MAJOR CONTENT

The student solves problems involving the Major Content for the course with connections to the Standards for Mathematical Practice.

Major Content				
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
Expressions A1: A-SSE.A.1 A1: A-SSE.A.2 A1: A-APR.A.1	Writes and **analyzes** equivalent numerical and polynomial expressions in one variable, using addition, subtraction, multiplication and factoring, **including multi-step problems.**	Writes equivalent numerical and polynomial expressions in one variable, using addition, subtraction, multiplication, **and factoring**.	Writes equivalent numerical and polynomial expressions in one variable, using addition, subtraction, and multiplication.	Writes equivalent numerical and polynomial expressions in one variable, using addition, subtraction, and multiplication.
	Interprets parts of exponential and quadratic expressions that represent a quantity in terms of its context	**Interprets parts of exponential and quadratic expressions that represent a quantity in terms of its context.**	Identifies components of exponential **and quadratic** expressions.	Identifies components of exponential expressions.
Interpreting Functions A1: F-IF.A.1 A1: F-IF.A.2 A1: F-IF.B.4 A1: F-IF.B.5 LEAP.I.A1.1 LEAP.I.A1.2 LEAP.I.A1.3	Determines if a given relation is a function.	Determines if a given relation is a function.	Determines if a given relation is a function.	Determines if a given relation is a function.
	Evaluates with, uses, and **interprets** with function notation within a context.	Evaluates with and uses function notation **within a context.**	Evaluates with and uses function notation.	Evaluates with and uses function notation.
	Given a context, writes **and analyzes** a linear function.	Given a context, writes a linear function.	Given a context, writes a linear function.	Given a context, writes a linear function.
	For linear and quadratic functions that model **contextual** relationships, determines **and interprets** key features, graphs the function, **and solves problems.**	For linear and quadratic functions that model relationships, determines key features **and graphs the function.**	For linear **and quadratic** functions that model relationships, determines key features.	For linear functions that model relationships, determines key features.
	Determines the domain and relates it to the quantitative relationship it describes for linear, quadratic, exponential (limited to domains in the integers), **piece-wise, and absolute value** functions.	Determines the domain **and relates it to the quantitative relationship it describes for** linear, quadratic, **and exponential (limited to domains in the integers)** functions.	**Determines the domain of linear and quadratic functions.**	

Major Content				
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
Rate of Change A1: F-IF.B.6	Calculates and interprets the average rate of change of linear, exponential, quadratic, **and piecewise-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, exponential, and quadratic 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, exponential, and quadratic functions (presented **symbolically** or as a table) over a specified interval.	Calculates the average rate of change of linear, exponential, and quadratic functions (presented as a table) over a specified interval.
	Compares rates of change associated with different intervals.			
Solving Algebraically A1: A-REI.B.3 A1: A-REI.B.4 A1: A-CED.A.4 LEAP.I.A1.4 LEAP.I.A1.5 LEAP.I.A1.6	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), **including those with coefficients represented by letters.**	Algebraically solves linear equations, linear inequalities, and **quadratics** in one variable (at complexity appropriate to the course).	Algebraically solves linear equations and linear inequalities in one variable (at complexity appropriate to the course).
	Utilizes structure and rewriting as strategies for solving.			
Solving Graphically A1: A-CED.A.3 A1: A-REI.D.10 A1: A-REI.D.11 A1: A-REI.D.12	Graphs **and analyzes** the solution sets of equations, linear inequalities, and systems of linear inequalities.	Graphs the solution sets of equations, linear inequalities, **and systems of linear equations and linear inequalities.**	Graphs the solution sets of equations and linear inequalities.	Graphs the solution sets of equations and linear inequalities.
	Finds the solutions to two polynomial functions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations.	Finds the solutions to two polynomial functions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations.	**Finds the solutions to two polynomial functions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations.**	Given the graph, identify the solutions of a system of two polynomial functions.
	Writes a system of linear inequalities given a context.			

ADDITIONAL & SUPPORTING CONTENT

The student solves problems involving the Additional & Supporting Content for the course with connections to the Standards for Mathematical Practice.

Additional & Supporting Content				
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
Number Systems LEAP.I.A1.7	Identifies rational and irrational numbers.	Identifies rational and irrational numbers.	Identifies rational and irrational numbers.	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.**	**Calculates sums and products of two rational and/or irrational numbers.**		
Equivalent Expressions and Functions A1: A-SSE.B.3 A1: F-IF.C.8a	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**.	Identifies equivalent forms of quadratic expressions and functions in cases where suitable factorizations are provided.
Interpreting Graphs of Functions A1: A-APR.B.3 A1: F-IF.C.7	Graphs linear, quadratic, **and piecewise-defined functions, showing key features.**	Graphs linear and quadratic functions, showing key features.	Graphs linear **and quadratic functions**, showing key features.	Graphs linear functions, showing key features.
	Determines a function, given a graph with key features identified.			
Function Transformations A1: F-BF.B.3	Identifies the effects of **multiple** transformations on graphs of linear and quadratic functions and finds the value of k given a transformed graph.	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 $kf(x)$.**	Identifies the effects of a single transformation on graphs of linear and quadratic functions, limited to $f(x)+k$.

Additional & Supporting Content				
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
	Experiments with cases using technology.			
	Given the equation of a transformed linear or quadratic function, creates an appropriate graph.			
Multiple Representations of Functions A1: A-REI.C.6 A1: F-LE.A.2 A1: F-IF.C.9	Writes **and analyzes** systems of linear equations in multi-step contextual problems.	Writes systems of linear equations in multi-step contextual problems.	Writes systems of linear equations in **multi-step** contextual problems.	Writes systems of linear equations in simple contextual problems.
	Represents linear and exponential (with domain in the integers) functions symbolically, graphically, **with a verbal description, as a sequence,** and with input- output pairs to solve mathematical problems.	**Represents** linear and exponential (with domain in the integers) functions symbolically, graphically, and with input-output pairs to solve mathematical problems.	Given a symbolic representation, graph, verbal description, sequence, or input-output pairs for linear **and exponential** functions **(with domains in the integers)**, solves mathematical problems.	Given a symbolic representation, graph, verbal description, sequence, or input-output pairs for linear functions, solves mathematical problems.
	Compares the properties of two functions represented in different ways, limited to linear, quadratic, exponential (with domains in the integers), **absolute value, and piecewise**.	Compares the properties of two functions represented in different ways, limited to linear, quadratic, and **exponential (with domains in the integers).**	Compares the properties of two functions represented in different ways, limited to linear **and quadratic**.	Compares the properties of two linear functions represented in different ways.
Summarizing Representing and Interpreting Data A1: S-ID.B.5	Determines appropriate representations of categorical and quantitative data, summarizing and interpreting the data and characteristics of the representations.	**Determines appropriate** representations of categorical and 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.	Given representations of categorical and quantitative data, describes the characteristics of the representations.
	Describes and interprets possible associations and trends in the data.			

EXPRESSING MATHEMATICAL REASONING

In connection with course content, 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.

Expressing Mathematical Reasoning				
	Level 5: Advanced	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
Content	The student clearly constructs and communicates a **complete response** based on 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:	The student clearly constructs and communicates a response based on 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:	The student constructs and communicates a **partial response** based on 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:	The student constructs and communicates an incomplete response based on 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:
Reasoning LEAP.II.A1.1 LEAP.II.A1.2 LEAP.II.A1.3 LEAP.II.A1.4 LEAP.II.A1.5 LEAP.II.A1.6 LEAP.II.A1.7 LEAP.II.A1.8 LEAP.II.A1.9 LEAP.II.A1.10	• using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate)	• using a logical approach based on a conjecture and/or stated assumptions, **utilizing mathematical connections (when appropriate)**	• using a **logical** approach based on a conjecture and/or stated assumptions	• using an approach based on a conjecture and/or stated assumptions
	• providing an **efficient and** logical progression of steps or chain of reasoning with appropriate justification	• providing a logical progression of steps or chain of reasoning **with appropriate justification**	• providing a logical**, but incomplete,** progression of steps or chain of reasoning	• providing an incomplete or illogical progression of steps or chain of reasoning
	• performing precise calculations	• performing **precise** calculations	• **performing minor** calculation errors	• making an intrusive calculation error

Expressing Mathematical Reasoning				
	Level 5: Advanced	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
Content	The student clearly constructs and communicates a **complete response** based on 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:	The student clearly constructs and communicates a response based on 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:	The student constructs and communicates a **partial response** based on 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:	The student constructs and communicates an incomplete response based on 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:
	• using correct grade-level vocabulary, symbols and labels	• using **correct** grade-level vocabulary, symbols and labels	• using **some** grade-level vocabulary, symbols and labels	• using limited grade-level vocabulary, symbols and labels
	• providing a justification of a conclusion	• providing a **justification** of a conclusion	• providing a partial justification of a conclusion based on own calculations	• providing a partial justification of a conclusion based on own calculations
	• evaluating, interpreting and critiquing the validity of others' responses, approaches, and reasoning – using mathematical connections (when appropriate) – and **providing a counter-example where applicable**	• **evaluating, interpreting and critiquing the validity of others' responses, approaches, and reasoning – using mathematical connections(when appropriate)**	• **evaluating the validity of others' approaches and conclusions**	

Expressing Mathematical Reasoning				
	Level 5: Advanced	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
Content	The student clearly constructs and communicates a **complete response** based on 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:	The student clearly constructs and communicates a response based on 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:	The student constructs and communicates a **partial response** based on 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:	The student constructs and communicates an incomplete response based on 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:
	• **determining whether an argument or conclusion is generalizable**			

MODELING & APPLICATION

In connection with content, 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.

Modeling & Application				
Content	**Level 5: Advanced**	**Level 4: Mastery**	**Level 3: Basic**	**Level 2: Approaching Basic**
	The student devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society, and the workplace by:			
LEAP.III.A1.1 LEAP.III.A1.2 LEAP.III.A1.3 LEAP.III.A1.4	• using stated assumptions and making assumptions and approximations to simplify a real-world situation (include micro-models)	• using stated assumptions **and making assumptions** and approximations to simplify a real-world situation **(include micro-models)**	• using stated assumptions and approximations to simplify a real-world situation	• using stated assumptions and approximations to simplify a real-world situation
	• mapping relationships between important quantities	• **mapping relationships between important quantities**	• **illustrating relationships between important quantities**	• identifying important quantities
	• analyzing relationships mathematically between quantities to draw conclusions	• analyzing relationships mathematically between quantities to draw conclusions	• analyzing relationships mathematically **between quantities** to draw conclusions	• analyzing relationships mathematically to draw conclusions
	• interpreting mathematical results in the context of the situation	• interpreting mathematical results **in the context of the situation**	• interpreting mathematical results in a simplified context	
	• reflecting on whether the results make sense	• reflecting on whether the results make sense	• **reflecting on whether the results make sense**	
	• improving the model if it has not served its purpose	• **improving** the model if it has not served its purpose	• **modifying the model if it has not served its purpose**	
	• writing an algebraic expression or equation to describe a situation	• writing an algebraic expression or equation to describe a situation	• writing an algebraic expression or equation to describe a situation	• writing an algebraic expression or equation to describe a situation

Modeling & Application				
Content	Level 5: Advanced	Level 4: Mastery	Level 3: Basic	Level 2: Approaching Basic
	The student devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society, and the workplace by:			
	• applying proportional reasoning and percentages **justifying and defending models which lead to a conclusion**	• applying proportional reasoning and percentages	• applying proportional reasoning and percentages	• applying proportional reasoning and percentages
	• writing and using functions in any form to describe how one quantity of interest depends on another	• writing and using functions **in any form** to describe how one quantity of interest depends on another	• **writing and** using functions to describe how one quantity of interest depends on another	• using functions to describe how one quantity of interest depends on another
	• using statistics	• using statistics	• using statistics	• using statistics
	• using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity	• using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity	• using **reasonable** estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity	• using estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity
	• **analyzing and/or creating constraints, relationships and goals**			