-IF.C.9	Identify properties of two functions each represented in a different way (graphically or numerically in tables). Focus on linear and exponential functions.	Define properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Focus on linear, quadratic, and exponential functions.	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Analyze two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).

Building Functions				
A1.F-BF.A.1	Identify a function that describes a relationship between two quantities. Identify an explicit expression, steps for calculation from real-world context. Focus on linear and exponential functions.	Identify a function that describes a relationship between two quantities. Identify an explicit expression, a recursive process, or steps for calculation from real-world context. Focus on linear, quadratic and exponential functions.	Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Write a function that describes a relationship between two quantities. Compare the explicit expression to the recursive process. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).
A1.F-BF.B.3	Identify the effect on the graph of replacing f(x) by f(x) + k, and f(x+k) for specific positive values of k. Illustrate the effects on the graph. Focus on linear and exponential functions.	Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), and f(x+k) for specific positive values of k; identify the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph. Focus on linear, quadratic, and exponential functions.	Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, 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. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Explain the effect on the graph of replacing f(x) by f(x) + k, k f(x), and f(x+k) for specific values of k (both positive and negative rational numbers); determine the value of k given the graphs. Experiment with cases and explain an explanation of the effects on the graph. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).

Linear, Quadratic, and Exponential Models				
A1.F-LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Recognize that linear functions grow by equal differences over equal intervals. b. Identify situations in which one quantity changes at a constant rate per unit interval relative to another. c. Identify situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Recognize that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Identify situations in which one quantity changes at a constant rate per unit interval relative to another as a situation that can be modeled with a linear function. c. Identify situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another as a situation that can be modeled with an exponential function.	Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Explain why linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Create situations in which one quantity changes at a constant rate per unit interval relative to another. c. Create situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
A1.F-LE.A.2	Identify linear functions, including arithmetic sequences, given a graph, a description of a relationship, or input/output pairs.	Identify linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or input/output pairs.	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or input/output pairs.	Explain how linear and exponential functions, can model arithmetic and geometric sequences.
A1.F-LE.A.3	Identify graphs and tables that have a quantity increasing linearly, exponentially, or quadratically.	Compare graphs and tables that have quantities increasing linearly, exponentially, and quadratically.	Observe, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.	Explain why a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.
A1.F-LE.B.5	Identify the parameters in a linear function with integer exponents utilizing real world context.	Identify the parameters in a linear or exponential function with integer exponents utilizing real world context.	Interpret the parameters in a linear or exponential function with integer exponents utilizing real world context.	Define the parameters while creating a linear or exponential function with integer exponents utilizing real world context.

Summarize, represent, and interpret data on a single count or measurement variable.				
A1.S-ID.A.1	Match real-value data with dot plots, histograms, and box plots.	Represent real-value data with dot plots, histograms, and box plots.	Represent real-value data with plots for the purpose of comparing two or more data sets.	Represent real-value data with the most appropriate plots and analyze the similarityes and differences between two or more data sets.
A1.S-ID.A.2	Identify the center (median, mean) and spread (interquartile range) of two or more different data sets.	Compare the center (median, mean) or spread (interquartile range, standard deviation) of two or more different data sets.	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.	Use statistics appropriate to the shape of the data distribution to analyze and explain the similarities and differences between the center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
A1.S-ID.A.3	Identify differences in shape, center, and spread in the context of the data sets.	Compare informally differences in shape, center, and spread in the context of the data sets, accounting for possible effects of outliers if present.	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of outliers if present.	Interpret and explain differences in shape, center, and spread in the context of the data sets, make observations about the effects different outlier would have.
A1.S-ID.B.5	For categorical data summarized for two categories in two-way frequency tables, identify relative frequencies in the context of the data.	Complete a partially filled in frequency table to summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data, including joint, and conditional relative frequencies.	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.	Summarize categorical data for two categories in two-way frequency tables. Interpret and explain relative frequencies in the context of the data, including joint, marginal, and conditional relative frequencies. Explain possible associations and trends in the data.
A1.S-ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how the quantities are related. a. Identify a linear function that best fits the data represented in a scatter plot. b. Informally assess the fit of a function when given a residual plot.	Represent data on two quantitative variables on a scatter plot, and describe how the quantities are related. a. Identify a linear function that best fits the data represented in a scatter plot; use functions fitted to data to identify the solutions to problems in the context of the data. Focus on linear models. b. Plot the residuals of a function.	Represent data on two quantitative variables on a scatter plot, and describe how the quantities are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Focus on linear models. b. Informally assess the fit of a function by plotting and analyzing residuals.	Represent data on two quantitative variables on a scatter plot, and describe how the quantities are related. a. Compare the fit of different functions to the data, including exponential functions with domains in the integers; use functions fitted to data to solve problems in the context of the data. b. Informally assess the fit of different functions by plotting and analyzing their residuals.
A1.S-ID.C.7	Match the slope and the constant term of a linear model with their meaning in the context of the data.	Identify the slope of a linear model as a rate of change in the context of the data, and identify the constant term of a linear model in the context of the data.	Interpret the slope as a rate of change and the constant term of a linear model in the context of the data.	Define the meaning of the slope as a rate of change in the context of the data, and define the constant term of a linear model in the context of the data.

A1.S-ID.C.8	Select the correlation coefficient of a linear relationship represented with a scatter plot where the correlation coefficient can be easily estimated.	Identity the correlation coefficient of a linear relationship.	Compute and interpret the correlation coefficient of a linear relationship.	Explain the meaning of different correlation coefficients for linear relationships.
A1.S-ID.C.9	Define correlation and causation.	Identify examples of correlation and causation.	Distinguish between correlation and causation.	Supports or refutes claims of causation, distinguishing between correlation and causation.

Conditional Probability and the rules of Probability				
A1.S-CP.A.1	Identify an event as a subset of a sample space.	Identify events as subsets of a sample space using characteristics of the outcomes, or as unions, intersections, or complements of other events, as shown in a visual model.	Describe events as subsets of a sample space using characteristics of the outcomes, or as unions, intersections, or complements of other events.	Using complex representations, explain how specific events are subsets of a sample space using characteristics of the outcomes, or as unions, intersections, or complements of other events.
A1.S-CP.A.2	Use the Multiplication Rule for independent events to calculate the probability of 2 independent events.	Use the Multiplication Rule for independent events to determine if two events A and B are independent, given the probability of A, the probability of B, and the probability of A and B occurring together.	Use the Multiplication Rule for independent events to understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	Use the Multiplication Rule for independent events to understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if several events in a sample space are dependent or independent.

Standard	Minimally Proficient	Partially Proficient	Proficient	Highly Proficient
	The Minimally Proficient student	The Partially Proficient student	The Proficient student	The Highly Proficient student
			Congruence	
G.G-CO.A.1	Identify precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Informally define angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Create precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
G.G-CO.A.2	Identify transformations in the plane as functions that take points in the plane as inputs and give other points as outputs.	Interpret transformations in the plane as functions that take points in the plane as inputs and give other points as outputs. Identify transformations that preserve distance and angle to those that do not.	Represent and describe transformations in the plane as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not.	Create and rewrite transformations in the plane as functions that take points in the plane as inputs and give other points as outputs. Evaluate and compare transformations that preserve distance and angle to those that do not.
G.G-CO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, identify a rotation or reflection that could carry it onto itself.	Given a rectangle, parallelogram, trapezoid, or regular polygon, identify the rotations and reflections that carry it onto itself.	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Given a rectangle, parallelogram, trapezoid, or regular polygon, create and justify the rotations and reflections that carry it onto itself.
G.G-CO.A.4	Identify definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Interpret definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Create and evaluate definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
G.G-CO.A.5	Given a geometric figure and a rotation, reflection, or translation, identify the transformed figure.	Given a geometric figure and a rotation, reflection, or translation, describe the transformed figure. Identify a sequence of transformations that will carry a given figure onto another.	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure. Specify a sequence of transformations that will carry a given figure onto another.	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure. Specify sequences of transformations that will carry a given figure onto another.
G.G-CO.B.6	Use geometric definitions of rigid motions to transform a figure; given two figures, use the definition of congruence in terms of rigid motions to identify if they are congruent.	Use geometric definitions of rigid motions to transform a figure or to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to identify if they are congruent.	Use geometric definitions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	Use geometric definitions of rigid motions to transform figures and to predict and describe the effect of a sequence of rigid motions on a given figure; given two figures, use the definition of congruence in terms of rigid motions to describe if and why they are congruent.
G.G-CO.B.7	Use the definition of congruence in terms of rigid motions to understand that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Use the definition of congruence in terms of rigid motions to identify that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Use the definition of congruence in terms of rigid motions to justify that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
G.G-CO.B.8	Understand how the criteria for triangle congruence (ASA, AAS, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	Show how the criteria for triangle congruence (ASA, AAS, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	Explain how the criteria for triangle congruence (ASA, AAS, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	Justify how the criteria for triangle congruence (ASA, AAS, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

G.G-CO.C.9	Identify theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	Interpret theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	Construct and evaluate proofs for theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.
G.G-CO.C.10	Identify theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of an isosceles triangle are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.	Interpret theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of an isosceles triangle are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.	Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of an isosceles triangle are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.	Construct and evaluate proofs for theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of an isosceles triangle are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.
G.G-CO.C.11	Identify theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and rectangles are parallelograms with congruent diagonals.	Interpret theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and rectangles are parallelograms with congruent diagonals.	Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and rectangles are parallelograms with congruent diagonals.	Construct and evaluate proofs for theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and rectangles are parallelograms with congruent diagonals.
G.G-CO.D.12	Identify formal geometric constructions with a variety of tools and methods. Constructions include: copying segments; copying angles; bisecting segments; bisecting angles; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	Complete formal geometric constructions with a variety of tools and methods. Constructions include: copying segments; copying angles; bisecting segments; bisecting angles; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	Make formal geometric constructions with a variety of tools and methods. Constructions include: copying segments; copying angles; bisecting segments; bisecting angles; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	Critique formal geometric constructions with a variety of tools and methods. Constructions include: copying segments; copying angles; bisecting segments; bisecting angles; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
G.G-CO.D.13	Identify steps needed to construct an equilateral triangle, a square, or a regular hexagon inscribed in a circle.	Identify steps needed to construct an equilateral triangle, a square, or a regular hexagon inscribed in a circle with a variety of tools and methods.	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle with a variety of tools and methods.	Make observations about a constructed equilateral triangle, square, and regular hexagon inscribed in a circle with a variety of tools and methods.

Similarity, Right Triangles and Trigonometry				
G.G-SRT.A.1	Identify the properties of dilations given by a center and a scale factor: a. Dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Interpret examples demonstrating the properties of dilations given by a center and a scale factor: a. Dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Verify experimentally the properties of dilations given by a center and a scale factor: a. Dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Explain quantitatively the properties of dilations given by a center and a scale factor: a. Dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.
G.G-SRT.A.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; identify the meaning of similarity for triangles as the equality of all corresponding pairs of angles or the proportionality of all corresponding pairs of sides.	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; qualitatively describe the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; make observations using similarity transformations on the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
G.G-SRT.A.3	Use the properties of similarity transformations to identify the AA, SAS, and SSS criterion for two triangles to be similar.	Use the properties of similarity transformations to interpret the AA, SAS, and SSS criterion for two triangles to be similar.	Use the properties of similarity transformations to establish the AA, SAS, and SSS criterion for two triangles to be similar.	Use the properties of similarity transformations to develop definitions for the AA, SAS, and SSS criterion for two triangles to be similar.
G.G-SRT.B.4	Identify theorems about triangles. Theorems include: an interior line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.	Interpret theorems about triangles. Theorems include: an interior line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.	Prove theorems about triangles. Theorems include: an interior line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.	Construct and evaluate proofs of theorems about triangles. Theorems include: an interior line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.
G.G-SRT.B.5	Use congruence and similarity criteria to interpret problems.	Use congruence and similarity criteria to identify relationships in geometric figures and solve problems utilizing real-world context.	Use congruence and similarity criteria to prove relationships in geometric figures and solve problems utilizing real-world context.	Use congruence and similarity criteria to construct and evaluate proofs for relationships in geometric figures and solve complex problems utilizing real-world context.
G.G-SRT.C.6	Identify that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Specify that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Explain that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G.G-SRT.C.7	Identify the relationship between the sine and cosine of complementary angles.	Interpret and use the relationship between the sine and cosine of complementary angles.	Explain and use the relationship between the sine and cosine of complementary angles.	Prove the relationship between the sine and cosine of complementary angles.
G.G-SRT.C.8	Use trigonometric ratios and the Pythagorean Theorem to identify unknown measurements in right triangles.	Use trigonometric ratios (including inverse trigonometric ratios) and the Pythagorean Theorem to find unknown measurements in right triangles.	Use trigonometric ratios (including inverse trigonometric ratios) and the Pythagorean Theorem to find unknown measurements in right triangles utilizing real-world context.	Use trigonometric ratios (including inverse trigonometric ratios) and the Pythagorean Theorem to describe a solution process to find unknown measurements in right triangles utilizing real-world context.

Circles				
G.G-C.A.1	Recognize that all circles are similar.	Explain qualitatively that all circles are similar.	Prove that all circles are similar.	Construct and evaluate proofs that all circles are similar.
G.G-C.A.2	Use relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	Find relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	Prove relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
G.G-C.A.3	Identify inscribed and circumscribed circles of a triangle.	Construct the inscribed and circumscribed circles of a triangle, and use properties of angles for a quadrilateral inscribed in a circle.	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	Evaluate constructions of inscribed and circumscribed circles of a triangle, and prove unique relationships between the angles for a quadrilateral inscribed in a circle.
G.G-C.B.5	Identify that the length of the arc intercepted by an angle is proportional to the radius and that the radian measure of the angle is the constant of proportionality; define the formula for the area of a sector. Identify the relationship between degrees and radians.	Solves problems using the fact that the length of the arc intercepted by an angle is proportional to the radius and that the radian measure of the angle is the constant of proportionality; solve problems using the formula for the area of a sector. Convert between degrees and radians.	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. Convert between degrees and radians.	Prove using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; prove the formula for the area of a sector. Derive the formula to convert between degrees and radians.

Geometric Properties with Equations				
G.G-GPE.A.1	Identify the center and radius of a circle given by an equation of the form $(x - h)^2 + (y - k)^2 = r^2$.	Create the equation of a circle of given center and radius; find the center and radius of a circle given by an equation of the form $(x - h)^2 + (y - k)^2 = r^2$.	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	Explain the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.
G.G-GPE.B.4	Use coordinates to identify geometric relationships. Relationships include: proving or disproving geometric figures given specific points in the coordinate plane; and proving or disproving if a specific point lies on a given circle.	Use coordinates to algebraically solve problems involving geometric relationships. Relationships include: proving or disproving geometric figures given specific points in the coordinate plane; and proving or disproving if a specific point lies on a given circle.	Use coordinates to algebraically prove or disprove geometric relationships. Relationships include: proving or disproving geometric figures given specific points in the coordinate plane; and proving or disproving if a specific point lies on a given circle.	Use coordinates to algebraically justify statements about geometric relationships. Relationships include: proving or disproving geometric figures given specific points in the coordinate plane; and proving or disproving if a specific point lies on a given circle.
G.G-GPE.B.5	Use the slope criteria for parallel or perpendicular lines to solve simple geometric problems, including finding the equation of a line parallel or perpendicular to a given line.	Use the slope criteria for parallel and perpendicular lines to solve simple geometric problems, including finding the equation of a line parallel or perpendicular to a given line that passes through a given point.	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems, including finding the equation of a line parallel or perpendicular to a given line that passes through a given point.	Prove and explain the slope criteria for parallel and perpendicular lines and use them to solve geometric problems, including finding the equation of a line parallel or perpendicular to a given line that passes through a given point.
G.G-GPE.B.6	Identify the point on a directed horizontal or vertical line segment between two given points that partitions the segment in a given ratio, given visual representation.	Identify the point on a directed line segment between two given points that partitions the segment in a given ratio, given visual representation.	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Construct a line segment that partitions the segment in a given ratio.
G.G-GPE.B.7	Use coordinates to compute perimeters and areas of right triangles and rectangles.	Use coordinates to compute perimeters of regular polygons and areas of right triangles and rectangles.	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.	Use coordinates to justify perimeters of polygons and areas of triangles and rectangles.

Geometric Measurement and Dimension				
G-GMD.A.1	Identify the formulas for the volume of a cylinder, pyramid, and cone.	Informally describe the formulas for the volume of a cylinder, pyramid, and cone.	Analyze and verify the formulas for the volume of a cylinder, pyramid, and cone.	Create and interpret the relationships between the formulas for the volume of a cylinder, pyramid, and cone.
G-GMD.A.3	Substitute given measures into volume formulas for cylinders, pyramids, cones, and spheres to solve simple problems.	Use volume formulas for cylinders, pyramids, cones, and spheres to solve simple problems.	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems utilizing real-world context.	Compare volume formulas for cylinders, pyramids, cones, and spheres.
G-GMD.B.4	Identify the shapes of two-dimensional horizontal or vertical cross-sections of three-dimensional objects.	Identify three-dimensional objects generated by rotations of two-dimensional objects about a line of symmetry.	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	Describe or create the shapes of two-dimensional cross-sections of three-dimensional objects, and describe three-dimensional objects generated by rotations of two-dimensional objects.

Modeling with Geometry				
G.G-MG.A.1	Use simple geometric shapes to qualitatively describe objects utilizing real-world context.	Use geometric shapes and their properties to qualitatively describe objects utilizing real-world context.	Use geometric shapes, their measures, and their properties to describe objects utilizing real-world context.	Use geometric shapes, their measures, and their properties to model complex objects utilizing real-world context.
G.G-MG.A.2	Calculate density based on area and volume.	Calculate density based on area and volume in modeling situations utilizing real-world context.	Apply concepts of density based on area and volume in modeling situations utilizing real-world context.	Apply concepts of density based on area and volume in comparative modeling situations utilizing real-world context.
G.G-MG.A.3	Identify relevant geometric models to solve design problems utilizing real-world context.	Apply geometric methods to identify solutions for design problems utilizing real-world context.	Apply geometric methods to solve design problems utilizing real-world context.	Apply geometric methods to create composite structures as solutions for design problems utilizing real-world context.