

Performance Level Descriptors – Algebra I

	Algebra I: Sub-Claim A The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Expressions A-SSE.1-1 A-SSE.1-2 A-SSE.2-1 A-SSE.2-4 A.APR.1-1	<p>Writes equivalent numerical and polynomial expressions in one variable, using addition, subtraction, multiplication and factoring, including multi-step problems in mathematical and contextual situations.</p> <p>Interprets parts of complicated exponential and quadratic expressions that represent a quantity in terms of its context.</p> <p>Evaluates expressions, including for accuracy within context, and justifies the results.</p>	<p>Writes equivalent numerical and polynomial expressions in one variable, using addition, subtraction, multiplication and factoring, including multi-step problems.</p> <p>Interprets parts of complicated exponential and quadratic expressions that represent a quantity in terms of its context.</p>	<p>Writes equivalent numerical and polynomial expressions in one variable, using addition, subtraction, multiplication and factoring.</p> <p>Interprets parts of exponential and quadratic expressions that represent a quantity in terms of its context.</p>	<p>Writes equivalent numerical and polynomial expressions in one variable, using addition, subtraction and multiplication.</p> <p>Identifies components of exponential and quadratic expressions.</p>
Interpreting Functions F-IF.1 F-IF.2 F-IF.A.Int.1 F-IF.4-1 F-IF.5-1 F-IF.5-2	<p>Determines if a given relation is a function.</p> <p>Evaluates with, uses and interprets with function notation within a context.</p> <p>Given a context, writes and analyzes a linear or</p>	<p>Determines if a given relation is a function.</p> <p>Evaluates with, uses and interprets with function notation within a context.</p> <p>Given a context, writes a linear or quadratic function.</p>	<p>Determines if a given relation is a function.</p> <p>Evaluates with and uses function notation within a context.</p> <p>Given a context, writes a linear function.</p>	<p>Determines if a given relation is a function.</p> <p>Evaluates with and uses function notation.</p> <p>Given a context, writes a linear function.</p>

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	<p>quadratic function.</p> <p>For linear and quadratic functions that model contextual relationships, determines and interprets key features, graphs the function, and solves problems.</p> <p>Determines the domain and relates it to the quantitative relationship it describes for a linear, quadratic, exponential (limited to domains in the integers), square root, cube root, piece-wise, step and absolute value functions.</p>	<p>For linear and quadratic functions that model contextual relationships, determines and interprets key features, graphs the function and solves problems.</p> <p>Determines the domain and relates it to the quantitative relationship it describes for a linear, quadratic, exponential (limited to domains in the integers), square root and absolute value functions.</p>	<p>For linear and quadratic functions that model contextual relationships, determines key features and graphs the function.</p> <p>Determines the domain and relates it to the quantitative relationship it describes for linear, quadratic and exponential (limited to domains in the integers) functions.</p>	<p>For linear and quadratic functions that model contextual relationships, determines key features.</p> <p>Determines the domain of linear and quadratic functions.</p>
<p>Rate of Change</p> <p>F-IF.6-1a F-IF.6-1b F-IF.6-6a F-IF.6-6b</p>	<p>Calculates and interprets the average rate of change of linear, exponential, quadratic, square root, cube root and piece-wise-defined functions (presented symbolically or as a table) over a specified interval, and estimates the rate of</p>	<p>Calculates and interprets the average rate of change of linear, exponential, quadratic, square root, cube root and piece-wise-defined functions (presented symbolically or as a table) over a specified interval, and estimates the</p>	<p>Calculates the average rate of change of linear, exponential and quadratic functions (presented symbolically or as a table) over a specified interval and estimate the rate of change from a graph.</p>	<p>Calculates the average rate of change of linear, exponential and quadratic functions (presented symbolically or as a table) over a specified interval.</p>

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	change from a graph. Compares rates of change associated with different intervals.	rate of change from a graph.		
Solving Algebraically A-REI.3 A-REI.4a-1 A-REI.4b-1 A-REI.4b-2 A-CED.4-1 A-CED.4-2 HS-Int.1 HS-Int.2 HS-Int.3-2	Algebraically solves linear equations, linear inequalities and quadratics in one variable (at complexity appropriate to the course), including those with coefficients represented by letters. Utilizes structure and rewriting as strategies for solving. Identifies and corrects errors in a given solution.	Algebraically solves linear equations, linear inequalities and quadratics in one variable (at complexity appropriate to the course), including those with coefficients represented by letters. Utilizes structure and rewriting as strategies for solving.	Algebraically solves linear equations, linear inequalities and quadratics in one variable (at complexity appropriate to the course), including those with coefficients represented by letters.	Algebraically solves linear equations, linear inequalities and quadratics in one variable (at complexity appropriate to the course).
Solving Graphically A-CED.3-1 A-REI.10 A-REI.11-1a A-REI.11-1b	Graphs and analyzes the solution sets of equations, linear inequalities and systems of linear inequalities. Finds the solutions to two polynomial functions	Graphs the solution sets of equations, linear inequalities and systems of linear inequalities. Finds the solutions to two polynomial functions approximately, e.g., using	Graphs the solution sets of equations, linear inequalities and systems of linear inequalities. Finds the solutions to two polynomial functions approximately, e.g., using	Graphs the solution sets of equations and linear inequalities. Finds the solutions to two polynomial functions approximately, e.g., using technology to graph the

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A-REI.12 A.Int.1	approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Writes a system of linear inequalities given a context.	technology to graph the functions, make tables of values, or find successive approximations. Writes a system of linear inequalities given a context.	technology to graph the functions, make tables of values, or find successive approximations.	functions, make tables of values, or find successive approximations.

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Number Systems N-RN.3	Identifies rational and irrational numbers. Calculates sums and products of two rational and/or irrational numbers and determines whether and generalizes when the sums and products are rational or irrational.	Identifies rational and irrational numbers. Calculates sums and products of two rational and/or irrational numbers and determines whether the sums and products are rational or irrational.	Identifies rational and irrational numbers. Calculates sums and products of two rational and/or irrational numbers.	Identifies rational and irrational numbers.
Equivalent Expressions and Functions A-SSE.3a A-SSE.3b A-SSE.3c-1 F.IF.8a	Determines equivalent forms of quadratic and exponential (with integer domain) expressions and functions to reveal and explain their properties. Given a scenario, determines the most appropriate form of a quadratic or exponential (with integer domain) function.	Determines equivalent forms of quadratic and exponential (with integer domain) expressions and functions to reveal and explain their properties.	Determines equivalent forms of quadratic expressions and functions. Uses equivalent forms to reveal and explain zeros, extreme values and symmetry.	Identifies equivalent forms of quadratic expressions and functions. Identifies zeros and symmetry.
Interpreting Graphs of Functions	Graphs linear, quadratic, cubic (in which linear and quadratic factors are available), square root, cube root and piece-wise-defined	Graphs linear, quadratic, cubic (in which linear and quadratic factors are available), square root, cube root and piece-wise-	Graphs linear, quadratic and cubic (in which linear and quadratic factors are available) functions, showing key features.	Graphs linear and quadratic functions, showing key features.

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A-APR.3-1 F-IF.7a-1 F-IF.7a-2 F-IF.7b	functions, showing key features. Determines a function, given a graph with key features identified.	defined functions , showing key features.		
Function Transformations F-BF.3-1 F-BF.3-4	Identifies the effects of multiple transformations on graphs of linear and quadratic functions and finds the value of k given a transformed graph. Experiments with cases using technology. Given the equation of a transformed linear or quadratic function, creates an appropriate graph.	Identifies the effects of multiple transformations on graphs of linear and quadratic functions and finds the value of k given a transformed graph. Experiments with cases using technology.	Identifies the effects of a single transformation on graphs of linear and quadratic functions, including $f(x)+k$, $kf(x)$, $f(kx)$ and $f(x+k)$, and finds the value of k given a transformed graph.	Identifies the effects of a single transformation on graphs of linear and quadratic functions, limited to $f(x)+k$ and $kf(x)$.
Multiple Representations of Functions A-REI.6-1 F-LE.2-1	Writes and analyzes systems of linear equations in multi-step contextual problems. Represents linear and exponential (with domain in	Writes and analyzes systems of linear equations in multi-step contextual problems. Represents linear and exponential (with domain in	Writes systems of linear equations in multi-step contextual problems. Represents linear and exponential (with domain in the integers) functions	Writes systems of linear equations in multi-step contextual problems. Given a symbolic representation, real-life scenario, graph, verbal

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F-LE.2-2 F-IF.9-1 F-Int.1-1 S-ID.Int.1 S-ID.Int.2 HS-Int.1 HS-Int.2 HS-Int.3-1 HS-Int.3-2	<p>the integers) functions symbolically, in real-life scenarios, graphically, with a verbal description, as a sequence and with input-output pairs to solve mathematical and contextual problems.</p> <p>Compares the properties of two functions represented in multiple ways, limited to linear, exponential (with domains in the integers), quadratic, square root, absolute value, cube root, piece-wise and step.</p>	<p>the integers) functions symbolically, in real-life scenarios, graphically, with a verbal description, as a sequence and with input-output pairs to solve mathematical and contextual problems.</p> <p>Compares the properties of two functions represented in multiple ways, limited to linear, exponential (with domains in the integers), quadratic, square root and absolute value.</p>	<p>symbolically, graphically and with input-output pairs to solve mathematical problems.</p> <p>Compares the properties of two functions represented in different ways, limited to linear, exponential (with domains in the integers) and quadratic.</p>	<p>description, sequence or input-output pairs for linear and exponential functions (with domains in the integers), solves mathematical problems.</p> <p>Compares the properties of two functions represented in different ways, limited to linear and quadratic.</p>
<p>Summarizing Representing and Interpreting Data</p> S-ID.5 S-ID.Int.1 S-ID.Int.2	<p>Determines appropriate representations of categorical and quantitative data, summarizing and interpreting the data and characteristics of the representations.</p> <p>Describes and interprets possible associations and trends in the data.</p>	<p>Determines appropriate representations of categorical and quantitative data, summarizing and interpreting the data and characteristics of the representations.</p> <p>Describes possible associations and trends in the data.</p>	<p>Determines appropriate representations of categorical quantitative data, summarizing the data and characteristics of the representations.</p>	<p>Given representations of categorical and quantitative data, summarizes the data and characteristics of the representations.</p>

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	Algebra I: Sub-Claim C			
	The student expresses course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
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Reasoning HS.C.2.1 HS.C.5.5 HS.C.5.6 HS.C.5.10-1 HS.C.6.1 HS.C.8.1 HS.C.9.1 HS.C.10.1 HS.C.12.1 HS.C.16.2 HS.C.18.1	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> • the principle that a graph of an equation in two variables is the set of all its solutions • reasoning about linear and exponential growth • properties of rational numbers or irrational numbers • transformations of functions • a chain of reasoning to justify or refute algebraic, function, or linear-equation propositions or conjectures • a given equation or system of equations • the number or nature of solutions by:	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> • the principle that a graph of an equation in two variables is the set of all its solutions • reasoning about linear and exponential growth • properties of rational numbers or irrational numbers • transformations of functions • a chain of reasoning to justify or refute algebraic, function, or linear-equation propositions or conjectures • a given equation or system of equations • the number or nature of solutions by:	Constructs and communicates a response based on: <ul style="list-style-type: none"> • the principle that a graph of an equation in two variables is the set of all its solutions • reasoning about linear and exponential growth • properties of rational numbers or irrational numbers • transformations of functions • a chain of reasoning to justify or refute algebraic, function, or linear-equation propositions or conjectures • a given equation or system of equations • the number or nature of solutions by:	Constructs and communicates an incomplete response based on: <ul style="list-style-type: none"> • the principle that a graph of an equation in two variables is the set of all its solutions • reasoning about linear and exponential growth • properties of rational numbers or irrational numbers • transformations of functions • a chain of reasoning to justify or refute algebraic, function or linear-equation propositions or conjectures • a given equation or system of equations • the number or nature of solutions by :

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The student expresses course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.				
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<ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) • providing an efficient and logical progression of steps or chain of reasoning with appropriate justification • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion • determining whether an argument or conclusion is generalizable. 	<ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) • providing a logical progression of steps or chain of reasoning with appropriate justification • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion • evaluating, interpreting and critiquing the validity of others' responses, approaches 	<ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions • providing a logical, but incomplete, progression of steps or chain of reasoning • performing minor calculation errors • using some grade-level vocabulary, symbols and labels • providing a partial justification of a conclusion based on own calculations • evaluating the validity of others' approaches and conclusions 	<ul style="list-style-type: none"> • using an approach based on a conjecture and/or stated or faulty assumptions • providing an incomplete or illogical progression of steps or chain of reasoning • making an intrusive calculation error • using limited grade-level vocabulary, symbols and labels • providing a partial justification of a conclusion based on own calculations 	

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	<ul style="list-style-type: none"> evaluating, interpreting and critiquing the validity and efficiency of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) – and providing a counter-example where applicable 	and reasoning – utilizing mathematical connections (when appropriate)		

Performance Level Descriptors – Algebra I

Algebra I: Sub-Claim D				
The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
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Modeling HS.D.1-1 HS.D.2-5 HS.D.2-6 HS.D.2-8 HS.D.2-9 HS.D.3-1 HS.D.3-3	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) • mapping relationships between important quantities • selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusion • analyzing and/or 	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) • mapping relationships between important quantities • selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusions 	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • illustrating relationships between important quantities • using provided tools to create models • analyzing relationships mathematically between important quantities to draw conclusions • interpreting mathematical results in a simplified context 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • identifying important quantities • using provided tools to create models • analyzing relationships mathematically to draw conclusions • writing an algebraic expression or equation to describe a situation • applying proportional reasoning and percentages

Performance Level Descriptors – Algebra I

Algebra I: Sub-Claim D				
The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	<p>creating constraints, relationships and goals</p> <ul style="list-style-type: none"> interpreting mathematical results in the context of the situation reflecting on whether the results make sense improving the model if it has not served its purpose writing a complete, clear and correct algebraic expression or equation to describe a situation applying proportional reasoning and percentages justifying and defending models which lead to a conclusion applying geometric principles and theorems 	<ul style="list-style-type: none"> interpreting mathematical results in the context of the situation reflecting on whether the results make sense improving the model if it has not served its purpose writing a complete, clear and correct algebraic expression or equation to describe a situation applying proportional reasoning and percentages applying geometric principles and theorems writing and using functions in any form to describe how one quantity of interest depends on another 	<ul style="list-style-type: none"> reflecting on whether the results make sense modifying the model if it has not served its purpose writing an algebraic expression or equation to describe a situation applying proportional reasoning and percentages applying geometric principles and theorems writing and using functions to describe how one quantity of interest depends on another using statistics using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 	<ul style="list-style-type: none"> applying common geometric principles and theorems using functions to describe how one quantity of interest depends on another using statistics using estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity

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<p style="text-align: center;">Algebra I: Sub-Claim D</p> <p style="text-align: center;">The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.</p>				
	<p style="text-align: center;">Level 5: Distinguished Command</p>	<p style="text-align: center;">Level 4: Strong Command</p>	<p style="text-align: center;">Level 3: Moderate Command</p>	<p style="text-align: center;">Level 2: Partial Command</p>
	<ul style="list-style-type: none"> • writing and using functions in any form to describe how one quantity of interest depends on another • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 	<ul style="list-style-type: none"> • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 		

Performance Level Descriptors – Geometry

	Geometry: Sub-Claim A			
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Congruence Transformations G-CO.6 G-CO.C	Determines and uses appropriate geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve non-routine problems and prove statements about angle measurement, triangles, distance, line properties and congruence.	Determines and uses appropriate geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and prove statements about angle measurement, triangles, distance, line properties and congruence.	Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and prove statements about angle measurement, triangles, distance, line properties and congruence.	Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and reason about angle measurement, triangles, distance, line properties and congruence.
Similarity G-SRT.1a G-SRT.1b G-SRT.2 G-SRT.5	Uses transformations and congruence and similarity criteria for triangles and to prove relationships among composite geometric figures and to solve multi-step problems.	Uses transformations and congruence and similarity criteria for triangles to prove relationships among geometric figures and to solve problems.	Uses transformations to determine relationships among geometric figures and to solve problems.	Identifies transformation relationships in geometric figures.
Similarity in Trigonometry G-SRT.6 G-SRT.7-2 G-SRT.8	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied non-routine problems. Uses similarity transformations with right	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied problems. Uses similarity transformations with right triangles to define	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied problems.	Uses trigonometric ratios and the Pythagorean Theorem to determine the unknown side lengths and angle measurements of a right triangle.

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	triangles to define trigonometric ratios for acute angles.	trigonometric ratios for acute angles.		
Modeling and Applying G-SRT.7-2 G-SRT.8 G-GPE.6 G-Int.1	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter and ratios of lengths. Applies geometric concepts and trigonometric ratios to describe, model and solve applied problems (including design problems) related to the Pythagorean theorem, density, geometric shapes, their measures and properties.	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter and ratios of lengths. Applies geometric concepts and trigonometric ratios to describe, model and solve applied problems related to the Pythagorean theorem, density , geometric shapes, their measures and properties.	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter and ratios of lengths. Applies geometric concepts to describe, model and solve applied problems related to the Pythagorean theorem, geometric shapes, their measures and properties.	Uses provided geometric relationships in the coordinate plane to solve problems involving area and perimeter. Applies geometric concepts to describe, model and solve applied problems related to the Pythagorean theorem, geometric shapes, their measures and properties.

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Transformations G-CO.1 G-CO.3 G-CO.5	<p>Given a figure and a sequence of transformations, draws the transformed figure.</p> <p>Uses precise geometric terminology to specify more than one sequence of transformations that will carry a figure onto itself or another.</p>	<p>Given a figure and a transformation, draws the transformed figure.</p> <p>Uses precise geometric terminology to specify a sequence of transformations that will carry a figure onto itself or another.</p>	<p>Given a figure and a transformation, draws the transformed figure.</p> <p>Specifies a sequence of transformations that will carry a figure onto another.</p>	<p>Given a figure and a transformation, draws the transformed figure.</p>
Geometric Constructions G-CO.D	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p>Given a line and a point not on the line, uses a variety of tools and methods to construct perpendicular and parallel lines, equilateral triangles, squares and regular hexagons inscribed in circles to prove geometric theorems.</p>	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p>Given a line and a point not on the line, uses a variety of tools and methods to construct perpendicular and parallel lines, equilateral triangles, squares and regular hexagons inscribed in circles.</p>	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p>Given a line and a point not on the line, constructs perpendicular and parallel lines.</p>	<p>Makes basic geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p>

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<p>Applying Geometric Properties and Theorems</p> <p>G-C.A.Int.1 G-C.B.Int.1 G-GPE.1-2</p>	<p>Applies properties and theorems of angles, segments and arcs in circles to solve problems, model relationships and formulate generalizations.</p> <p>Completes the square to find the center and radius of a circle given by an equation.</p>	<p>Applies properties and theorems of angles, segments and arcs in circles to solve problems and model relationships.</p> <p>Completes the square to find the center and radius of a circle given by an equation.</p>	<p>Applies properties and theorems of angles, segments and arcs in circles to solve problems.</p> <p>Completes the square to find the center and radius of a circle given by an equation.</p>	<p>Applies provided properties and theorems of angles, segments and arcs in circles to solve problems.</p>
<p>Geometric Formulas</p> <p>G-GMD.1 G-GMD.3 G-GMD.4</p>	<p>Uses volume formulas to solve mathematical and contextual problems that involve cylinders, pyramids, cones and spheres.</p> <p>Uses dissection arguments, Cavalieri’s principle and informal limit arguments to support the formula for the circumference of a circle, area of a circle, volume of a cylinder, pyramid and cone.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional</p>	<p>Uses volume formulas to solve mathematical and contextual problems that involve cylinders, pyramids, cones and spheres.</p> <p>Gives an informal argument for the formula for the circumference of a circle, area of a circle and volume of a cylinder, including dissection arguments.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects and identifies</p>	<p>Using formulas, determines the volume of cylinders, pyramids, cones and spheres.</p> <p>Gives an informal argument for the formula for the circumference of a circle and area of a circle, including dissection arguments.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects.</p>	<p>Using formulas, determines the volume of cylinders, pyramids, cones and spheres.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects.</p>

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	objects and identifies three-dimensional objects generated by rotations of two-dimensional objects.	three-dimensional objects generated by rotations of two-dimensional objects.		

Performance Level Descriptors – Geometry

Geometry: Sub-Claim C				
	The student expresses course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Reasoning HS.C.13.1 HS.C.13.2 HS.C.13.3 HS.C.14.1 HS.C.14.2 HS.C.14.3 HS.C.14.5 HS.C.14.6 HS.C.15.14 HS.C.18.2	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> • a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures • geometric reasoning in a coordinate setting, OR • a response to a multi-step problem, by: <ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) • providing an efficient and logical progression of steps or chain of reasoning with appropriate justification 	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> • a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures • geometric reasoning in a coordinate setting, OR • a response to a multi-step problem, by: <ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) • providing a logical progression of steps or chain of reasoning with appropriate justification 	Constructs and communicates a response based on: <ul style="list-style-type: none"> • a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures • geometric reasoning in a coordinate setting, OR • a response to a multi-step problem, by: <ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions • providing a logical, but incomplete, progression of steps or chain of reasoning • performing minor calculation errors • using some grade-level vocabulary, symbols 	Constructs and communicates an incomplete response based on: <ul style="list-style-type: none"> • a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures • geometric reasoning in a coordinate setting, OR • a response to a multi-step problem, by : <ul style="list-style-type: none"> • using an approach based on a conjecture and/or stated or faulty assumptions • providing an incomplete or illogical chain of reasoning, or progression of steps • making an intrusive calculation error • using limited grade-level vocabulary,

Performance Level Descriptors – Geometry

Geometry: Sub-Claim C				
The student expresses course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	<ul style="list-style-type: none"> • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion • determining whether an argument or conclusion is generalizable • evaluating, interpreting and critiquing the validity and efficiency of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) – and providing a counter-example where applicable 	<ul style="list-style-type: none"> • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion • evaluating, interpreting and critiquing the validity of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) 	<p>and labels</p> <ul style="list-style-type: none"> • providing a partial justification of a conclusion based on own calculations • evaluating the validity of others' approaches and conclusions 	<p>symbols and labels</p> <ul style="list-style-type: none"> • providing a partial justification of a conclusion based on own calculations

Performance Level Descriptors – Geometry

Geometry: Sub-Claim D The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Modeling HS.D.1-2 HS.D.2-1 HS.D.2-2 HS.D.2-11 HS.D.3-2 HS.D.3-4	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) • mapping relationships between important quantities • selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusion • analyzing and/or 	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) • mapping relationships between important quantities • selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusions 	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • illustrating relationships between important quantities • using provided tools to create models • analyzing relationships mathematically between important quantities to draw conclusions 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • identifying important quantities • using provided tools to create models • analyzing relationships mathematically to draw conclusions • writing an algebraic expression or equation to describe a situation • applying proportional reasoning and percentages

Performance Level Descriptors – Geometry

Geometry: Sub-Claim D The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	<p>creating constraints, relationships and goals</p> <ul style="list-style-type: none"> • interpreting mathematical results in the context of the situation • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct algebraic expression or equation to describe a situation • applying proportional reasoning and percentages justifying and defending models which lead to a conclusion • applying geometric principles and theorems 	<ul style="list-style-type: none"> • interpreting mathematical results in the context of the situation • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct algebraic expression or equation to describe a situation • applying proportional reasoning and percentages • applying geometric principles and theorems • writing and using functions in any form to describe how one quantity of interest depends on another 	<ul style="list-style-type: none"> • interpreting mathematical results in a simplified context • reflecting on whether the results make sense • modifying the model if it has not served its purpose • writing an algebraic expression or equation to describe a situation • applying proportional reasoning and percentages • applying geometric principles and theorems • writing and using functions to describe how one quantity of interest depends on another • using statistics • using reasonable estimates of known 	<ul style="list-style-type: none"> • applying common geometric principles and theorems • using functions to describe how one quantity of interest depends on another • using statistics • using estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity

Performance Level Descriptors – Geometry

Geometry: Sub-Claim D The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	<ul style="list-style-type: none"> • writing and using functions in any form to describe how one quantity of interest depends on another • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 	<ul style="list-style-type: none"> • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 	quantities in a chain of reasoning that yields an estimate of an unknown quantity	

Performance Level Descriptors – Algebra II

	Algebra II: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
<p>Equivalent Expressions</p> <p>N-RN.2 A.Int.1 A-REI.2 A-SSE.2-3 A-SSE.2-6 A-SSE.3c-2</p>	<p>Uses mathematical properties and structure of polynomial, exponential, rational and radical expressions to create equivalent expressions that aid in solving mathematical and contextual problems with three or more steps required.</p> <p>Rewrites exponential expressions to reveal quantities of interest that may be useful.</p>	<p>Uses mathematical properties and structure of polynomial, exponential, rational and radical expressions to create equivalent expressions that aid in solving mathematical and contextual problems with two steps required.</p> <p>Rewrites exponential expressions to reveal quantities of interest that may be useful.</p>	<p>Uses mathematical properties and structure of polynomial, exponential and rational expressions to create equivalent expressions.</p> <p>Rewrites exponential expressions to reveal quantities of interest that may be useful.</p>	<p>Uses provided mathematical properties and structure of polynomial and exponential expressions to create equivalent expressions.</p>
<p>Interpreting Functions</p> <p>A-APR.2 A-REI.11-2 F-IF.4-2</p>	<p>Uses mathematical properties and relationships to reveal key features of polynomial, exponential, rational, trigonometric and logarithmic functions, using them to sketch graphs and identify characteristics of the relationship between two quantities, and applying the remainder theorem where appropriate.</p> <p>Identifies how changing the</p>	<p>Uses mathematical properties and relationships to reveal key features of polynomial, exponential, rational, trigonometric and logarithmic functions, using them to sketch graphs and identify characteristics of the relationship between two quantities, and applying the remainder theorem where appropriate.</p>	<p>Interprets key features of graphs and tables, and uses mathematical properties and relationships to reveal key features of polynomial, exponential and rational functions, using them to sketch graphs.</p>	<p>Uses provided mathematical properties and relationships to reveal key features of polynomial and exponential functions, using them to sketch graphs.</p>

Performance Level Descriptors – Algebra II

	Algebra II: Sub-Claim A The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	parameters of functions impacts key features of graphs.			
Rate of Change F-IF.6-2 F-IF.6-7	Calculates and interprets the average rate of change of polynomial, exponential, logarithmic or trigonometric functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph. Compares rates of change associated with different intervals.	Calculates and interprets the average rate of change of polynomial, exponential, logarithmic or trigonometric functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph.	Calculates the average rate of change of polynomial and exponential functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph.	Calculates the average rate of change of polynomial and exponential functions (presented symbolically or as a table) over a specified interval.
Building Functions A-SSE.4-2 F-Int.3 F-BF.1b-1 F-BF.2	Builds functions that model mathematical and contextual situations, including those requiring multiple trigonometric functions, sequences and combinations of these and other functions, and uses the models to solve, interpret and generalize about problems.	Builds functions that model mathematical and contextual situations, including those requiring trigonometric functions, sequences and combinations of these and other functions, and uses the models to solve, interpret and generalize about problems.	Builds functions that model mathematical and contextual situations, including those requiring trigonometric functions, sequences and combinations of these and other functions , and uses the models to solve and interpret problems.	Builds functions that model mathematical and contextual situations, limited to those requiring arithmetic and geometric sequences, and uses the models to solve and interpret problems.

Performance Level Descriptors – Algebra II

	Algebra II: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Statistics & Probability S-IC.3-1	Determines why a sample survey, experiment or observational study is most appropriate. Given an inappropriate choice of a sample survey, experiment or observational study, determines how to change the scenario to make the choice appropriate.	Determines why a sample survey, experiment or observational study is most appropriate. Given an inappropriate choice of a sample survey, experiment or observational study, identifies and supports the appropriate choice.	Determines whether a sample survey, experiment or observational study is most appropriate.	Identifies whether a given scenario represents a sample survey, experiment or observational study.

Performance Level Descriptors – Algebra II

	Algebra II: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Interpreting Functions F-IF.7c F-IF.7e-1 F-IF.7e-2 F-IF.8b F-IF.9-2 F-Int.1-2	<p>Given multiple functions in different forms (algebraically, graphically, numerically and by verbal description), writes multiple equivalent versions of the functions, and identifies and compares key features.</p> <p>Graphs polynomial, exponential, trigonometric and logarithmic functions, showing key features.</p> <p>Determines how the changes of a parameter in functions impact their other representations.</p>	<p>Given multiple functions in different forms (algebraically, graphically, numerically and by verbal description), writes multiple equivalent versions of the functions, and identifies and compares key features.</p> <p>Graphs exponential, polynomial and trigonometric functions, showing key features.</p>	<p>Given functions represented algebraically, graphically, numerically and by verbal description, writes multiple equivalent versions of the functions and identifies key features.</p> <p>Graphs exponential and polynomial functions, showing key features.</p>	<p>Given functions represented algebraically, graphically, numerically and by verbal description, writes equivalent versions of the functions, and identifies key features.</p> <p>Graphs polynomial functions, showing key features.</p>
Equivalent Expressions N-CN.1 N-CN.2 A-APR.6	<p>Uses commutative, associative and distributive properties to perform operations with complex numbers.</p> <p>Rewrites simple rational expressions using inspection or long division, and determines how different</p>	<p>Uses commutative, associative and distributive properties to perform operations with complex numbers.</p> <p>Rewrites simple rational expressions using inspection or long division.</p>	<p>Uses commutative, associative and distributive properties to perform operations with complex numbers.</p> <p>Rewrites simple rational expressions using inspection.</p>	<p>Uses commutative and associative properties to perform operations with complex numbers.</p>

Performance Level Descriptors – Algebra II

	Algebra II: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	forms of an expression reveal useful information.			
Function Transformations F-BF.3-2 F-BF.3-3 F-BF.3-5	Given a context that infers particular transformations, identifies the effects on graphs of polynomial, exponential, logarithmic and trigonometric functions, and determines if the resulting function is even or odd.	Identifies the effects of multiple transformations on graphs of polynomial, exponential, logarithmic and trigonometric functions, and determines if the resulting function is even or odd.	Identifies the effects of a single transformation on graphs of polynomial, exponential, logarithmic and trigonometric functions – including $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ – and determines if the resulting function is even or odd.	Identifies the effects of a single transformation on graphs of polynomial, exponential, logarithmic and trigonometric functions – limited to $f(x)+k$ and $kf(x)$ – and determines if the resulting function is even or odd.
Trigonometry F-TF.1 F-TF.8-2	Given a trigonometric value and quadrant for an angle, utilizes the structure and relationships of trigonometry, including relationships in the unit circle, to identify other trigonometric values for that angle, and describes the relationship between the radian measure and the subtended arc in the circle in contextual situations.	Given a trigonometric value and quadrant for an angle, utilizes the structure and relationships of trigonometry, including relationships in the unit circle, to identify other trigonometric values for that angle, and describes the relationship between the radian measure and the subtended arc in the circle.	Given a trigonometric value and quadrant for an angle, utilizes the structure and relationships of trigonometry, including relationships in the unit circle, to identify other trigonometric values for that angle.	Given a trigonometric value and quadrant for an angle, utilizes the structure and relationships of trigonometry to identify other trigonometric values for that angle.

Performance Level Descriptors – Algebra II

	Algebra II: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Solving Equations and Systems N-CN.7 A-REI.4b-2 A-REI.6-2 A-REI.7 F-Int.3 F-BF.Int.2 F-LE.2-3 HS-Int.3-3	Solves multi-step contextual word problems to find similarities and differences between solution approaches involving linear, exponential, quadratic (with real or complex solutions) and trigonometric equations and systems of equations, using inverses where appropriate. Constructs linear and exponential function models in multi-step contextual problems.	Solves multi-step contextual word problems involving linear, exponential, quadratic (with real or complex solutions) and trigonometric equations and systems of equations, using inverses where appropriate. Constructs linear and exponential function models in multi-step contextual problems.	Solves problems involving linear, exponential, quadratic (with real or complex solutions) and trigonometric equations and systems of equations, using inverses where appropriate. Constructs linear and exponential function models in multi-step contextual problems with mathematical prompting.	Solves problems involving linear, exponential and quadratic (with real solutions) equations and systems of equations, using inverses where appropriate. Constructs linear and exponential function models in multi-step contextual problems with mathematical prompting.
Data – Univariate and Bivariate S-ID.4 S-ID.6a-1 S-ID.6a-2	Uses the means and standard deviations of data sets to fit them to normal distributions. Fits exponential or trigonometric functions to data in order to solve multi-step contextual problems. Identifies when these procedures are not appropriate.	Uses the means and standard deviations of data sets to fit them to normal distributions. Fits exponential and trigonometric functions to data in order to solve multi-step contextual problems.	Uses the means and standard deviations of data sets to fit them to normal distributions. Fits exponential functions to data in order to solve multi-step contextual problems.	Uses the means and standard deviations of data sets to fit them to normal distributions. Uses fitted exponential functions to solve multi-step contextual problems.

Performance Level Descriptors – Algebra II

	Algebra II: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Inference S-IC.2 S-IC.Int.1	Uses sample data to make, justify and critique inferences and conclusions about the corresponding population. Decides if specified models are consistent with results from given data-generating processes.	Uses sample data to make inferences and justify conclusions about the corresponding population. Decides if specified models are consistent with results from given data-generating processes.	Uses sample data to make inferences about the corresponding population.	Identifies when sample data can be used to make inferences about the corresponding population.
Probability S-CP.Int.1	Recognizes, determines and uses conditional probability and independence in multi-step contextual problems, using appropriate set language and appropriate representations, including two-way frequency tables. Applies the Addition Rule of probability and interprets answers in context.	Recognizes, determines and uses conditional probability and independence in multi-step contextual problems, using appropriate set language and appropriate representations, including two-way frequency tables. Applies the Addition Rule of probability.	Recognizes, determines and uses conditional probability and independence in contextual problems, using appropriate set language and appropriate representations, including two-way frequency tables.	Recognizes and determines conditional probability and independence in contextual problems.

Performance Level Descriptors – Algebra II

	Algebra II: Sub-Claim C			
	The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Reasoning HS.C.3.1 HS.C.3.2 HS.C.4.1 HS.C.5.4 HS.C.5.11 HS.C.6.2 HS.C.6.4 HS.C.7.1 HS.C.8.2 HS.C.8.3 HS.C.9.2 HS.C.11.1 HS.C.12.2 HS.C.16.3 HS.C.17.2 HS.C.17.3 HS.C.17.4 HS.C.17.5 HS.C.18.4 HS.C.CCR	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> • a response to a given equation or system of equations • a chain of reasoning to justify or refute algebraic, function or number system propositions or conjectures • a response based on data • a response based on the graph of an equation in two variables, the principle that a graph is a solution set or the relationship between zeros and factors of polynomials • a response based on trigonometric functions and the unit circle • a response based on 	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> • a response to a given equation or system of equations • a chain of reasoning to justify or refute algebraic, function or number system propositions or conjectures, • a response based on data • a response based on the graph of an equation in two variables, the principle that a graph is a solution set or the relationship between zeros and factors of polynomials • a response based on trigonometric functions and the unit circle • a response based on 	Constructs and communicates a response based on: <ul style="list-style-type: none"> • a response to a given equation or system of equations • a chain of reasoning to justify or refute algebraic, function or number system propositions or conjectures • a response based on data • a response based on the graph of an equation in two variables, the principle that a graph is a solution set or the relationship between zeros and factors of polynomials • a response based on trigonometric functions and the unit circle • a response based on 	Constructs and communicates an incomplete response based on: <ul style="list-style-type: none"> • a response to a given equation or system of equations • a chain of reasoning to justify or refute algebraic, function or number system propositions or conjectures • a response based on data • a response based on the graph of an equation in two variables, the principle that a graph is a solution set or the relationship between zeros and factors of polynomials • a response based on trigonometric functions and the unit circle • a response based on

Performance Level Descriptors – Algebra II

Algebra II: Sub-Claim C				
The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	transformations of functions OR <ul style="list-style-type: none"> a response based on properties of exponents by: <ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) providing an efficient and logical progression of steps or chain of reasoning with appropriate justification performing precise calculations using correct grade-level vocabulary, symbols and labels providing a justification of a conclusion 	transformations of functions OR <ul style="list-style-type: none"> a response based on properties of exponents by: <ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) providing a logical progression of steps or chain of reasoning with appropriate justification performing precise calculations using correct grade-level vocabulary, symbols and labels providing a justification of a conclusion 	transformations of functions OR <ul style="list-style-type: none"> a response based on properties of exponents by: <ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions providing a logical, but incomplete, progression of steps or chain of reasoning performing minor calculation errors using some grade-level vocabulary, symbols and labels providing a partial justification of a conclusion based on own calculations 	transformations of functions OR <ul style="list-style-type: none"> a response based on properties of exponents by : <ul style="list-style-type: none"> using an approach based on a conjecture and/or stated or faulty assumptions providing an incomplete or illogical progression of steps or chain of reasoning making an intrusive calculation error using limited grade-level vocabulary, symbols and labels providing a partial justification of a conclusion based on own calculations

Performance Level Descriptors – Algebra II

Algebra II: Sub-Claim C				
The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	<ul style="list-style-type: none"> determining whether an argument or conclusion is generalizable evaluating, interpreting and critiquing the validity and efficiency of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) – and providing a counter-example where applicable 	<ul style="list-style-type: none"> evaluating, interpreting and critiquing the validity of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) 	<ul style="list-style-type: none"> evaluating the validity of others' approaches and conclusions 	

Performance Level Descriptors – Algebra II

Algebra II: Sub-Claim D				
The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Modeling HS.D.2-3 HS.D.2-4 HS.D.2-7 HS.D.2-10 HS.D.2-12 HS.D.2-13 HS.D.3-5 HS.D.3-6 HS.D.CCR	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • mapping relationships between important quantities • selecting appropriate tools to create the appropriate model • analyzing relationships mathematically between important quantities (either given or created) to draw conclusions 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • mapping relationships between important quantities • selecting appropriate tools to create the appropriate model • analyzing relationships mathematically between important quantities (either given or created) to draw conclusions • interpreting 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • illustrating relationships between important quantities • using provided tools to create appropriate but inaccurate model • analyzing relationships mathematically between important given quantities to draw conclusions • interpreting mathematical results in 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • identifying important given quantities • using provided tools to create inaccurate model • analyzing relationships mathematically to draw conclusions • writing an expression, equation or function to describe a situation • using securely held content incompletely reporting a conclusion,

Performance Level Descriptors – Algebra II

Algebra II: Sub-Claim D The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	<ul style="list-style-type: none"> • interpreting mathematical results in the context of the situation • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct expression, equation or function to describe a situation • analyzing and/or creating constraints, relationships and goals • justifying and defending models which lead to a conclusion • using geometry to solve design problems • using securely held 	<p style="text-align: center;">mathematical results in the context of the situation</p> <ul style="list-style-type: none"> • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct expression, equation or function to describe a situation • using geometry to solve design problems • using securely held content, briefly, but accurately reporting the conclusion • identifying and using relevant data from a data source 	<p style="text-align: center;">a simplified context</p> <ul style="list-style-type: none"> • reflecting on whether the results make sense • modifying the model if it has not served its purpose • writing an expression, equation or function to describe a situation • using geometry to solve design problems • using securely held content, incompletely reporting a conclusion • selecting and using some relevant data from a data source • making an evaluation or recommendation 	<p style="text-align: center;">with some inaccuracy within the reporting</p> <ul style="list-style-type: none"> • indiscriminately using data from a data source

Performance Level Descriptors – Algebra II

Algebra II: Sub-Claim D The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command	
content, accurately reporting and justifying the conclusion <ul style="list-style-type: none"> • identifying and using relevant data from a data source • making an appropriate evaluation or recommendation 	<ul style="list-style-type: none"> • making an appropriate evaluation or recommendation 			

Performance Level Descriptors – Math I

	Math I: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Expressions and Equations A-SSE.1-1 A.Int.1 A.CED.4-1 A.REI.3	Manipulates complicated linear formulas and equations to highlight a quantity of interest in context. Interprets components of contextual exponential expressions and solves equations that require seeing structure.	Manipulates linear formulas and equations to highlight a quantity of interest in context. Interprets components of contextual exponential expressions and solves equations that require seeing structure.	Manipulates linear formulas and equations for a specified variable. Identifies components of contextual exponential expressions and solves equations that require seeing structure.	Manipulates linear formulas and equations to solve for a specified variable requiring one-step. Identifies components of contextual exponential expressions.
Rate of Change F.IF.6-3a F.IF.6-3b F.IF.6-8	Calculates and interprets the average rate of change of linear, exponential, square root, cube root and piece-wise-defined functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph. Compares rates of change associated with different intervals.	Calculates and interprets the average rate of change of linear, exponential, square root, cube root and piece-wise-defined functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph.	Calculates the average rate of change of linear and exponential functions (presented symbolically or as a table) over a specified interval and estimate the rate of change from a graph.	Calculates the average rate of change of linear and exponential functions (presented symbolically or as a table) over a specified interval.

Performance Level Descriptors – Math I

	Math I: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
<p>Interpreting Functions</p> <p>F.BF.2 F.Int.1-3 F.IF.1 F.IF.2 F.IF.A.Int.1 F.IF.4-3 F.IF.5-1 S.ID.Int.1 HS.Int.3-1</p>	<p>Determines if a given relation is a function.</p> <p>Evaluates with, uses and interprets with function notation within a context.</p> <p>Writes and uses arithmetic and geometric sequences to model situations.</p> <p>For linear functions that model contextual relationships, determines and interprets key features, graphs the function, and solves problems.</p> <p>Determines the domain and relates it to the quantitative relationship it describes for a linear, exponential (limited to domains in the integers), square root, cube root, piece-wise, step and absolute value functions.</p>	<p>Determines if a given relation is a function.</p> <p>Evaluates with, uses and interprets with function notation within a context.</p> <p>Writes and uses arithmetic and geometric sequences to model situations.</p> <p>For linear functions that model contextual relationships, determines and interprets key features, graphs the function and solves problems.</p> <p>Determines the domain and relates it to the quantitative relationship it describes for a linear, exponential (limited to domains in the integers), square root and absolute value functions.</p>	<p>Determines if a given relation is a function.</p> <p>Evaluates with and uses function notation within a context.</p> <p>Writes arithmetic and geometric sequences.</p> <p>For linear functions that model contextual relationships, determines key features and graphs the function.</p> <p>Determines the domain and relates it to the quantitative relationship it describes for linear and exponential (limited to domains in the integers) functions.</p>	<p>Determines if a given relation is a function.</p> <p>Evaluates with and uses function notation.</p> <p>Writes arithmetic sequences.</p> <p>For linear functions that model contextual relationships, determines key features.</p> <p>Determines the domain of linear functions.</p>

Performance Level Descriptors – Math I

	Math I: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
<p>Solving Graphically</p> <p>A.REI.10 A.REI.11-1b A.REI.12 A.CED.3-1</p>	<p>Graphs and analyzes the solution sets of equations, linear inequalities and systems of linear inequalities.</p> <p>Finds the solutions to two polynomial functions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations.</p> <p>Writes a system of linear inequalities given a context.</p>	<p>Graphs the solution sets of equations, linear inequalities and systems of linear inequalities.</p> <p>Finds the solutions to two polynomial functions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations.</p> <p>Writes a system of linear inequalities given a context.</p>	<p>Graphs the solution sets of equations, linear inequalities and systems of linear inequalities.</p> <p>Finds the solutions to two polynomial functions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations.</p>	<p>Graphs the solution sets of equations and linear inequalities.</p> <p>Finds the solutions to two polynomial functions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations.</p>
<p>Congruence Transformations</p> <p>G.CO.C G.CO.6</p>	<p>Determines and uses appropriate geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve non-routine problems and prove statements about angle measurement, triangles, distance, line properties and congruence.</p>	<p>Determines and appropriate geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and prove statements about angle measurement, triangles, distance, line properties and congruence.</p>	<p>Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and prove statements about angle measurement, triangles, distance, line properties and congruence.</p>	<p>Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and reason about angle measurement, triangles, distance, line properties and congruence.</p>

Performance Level Descriptors – Math I

	Math I: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Summarizing, Representing and Interpreting Data S.ID.5	Determines appropriate representations of categorical and quantitative data, summarizing and interpreting the data and characteristics of the representations. Describes and interprets possible associations and trends in the data.	Determines appropriate representations of categorical and quantitative data, summarizing and interpreting the data and characteristics of the representations. Describes possible associations and trends in the data.	Determines appropriate representations of categorical quantitative data, summarizing the data and characteristics of the representations.	Given representations of categorical and quantitative data, summarizes the data and characteristics of the representations.
Transformations G.CO.1 G.CO.3 G.CO.5	Given a figure and a sequence of transformations, draws the transformed figure. Uses precise geometric terminology to specify more than one sequence of transformations that will carry a figure onto itself or another.	Given a figure and a transformation, draws the transformed figure. Uses precise geometric terminology to specify a sequence of transformations that will carry a figure onto itself or another.	Given a figure and a transformation, draws the transformed figure. Specifies a sequence of transformations that will carry a figure onto another.	Given a figure and a transformation, draws the transformed figure.
Solving Systems A.REI.6-1 A.REI.6-2	Solves multi-step contextual problems that require writing, solving and analyzing systems of linear equations exactly and	Solves multi-step contextual problems that require writing, solving and analyzing systems of linear equations exactly and	Given a system of linear equations, solves contextual problems exactly and approximately, focusing on pairs of linear equations in	Given a system of linear equations, solves contextual problems exactly and approximately, focusing on pairs of linear equations in

Performance Level Descriptors – Math I

	Math I: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	approximately, focusing on pairs of linear equations in two variables with real coefficients and solutions. Solves a given system of three linear equations and three unknowns with rational coefficients.	approximately, focusing on pairs of linear equations in two variables with rational coefficients and solutions.	two variables with rational coefficients and solutions.	two variables with integer coefficients and solutions.
Contextual Problems Functions F.IF.7a-1 F.IF.9-3 F.LE.2-1 F.LE.2-2 F.LE.2-3	Represents linear and exponential (with domain in the integers) functions symbolically, in real-life scenarios, graphically, with a verbal description, as a sequence and with input-output pairs to solve mathematical and contextual problems. Compares the properties of two functions represented in multiple ways, limited to linear, exponential (with domains in the integers), square root, absolute value, cube root, piece-wise and step.	Represents linear and exponential (with domain in the integers) functions symbolically, in real-life scenarios , graphically, with a verbal description, as a sequence and with input-output pairs to solve mathematical and contextual problems. Compares the properties of two functions represented in multiple ways, limited to linear, exponential (with domains in the integers), square root and absolute value.	Represents linear and exponential (with domain in the integers) functions symbolically, graphically and with input-output pairs to solve mathematical problems. Compares the properties of two functions represented in different ways, limited to linear and exponential (with domains in the integers).	Given a symbolic representation, real-life scenario, graph, verbal description, sequence or input-output pairs for linear and exponential functions (with domains in the integers), solves mathematical problems. Compares the properties of two linear functions represented in different ways.

Performance Level Descriptors – Math I

	Math I: Sub-Claim C			
	The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Reasoning HS.C.5.6 HS.C.5.10-2 HS.C.6.1 HS.C.10.1 HS.C.14.1 HS.C.14.2 HS.C.18.1	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> the principle that a graph of an equation in two variables is the set of all its solutions reasoning about linear and exponential growth properties of rational numbers or irrational numbers transformations of functions a chain of reasoning to justify or refute algebraic, function, or linear equation propositions or conjectures a given equation or system of equations the number or nature of solutions by:	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> the principle that a graph of an equation in two variables is the set of all its solutions reasoning about linear and exponential growth properties of rational numbers or irrational numbers transformations of functions a chain of reasoning to justify or refute algebraic, function, or linear equation propositions or conjectures a given equation or system of equations the number or nature of solutions by:	Constructs and communicates a response based on: <ul style="list-style-type: none"> the principle that a graph of an equation in two variables is the set of all its solutions reasoning about linear and exponential growth properties of rational numbers or irrational numbers transformations of functions a chain of reasoning to justify or refute algebraic, function, or linear equation propositions or conjectures a given equation or system of equations the number or nature of solutions by:	Constructs and communicates an incomplete response based on: <ul style="list-style-type: none"> the principle that a graph of an equation in two variables is the set of all its solutions reasoning about linear and exponential growth properties of rational numbers or irrational numbers transformations of functions a chain of reasoning to justify or refute algebraic, function, or linear equation propositions or conjectures a given equation or system of equations the number or nature of solutions by :

Performance Level Descriptors – Math I

Math I: Sub-Claim C				
The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.				
Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command	
<ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) providing an efficient and logical progression of steps or chain of reasoning with appropriate justification performing precise calculations using correct grade-level vocabulary, symbols and labels providing a justification of a conclusion determining whether an argument or conclusion is generalizable evaluating, interpreting and critiquing the validity of others' responses, approaches and 	<ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) providing a logical progression of steps or chain of reasoning with appropriate justification performing precise calculations using correct grade-level vocabulary, symbols and labels providing a justification of a conclusion evaluating, interpreting and critiquing the validity of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) 	<ul style="list-style-type: none"> using a logical approach based on a conjecture and/or stated assumptions providing a logical, but incomplete, progression of steps or chain of reasoning performing minor calculation errors using some grade-level vocabulary, symbols and labels providing a partial justification of a conclusion based on own calculations evaluating the validity of others' approaches and conclusions 	<ul style="list-style-type: none"> using an approach based on a conjecture and/or stated or faulty assumptions providing an incomplete or illogical progression of steps or chain of reasoning making an intrusive calculation error using limited grade-level vocabulary, symbols and labels providing a partial justification of a conclusion based on own calculations 	

Performance Level Descriptors – Math I

	Math I: Sub-Claim C			
	The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	reasoning – utilizing mathematical connections (when appropriate) - and providing a counter-example where applicable			

Performance Level Descriptors – Math I

Math I: Sub-Claim D				
The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Modeling HS.D.1-1 HS.D.2-5 HS.D.2-8 HS.D.3-1 HS.D.3-3	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) mapping relationships between important quantities selecting appropriate tools to create models analyzing relationships mathematically between important quantities to draw conclusion analyzing and/or 	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) mapping relationships between important quantities selecting appropriate tools to create models analyzing relationships mathematically between important quantities to draw conclusions 	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> using stated assumptions and approximations to simplify a real-world situation illustrating relationships between important quantities using provided tools to create models analyzing relationships mathematically between important quantities to draw conclusions 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> using stated assumptions and approximations to simplify a real-world situation identifying important quantities using provided tools to create models analyzing relationships mathematically to draw conclusions

Performance Level Descriptors – Math I

Math I: Sub-Claim D				
The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command	
<p>creating constraints, relationships and goals</p> <ul style="list-style-type: none"> interpreting mathematical results in the context of the situation reflecting on whether the results make sense improving the model if it has not served its purpose writing a complete, clear and correct algebraic expression or equation to describe a situation applying proportional reasoning and percentages justifying and defending models which lead to a conclusion applying geometric 	<ul style="list-style-type: none"> interpreting mathematical results in the context of the situation reflecting on whether the results make sense improving the model if it has not served its purpose writing a complete, clear and correct algebraic expression or equation to describe a situation applying proportional reasoning and percentages applying geometric principles and theorems writing and using functions in any form to describe how one quantity of interest depends on another 	<ul style="list-style-type: none"> interpreting mathematical results in a simplified context reflecting on whether the results make sense modifying the model if it has not served its purpose writing an algebraic expression or equation to describe a situation applying proportional reasoning and percentages applying geometric principles and theorems writing and using functions to describe how one quantity of interest depends on another using statistics using reasonable 	<ul style="list-style-type: none"> writing an algebraic expression or equation to describe a situation applying proportional reasoning and percentages applying common geometric principles and theorems using functions to describe how one quantity of interest depends on another using statistics using estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 	

Performance Level Descriptors – Math I

<p align="center">Math I: Sub-Claim D</p> <p>The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.</p>				
<p align="center">Level 5: Distinguished Command</p>				
<p align="center">Level 4: Strong Command</p>		<p align="center">Level 3: Moderate Command</p>		<p align="center">Level 2: Partial Command</p>
<ul style="list-style-type: none"> • principles and theorems • writing and using functions in any form to describe how one quantity of interest depends on another • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 		<ul style="list-style-type: none"> • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 		<p>estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity</p>

Performance Level Descriptors – Math II

	Math II: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Quadratics and Exponential Expressions A.SSE.1-2 A.SSE.2-2 A.SSE.2-5 A.SSE.3a A.SSE.3b A.SSE.3c-1 A.SSE.3c-2	Interprets the structure of quadratic and exponential expressions that contain real exponents. In cases where three or more steps are required, writes equivalent expressions to reveal information by viewing one or more of their parts as a single entity, including factoring and completing the square for quadratics.	Interprets the structure of quadratic and exponential expressions that contain real exponents. In cases where two steps are required, writes equivalent expressions to reveal information by viewing one or more of their parts as a single entity, including factoring and completing the square for quadratics.	Interprets the structure of quadratic and exponential expressions (with rational exponents) to reveal information by viewing at least one of their parts as a single entity.	Identifies equivalent quadratic and exponential expressions with integer exponents.
Quadratic Equations A.REI.4a-1 A.REI.4b-1 A.REI.4b-2 A.CED.4-2 A.Int.1 HS.Int.2	Solves quadratic equations in one variable with real coefficients, using methods appropriate to the initial form, including completing the square, inspection, taking square roots, the quadratic formula and factoring. Recognizes when the quadratic formula gives complex solutions.	Solves quadratic equations in one variable with real coefficients, using methods appropriate to the initial form , including completing the square, inspection, taking square roots, the quadratic formula and factoring.	Solves quadratic equations in one variable with rational coefficients, using methods including completing the square, inspection, taking square roots, the quadratic formula or factoring.	Identifies solutions to quadratic equations in one variable with integer or rational coefficients.

Performance Level Descriptors – Math II

	Math II: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Graphing Exponential and Quadratic Functions F.IF.4-4 F.IF.5-2 HS.Int-1	<p>Writes quadratic and exponential functions, determines key features, graphs functions and solves problems in contextual situations.</p> <p>Determines domains and relates them to the quantitative relationship described for quadratic functions.</p>	<p>Writes exponential functions for contextual situations.</p> <p>For quadratic and exponential functions that model contextual relationships, determines key features, graphs functions and solves problems.</p> <p>Determines domains and relates them to the quantitative relationship described for quadratic functions.</p>	<p>For quadratic and exponential functions that model contextual relationships, determines key features and sketches graphs of functions.</p> <p>Determines domains of quadratic functions.</p>	<p>Identifies key features of quadratic and exponential functions.</p>
Rate of Change F.IF.6-4 F.IF.6-9	<p>Calculates and interprets the average rate of change of exponential and quadratic functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph.</p> <p>Compares rates of change associated with different intervals.</p>	<p>Calculates and interprets the average rate of change of exponential and quadratic (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph.</p>	<p>Calculates the average rate of change of exponential and quadratic functions (presented symbolically or as a table) over a specified interval and estimate the rate of change from a graph.</p>	<p>Calculates the average rate of change of exponential and quadratic functions (presented symbolically or as a table) over a specified interval.</p>

Performance Level Descriptors – Math II

	Math II: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Polynomial, Rational and Radical Expressions N.RN.2 A.APR.1-1	Adds, subtracts and multiplies three or more polynomials requiring a combination of operations. Using the properties of exponents, rewrites expressions containing radicals and rational exponents.	Adds, subtracts and multiplies three or more polynomials. Using the properties of exponents, rewrites expressions containing radicals and rational exponents.	Adds, subtracts and multiplies two polynomials. Using the properties of exponents, rewrites expressions containing rational exponents.	Identifies equivalent expressions when adding, subtracting and multiplying polynomials and expressions containing integer exponents.
Similarity G.SRT.1a G.SRT.1b G.SRT.2 G.SRT.5	Uses transformations and congruence and similarity criteria for triangles and to prove relationships among composite geometric figures and to solve multi-step problems.	Uses transformations and congruence and similarity criteria for triangles to prove relationships among geometric figures and to solve problems.	Uses transformations to determine relationships among geometric figures and to solve problems.	Identifies transformation relationships in geometric figures.
Similarity in Trigonometry G.SRT.6 G.SRT.7-2 G.SRT.8	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied non-routine problems. Uses similarity transformations with right	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied problems. Uses similarity transformations with right triangles to define	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied problems.	Uses trigonometric ratios and the Pythagorean Theorem to determine the unknown side lengths and angle measurements of a right triangle.

Performance Level Descriptors – Math II

	Math II: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	triangles to define trigonometric ratios for acute angles.	trigonometric ratios for acute angles.		

Performance Level Descriptors – Math II

	Math II: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Probability S.CP.Int.1	Recognizes, determines and uses conditional probability and independence in multi-step contextual problems, using appropriate set language and appropriate representations, including two-way frequency tables. Applies the Addition Rule of probability and interprets answers in context.	Recognizes, determines and uses conditional probability and independence in multi-step contextual problems, using appropriate set language and appropriate representations, including two-way frequency tables. Applies the Addition Rule of probability.	Recognizes, determines and uses conditional probability and independence in contextual problems, using appropriate set language and appropriate representations, including two-way frequency tables.	Recognizes and determines conditional probability and independence in contextual problems.
Statistics S.ID.6a-1 S.ID.Int.2	Represents data on scatter plots and describes how the variables are related. Fits quadratic functions to data to solve multi-step problems in the context of the data and informally assesses the fit of functions by plotting and analyzing residuals.	Represents data on scatter plots and describes how the variables are related. Fits quadratic functions to data to solve problems in the context of the data and informally assesses the fit of functions by plotting and analyzing residuals.	Represents data on scatter plots and describes how the variables are related. Informally, determines whether quadratic models are a good fit. Fits quadratic functions to data to solve problems in the context of the data.	Represents data on scatter plots. Informally, determines whether quadratic models are a good fit.
Geometric Formulas G.GMD.1 G.GMD.3	Uses volume formulas to solve mathematical and contextual problems that involve cylinders, pyramids, cones and spheres.	Uses volume formulas to solve mathematical and contextual problems that involve cylinders, pyramids, cones and spheres.	Using formulas, determines the volume of cylinders, pyramids, cones and spheres.	Using formulas, determines the volume of cylinders, pyramids, cones and spheres.

Performance Level Descriptors – Math II

	Math II: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	Uses dissection arguments, Cavalieri’s principle and informal limit arguments to support the formula for the circumference of a circle, area of a circle, volume of a cylinder, pyramid and cone.	Gives an informal argument for the formula for the circumference of a circle, area of a circle and volume of a cylinder , including dissection arguments.	Gives an informal argument for the formula for the circumference of a circle and area of a circle, including dissection arguments.	
Graphs F.IF.7a-2 F.IF.7b F.IF.7e-1 F.BF.3-1 F.BF.3-4 HS-Int.2	Graphs and compares exponential, quadratic, square root, cube root, piece-wise-defined functions (including step functions and absolute value functions), identifying intercepts, maxima and minima, end behavior and zeros. Identifies, illustrates and interprets the effect on linear and quadratic graphs of replacing $f(x)$ by $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of k . Finds the values of k given the graphs.	Graphs and compares exponential, quadratic, piece-wise-defined functions (including step functions and absolute value functions) , identifying intercepts, maxima and minima, end behavior and zeros. Identifies and illustrates the effect on linear and quadratic graphs of replacing $f(x)$ by $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of k . Finds the values of k given the graphs.	Graphs exponential and quadratic functions , identifying intercepts, maxima and minima, end behavior and zeros. Identifies and illustrates the effect on linear and quadratic graphs of replacing $f(x)$ by one of the following: $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of k . Finds the values of k given the graphs.	Identifies intercepts, maxima and minima, end behavior and zeros from graphs Identifies the effect on linear and quadratic graphs of replacing $f(x)$ by one of the following $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of k .

Performance Level Descriptors – Math II

	Math II: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
<p>Multiple Representations of Functions</p> <p>A.REI.7 F.Int.1-4 F.BF.1b-1 F.IF.8a F.IF.8b F.IF.9-4 HS.Int.1</p>	<p>Writes quadratic or exponential functions defined by expressions in different but equivalent forms to reveal and explain different properties of the functions, including zeros, extreme values, symmetry and percent rate of change.</p> <p>Within a non-routine context, compares properties of two functions represented in different ways (algebraically, graphically, numerically or verbally).</p> <p>Solves a simple system of a linear and quadratic equation algebraically and graphically.</p> <p>Combines standard functions using multiple arithmetic operations.</p>	<p>Writes quadratic or exponential functions defined by expressions in different but equivalent forms to reveal and explain different properties of the functions, including zeros, extreme values, symmetry and percent rate of change.</p> <p>Within a routine context, compares properties of two functions represented in different ways (algebraically, graphically, numerically or verbally).</p> <p>Solves a simple system of a linear and quadratic equation algebraically or graphically.</p> <p>Combines standard functions using an arithmetic operation.</p>	<p>Writes quadratic or exponential functions defined by expressions in different but equivalent forms to reveal and explain different properties of the functions, including zeros, extreme values, symmetry and percent rate of change.</p> <p>Within a routine context, compares properties of two functions represented in different ways (algebraically, graphically, numerically or verbally).</p> <p>Given a graph, solves a system of a linear and quadratic equation given a graph.</p>	<p>Given equivalent expressions, identifies features of quadratic or exponential functions, including zeros, extreme values and percent rate of change.</p> <p>Compares properties of two functions within the same representation.</p>

Performance Level Descriptors – Math II

	Math II: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Number Systems N.RN.3 N.CN.1 N.CN.2 N.CN.7	<p>Identifies rational, irrational and complex numbers.</p> <p>Uses commutative, associative and distributive properties to perform operation with complex numbers.</p> <p>Calculates sums and products of two rational and/or irrational numbers and determines whether and generalizes when the sums and products are rational or irrational.</p>	<p>Identifies rational, irrational and complex numbers.</p> <p>Uses commutative, associative and distributive properties to perform operation with complex numbers.</p> <p>Calculates sums and products of two rational and/or irrational numbers and determines whether the sums and products are rational or irrational.</p>	<p>Identifies rational, irrational and complex numbers.</p> <p>Uses commutative, associative and distributive properties to perform operation with complex numbers.</p> <p>Calculates sums and products of two rational and/or irrational numbers.</p>	<p>Identifies rational, irrational and complex numbers.</p> <p>Uses commutative and associative properties to perform operation with complex numbers.</p>

Performance Level Descriptors – Math II

	Math II: Sub-Claim C			
	The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Reasoning HS.C.2.1 HS.C.3.1 HS.C.3.2 HS.C.5.5 HS.C.8.1 HS.C.9.1 HS.C.12.1 HS.C.12.2 HS.C.14.5 HS.C.14.6 HS.C.15.14 HS.C.16.2 HS.C.18.3	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> • the principle that the graph of an equation in two variables is the set of all its solutions • reasoning about linear and exponential growth • properties of rational numbers or irrational numbers • transformations of functions • a chain of reasoning to justify or refute algebraic, function-related, or linear equation propositions or conjectures • a given equation or system of equations by: <ul style="list-style-type: none"> • using a logical approach 	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> • the principle that the graph of an equation in two variables is the set of all its solutions • reasoning about linear and exponential growth • properties of rational numbers or irrational numbers • transformations of functions • a chain of reasoning to justify or refute algebraic, function-related, or linear equation propositions or conjectures • a given equation or system of equations by: <ul style="list-style-type: none"> • using a logical approach 	Constructs and communicates a response based on: <ul style="list-style-type: none"> • the principle that the graph of an equation in two variables is the set of all its solutions • reasoning about linear and exponential growth • properties of rational numbers or irrational numbers • transformations of functions • a chain of reasoning to justify or refute algebraic, function-related, or linear equation propositions or conjectures • a given equation or system of equations by: <ul style="list-style-type: none"> • using a logical approach 	Constructs and communicates an incomplete response based on: <ul style="list-style-type: none"> • the principle that the graph of an equation in two variables is the set of all its solutions • reasoning about linear and exponential growth • properties of rational numbers or irrational numbers • transformations of functions • a chain of reasoning to justify or refute algebraic, function-related, or linear equation propositions or conjectures • a given equation or system of equations by : <ul style="list-style-type: none"> • using an approach

Performance Level Descriptors – Math II

Math II: Sub-Claim C The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) <ul style="list-style-type: none"> • providing an efficient and logical progression of steps or chain of reasoning with appropriate justification • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion • determining whether an argument or conclusion is generalizable. • evaluating, interpreting and critiquing the validity and efficiency of others’ responses, approaches and 	based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) <ul style="list-style-type: none"> • providing a logical progression of steps or chain of reasoning with appropriate justification • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion • evaluating, interpreting and critiquing the validity of others’ responses, approaches and reasoning – utilizing mathematical connections (when appropriate) 	based on a conjecture and/or stated assumptions <ul style="list-style-type: none"> • providing a logical, but incomplete, progression of steps or chain of reasoning • performing minor calculation errors • using some grade-level vocabulary, symbols and labels • providing a partial justification of a conclusion based on own calculations • evaluating the validity of others’ approaches and conclusions 	based on a conjecture and/or stated or faulty assumptions <ul style="list-style-type: none"> • providing an incomplete or illogical progression of steps or chain of reasoning • making an intrusive calculation error • using limited grade-level vocabulary, symbols and labels • providing a partial justification of a conclusion based on own calculations

Performance Level Descriptors – Math II

	Math II: Sub-Claim C			
	The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	reasoning – utilizing mathematical connections (when appropriate) – and providing a counter-example where applicable			

Performance Level Descriptors – Math II

Math II: Sub-Claim D				
<p>The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.</p>				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
<p>Modeling</p> <p>HS.D.1-2 HS.D.2-1 HS.D.2-2 HS.D.2-3 HS.D.2-6 HS.D.2-9 HS.D.2-11 HS.D.3-2 HS.D.3-4</p>	<p>Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by:</p> <ul style="list-style-type: none"> • using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) • mapping relationships between important quantities • selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusion 	<p>Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by:</p> <ul style="list-style-type: none"> • using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models) • mapping relationships between important quantities • selecting appropriate tools to create models • analyzing relationships mathematically between important quantities to draw conclusions 	<p>Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by:</p> <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • illustrating relationships between important quantities • using provided tools to create models • analyzing relationships mathematically between important quantities to draw conclusions • interpreting mathematical results in a simplified context 	<p>Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by:</p> <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • identifying important quantities • using provided tools to create models • analyzing relationships mathematically to draw conclusions • writing an algebraic expression or equation to describe a situation • applying proportional reasoning and percentages

Performance Level Descriptors – Math II

Math II: Sub-Claim D				
The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command	
<ul style="list-style-type: none"> • analyzing and/or creating constraints, relationships and goals • interpreting mathematical results in the context of the situation • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct algebraic expression or equation to describe a situation • applying proportional reasoning and percentages justifying and defending models which lead to a conclusion • applying geometric 	<ul style="list-style-type: none"> • interpreting mathematical results in the context of the situation • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct algebraic expression or equation to describe a situation • applying proportional reasoning and percentages • applying geometric principles and theorems • writing and using functions in any form to describe how one quantity of interest depends on another 	<ul style="list-style-type: none"> • reflecting on whether the results make sense • modifying the model if it has not served its purpose • writing an algebraic expression or equation to describe a situation • applying proportional reasoning and percentages • applying geometric principles and theorems • writing and using functions to describe how one quantity of interest depends on another • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an 	<ul style="list-style-type: none"> • applying common geometric principles and theorems • using functions to describe how one quantity of interest depends on another • using statistics • using estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 	

Performance Level Descriptors – Math II

<p style="text-align: center;">Math II: Sub-Claim D</p> <p>The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.</p>				
	<p style="text-align: center;">Level 5: Distinguished Command</p>	<p style="text-align: center;">Level 4: Strong Command</p>	<p style="text-align: center;">Level 3: Moderate Command</p>	<p style="text-align: center;">Level 2: Partial Command</p>
	<p>principles and theorems</p> <ul style="list-style-type: none"> • writing and using functions in any form to describe how one quantity of interest depends on another • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 	<ul style="list-style-type: none"> • using statistics • using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity 	<p>estimate of an unknown quantity</p>	

Performance Level Descriptors – Math III

	Math III: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Equivalent Expressions A-SSE.2-3 A-SSE.2-6	Uses the structure of polynomial, exponential and rational expressions to create equivalent expressions in solving mathematical problems with three or more steps required.	Uses the structure of polynomial, exponential and rational expressions to create equivalent expressions that aid in solving mathematical problems with two steps required.	Uses the structure of polynomial, exponential and rational expressions to create equivalent expressions.	Uses the structure of polynomial and exponential expressions to create equivalent expressions.
Interpreting Functions A-APR.2 A-APR.3-1 F-IF.4-5	Uses mathematical properties and relationships to reveal key features of polynomial, rational, trigonometric and logarithmic functions to sketch graphs and identify characteristics of the relationship between two quantities. Identifies how changing the parameters of the function impacts key features of the graph. Identifies zeros and sketches graphs of quadratics and cubics, applying the remainder theorem where appropriate.	Uses mathematical properties and relationships to reveal key features of polynomial, rational, trigonometric and logarithmic functions to sketch graphs and identify characteristics of the relationship between two quantities. Identifies zeros and sketches graphs of quadratics and cubics, applying the remainder theorem where appropriate.	Interprets key features of graphs and tables , and uses mathematical properties and relationships to reveal key features of polynomial and rational functions to sketch graphs. Identifies zeros and sketches graphs of easily factorable quadratics and cubics.	Uses provided mathematical properties and relationships to reveal key features of polynomial functions to sketch graphs. Identifies zeros of easily factorable quadratics and cubics.

Performance Level Descriptors – Math III

	Math III: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Rate of Change F-IF.6-5 F-IF.6-10	Calculates and interprets the average rate of change of polynomial, logarithmic or trigonometric functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph. Compares rates of change associated with different intervals.	Calculates and interprets the average rate of change of polynomial, logarithmic or trigonometric functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph.	Calculates the average rate of change of polynomial functions (presented symbolically or as a table) over a specified interval, and estimates the rate of change from a graph.	Calculates the average rate of change of polynomial functions (presented symbolically or as a table) over a specified interval.
Solving Equations A-SSE.4-2 A-REI.2 A-REI.11-2 A.Int.1	Solves non-routine mathematical equations directly and indirectly, using structure, technology, graphs, formulas, tables of values and successive approximations, and gives examples of how extraneous solutions may arise.	Solves mathematical equations directly and indirectly using structure, technology, graphs, formulas, tables of values and successive approximations, and gives examples of how extraneous solutions may arise.	Solves mathematical equations directly and indirectly using structure, technology, graphs, formulas, tables of values and successive approximations, and identifies extraneous solutions.	Solves mathematical equations directly and indirectly using structure, technology, graphs, formulas, tables of values and successive approximations.
Modeling with Geometry G-GPE.6 G-Int.1	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter and ratios of lengths.	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter and ratios of lengths.	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter and ratios of lengths.	Uses provided geometric relationships in the coordinate plane to solve problems involving area and perimeter.

Performance Level Descriptors – Math III

	Math III: Sub-Claim A			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	Applies geometric concepts and trigonometric ratios to describe, model and solve applied problems (including design problems) related to the Pythagorean theorem, density, geometric shapes, their measures and properties.	Applies geometric concepts and trigonometric ratios to describe, model and solve applied problems related to the Pythagorean theorem, density , geometric shapes, their measures and properties.	Applies geometric concepts to describe, model and solve applied problems related to the Pythagorean theorem, geometric shapes, their measures and properties.	Applies geometric concepts to describe, model and solve applied problems related to the Pythagorean theorem, geometric shapes, their measures and properties.
Statistics & Probability S-IC.3-1	Determines why a sample survey, experiment or observational study is most appropriate. Given an inappropriate choice of a sample survey, experiment or observational study, determines how to change the scenario to make the choice appropriate.	Determines why a sample survey, experiment or observational study is most appropriate. Given an inappropriate choice of a sample survey, experiment or observational study, identifies and supports the appropriate choice.	Determines whether a sample survey, experiment or observational study is most appropriate.	Identifies whether a given scenario represents a sample survey, experiment or observational study.

Performance Level Descriptors – Math III

	Math III: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Interpreting Functions F-IF.7c F-IF.7e-2 F-IF.9-5 F-Int.1-5	Given multiple functions in different forms (algebraically, graphically, numerically and by verbal description), writes multiple equivalent versions of the functions, and identifies and compares key features. Graphs polynomial, trigonometric and logarithmic functions , showing key features. Determines how the changes of a parameter in functions impact their other representations.	Given multiple functions in different forms (algebraically, graphically, numerically and by verbal description), writes multiple equivalent versions of the functions, and identifies and compares key features. Graphs polynomial and trigonometric functions , showing key features.	Given functions represented algebraically, graphically, numerically and by verbal description, writes multiple equivalent versions of the functions and identifies key features. Graphs polynomial functions, showing key features.	Given functions represented algebraically, graphically, numerically and by verbal description, writes equivalent versions of the functions, and identifies key features. Graphs polynomial functions, showing key features.
Expressions and Equations A-APR.6 F-Int.3 F-BF.Int.2 HS.Int.3-3	Solves multi-step contextual word problems to find similarities and differences between solution approaches involving polynomial and trigonometric equations, using inverses where appropriate. Constructs linear, quadratic	Solves multi-step contextual word problems involving polynomial and trigonometric equations, using inverses where appropriate. Constructs linear, quadratic	Solves problems involving polynomial and trigonometric equations , using inverses where appropriate. Constructs linear, quadratic	Solves problems involving polynomial equations, using inverses where appropriate. Constructs linear and

Performance Level Descriptors – Math III

	Math III: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	and exponential function models in multi-step contextual problems. Rewrites simple rational expressions using inspection or long division, and determines how one form is more useful than the others.	and exponential function models in multi-step contextual problems. Rewrites simple rational expressions using inspection or long division.	and exponential function models in multi-step contextual problems with mathematical prompting. Rewrites simple rational expressions using inspection.	exponential function models in multi-step contextual problems with mathematical prompting.
Function Transformations F-BF.3-2 F-BF.3-3 F-BF.3-5	Given a context that infers particular transformations, identifies the effects on graphs of polynomial, exponential, logarithmic and trigonometric functions, and determines if the resulting function is even or odd.	Identifies the effects of multiple transformations on graphs of polynomial, exponential, logarithmic and trigonometric functions, and determines if the resulting function is even or odd.	Identifies the effects of a single transformation on graphs of polynomial, exponential, logarithmic and trigonometric functions – including $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ – and determines if the resulting function is even or odd.	Identifies the effects of a single transformation on graphs of polynomial, exponential, logarithmic and trigonometric functions – limited to $f(x)+k$ and $kf(x)$ – and determines if the resulting function is even or odd.
Trigonometry F-TF.1 F-TF.8-2	Given a trigonometric value and quadrant for an angle, utilizes the structure and relationships of trigonometry, including relationships in the unit circle, to identify other trigonometric values for that angle, and describes	Given a trigonometric value and quadrant for an angle, utilizes the structure and relationships of trigonometry, including relationships in the unit circle, to identify other trigonometric values for that angle, and describes	Given a trigonometric value and quadrant for an angle, utilizes the structure and relationships of trigonometry, including relationships in the unit circle , to identify other trigonometric values for that angle.	Given a trigonometric value and quadrant for an angle, utilizes the structure and relationships of trigonometry to identify other trigonometric values for that angle.

Performance Level Descriptors – Math III

	Math III: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	the relationship between the radian measure and the subtended arc in the circle in contextual situations.	the relationship between the radian measure and the subtended arc in the circle.		
Data – Univariate and Bivariate S-ID.4 S-ID.6a-2	Uses the means and standard deviations of data sets to fit them to normal distributions. Fits trigonometric functions to data in order to solve multi-step contextual problems. Identifies when these procedures are not appropriate.	Uses the means and standard deviations of data sets to fit them to normal distributions. Fits trigonometric functions to data in order to solve multi-step contextual problem.	Uses the means and standard deviations of data sets to fit them to normal distributions. Uses fitted trigonometric functions to solve a multi-step contextual problem.	Uses the means and standard deviations of data sets to fit them to normal distributions.
Inference S-IC.2 S-IC.Int.1	Uses sample data to make, justify and critique inferences and conclusions about the corresponding population. Decides if specified models are consistent with results from given data-generating processes.	Uses sample data to make inferences and justify conclusions about the corresponding population. Decides if specified models are consistent with results from given data-generating processes.	Uses sample data to make inferences about the corresponding population.	Identifies when sample data can be used to make inferences about the corresponding population.
Properties and	Applies properties and theorems of angles,	Applies properties and theorems of angles,	Applies properties and theorems of angles,	Applies provided properties and theorems of angles,

Performance Level Descriptors – Math III

	Math III: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Theorems G-C.A.Int.1 G-C.B.Int.1 G-GPE.1-2 G-GMD.4	<p>segments and arcs in circles to solve problems, model relationships and formulate generalizations.</p> <p>Completes the square to find the center and radius of a circle given by an equation.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects and identifies three-dimensional objects generated by rotations of two-dimensional objects.</p>	<p>segments and arcs in circles to solve problems and model relationships.</p> <p>Completes the square to find the center and radius of a circle given by an equation.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects and identifies three-dimensional objects generated by rotations of two-dimensional objects.</p>	<p>segments and arcs in circles to solve problems.</p> <p>Completes the square to find the center and radius of a circle given by an equation.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects.</p>	<p>segments and arcs in circles to solve problems.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects.</p>
Geometric Constructions G-CO.D	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p>Given a line and a point not on the line, uses a variety of tools and methods to construct perpendicular and</p>	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p>Given a line and a point not on the line, uses a variety of tools and methods to construct perpendicular and</p>	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p>Given a line and a point not on the line, constructs perpendicular and parallel lines.</p>	<p>Makes basic geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p>

Performance Level Descriptors – Math III

	Math III: Sub-Claim B			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	parallel lines, equilateral triangles, squares and regular hexagons inscribed in circles to prove geometric theorems.	parallel lines, equilateral triangles, squares and regular hexagons inscribed in circles.		

Performance Level Descriptors – Math III

	Math III: Sub-Claim C			
	The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Reasoning	Clearly constructs and communicates a complete response based on:	Clearly constructs and communicates a complete response based on:	Constructs and communicates a response based on:	Constructs and communicates an incomplete response based on:
HS.C.4.1 HS.C.5.4 HS.C.5.11 HS.C.6.2 HS.C.6.4 HS.C.7.1 HS.C.8.2 HS.C.8.3 HS.C.9.2 HS.C.11.1 HS.C.13.1 HS.C.13.2 HS.C.13.3 HS.C.14.3 HS.C.16.3 HS.C.17.2 HS.C.17.3 HS.C.17.4 HS.C.17.5 HS.C.18.4 HS.C.CCR	<ul style="list-style-type: none"> a given equation or system of equations a chain of reasoning to justify or refute algebraic, function, or number system related propositions or conjectures, data the graph of an equation in two variables, the principle that a graph is a solution set or the relationship between zeros and factors of polynomials trigonometric functions and the unit circle transformations of functions, OR properties of exponents 	<ul style="list-style-type: none"> a given equation or system of equations a chain of reasoning to justify or refute algebraic, function, or number system related propositions or conjectures data the graph of an equation in two variables, the principle that a graph is a solution set or the relationship between zeros and factors of polynomials trigonometric functions and the unit circle transformations of functions, OR properties of exponents 	<ul style="list-style-type: none"> a given equation or system of equations a chain of reasoning to justify or refute algebraic, function, or number system related propositions or conjectures data the graph of an equation in two variables, the principle that a graph is a solution set or the relationship between zeros and factors of polynomials trigonometric functions and the unit circle transformations of functions, OR properties of exponents 	<ul style="list-style-type: none"> a given equation or system of equations a chain of reasoning to justify or refute algebraic, function, or number system related propositions or conjectures data the graph of an equation in two variables, the principle that a graph is a solution set or the relationship between zeros and factors of polynomials trigonometric functions and the unit circle transformations of functions, OR properties of exponents

Performance Level Descriptors – Math III

Math III: Sub-Claim C				
The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	<p>by:</p> <ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) • providing an efficient and logical progression of steps or chain of reasoning with appropriate justification • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion • determining whether an argument or conclusion is generalizable • evaluating, interpreting and critiquing the 	<p>by:</p> <ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate) • providing a logical progression of steps or chain of reasoning with appropriate justification • performing precise calculations • using correct grade-level vocabulary, symbols and labels • providing a justification of a conclusion • evaluating, interpreting and critiquing the validity of others' responses, approaches and reasoning – utilizing mathematical 	<p>by:</p> <ul style="list-style-type: none"> • using a logical approach based on a conjecture and/or stated assumptions • providing a logical, but incomplete, progression of steps or chain of reasoning • performing minor calculation errors • using some grade-level vocabulary, symbols and labels • providing a partial justification of a conclusion based on own calculations • evaluating the validity of others' approaches and conclusions 	<p>by :</p> <ul style="list-style-type: none"> • using an approach based on a conjecture and/or stated or faulty assumptions • providing an incomplete or illogical progression of steps or chain of reasoning • making an intrusive calculation error • using limited grade-level vocabulary, symbols and labels • providing a partial justification of a conclusion based on own calculations

Performance Level Descriptors – Math III

	Math III: Sub-Claim C			
	The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	<p>validity and efficiency of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) – and providing a counter-example where applicable</p>	<p>connections (when appropriate)</p>		

Performance Level Descriptors – Math III

Math III: Sub-Claim D				
The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
Modeling HS.D.2-4 HS.D.2-7 HS.D.2-10 HS.D.2-12 HS.D.2-13 HS.D.3-5 HS.D.3-6 HS.D.CCR	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • mapping relationships between important quantities • selecting appropriate tools to create the appropriate model • analyzing relationships mathematically between important quantities (either given or created) to draw conclusions • interpreting 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • mapping relationships between important quantities • selecting appropriate tools to create the appropriate model • analyzing relationships mathematically between important quantities (either given or created) to draw conclusions • interpreting 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • illustrating relationships between important quantities • using provided tools to create appropriate but inaccurate model • analyzing relationships mathematically between important given quantities to draw conclusions • interpreting mathematical results in 	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> • using stated assumptions and approximations to simplify a real-world situation • identifying important given quantities • using provided tools to create inaccurate model • analyzing relationships mathematically to draw conclusions • writing an expression, equation or function to describe a situation • using securely held content incompletely reporting a conclusion,

Performance Level Descriptors – Math III

Math III: Sub-Claim D				
<p>The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.</p>				
Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command	
<ul style="list-style-type: none"> mathematical results in the context of the situation • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct expression, equation or function to describe a situation • analyzing and/or creating constraints, relationships and goals • justifying and defending models which lead to a conclusion • using geometry to solve design problems • using securely held content, accurately 	<ul style="list-style-type: none"> mathematical results in the context of the situation • reflecting on whether the results make sense • improving the model if it has not served its purpose • writing a complete, clear and correct expression, equation or function to describe a situation • using geometry to solve design problems • using securely held content, briefly, but accurately reporting the conclusion • identifying and using relevant data from a data source 	<p style="text-align: center;">a simplified context</p> <ul style="list-style-type: none"> • reflecting on whether the results make sense • modifying the model if it has not served its purpose • writing an expression, equation or function to describe a situation • using geometry to solve design problems • using securely held content, incompletely reporting a conclusion • selecting and using some relevant data from a data source • making an evaluation or recommendation 	<ul style="list-style-type: none"> with some inaccuracy within the reporting • indiscriminately using data from a data source 	

Performance Level Descriptors – Math III

Math III: Sub-Claim D The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
	reporting and justifying the conclusion <ul style="list-style-type: none"> • identifying and using relevant data from a data source • making an appropriate evaluation or recommendation 	<ul style="list-style-type: none"> • making an appropriate evaluation or recommendation 		