Algebra II
Course Code: 120033001
Pacing Guide

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MIAMI-DADE COUNTY PUBLIC SCHOOLS

District Pacing Guide

YEAR-AT-A-GLANCE

Algebra II | **2019 – 20120** | **Course Code: 120033001**

1st Nine Weeks

I. Functions

STEM Lessons - Model Eliciting Activities

- CollegeReview.com
- Looking for the Best Employment Option

A. Analyzing Functions
B. Absolute Value Functions, Equations, and Inequalities

II. Quadratic Functions, Equations, and Relations

STEM Lessons - Model Eliciting Activities

- Alternative Fuel Systems
- Efficient Storage
- Ranking Sports Players (Quadratic Equations Practice)
- Manufacturing Designer Gear T-Shirts

A. Quadratic Equations
B. Quadratic Relations and Systems of Equations

III. Polynomial Functions, Expressions, and Equations – Part A

A. Polynomial Functions

Total Days Allotted for Instruction, Testing, and "Catch-Up" days:

	T	B	Dates
Topic I	19	9	08/19 – 09/13
Topic II	23	11	09/16 – 10/18
Topic III	4	2	10/21 – 10/24
Total	46	23	

2nd Nine Weeks

IV. Polynomial Functions, Expressions, and Equations – Part B

A. Polynomials
B. Polynomial Equations

V. Rational Functions, Expressions, and Equations

A. Rational Functions
B. Rational Expressions and Equations

VI. Radical Functions, Expressions, and Equations

A. Radical Functions
B. Radical Expressions and Equations

Total Days Allotted for Instruction, Testing, and "Catch-Up" days:

	T	B	Dates
Topic IV	18	9	10/28 – 11/22
Topic V	12	6	11/25 – 12/13
Topic VI	14	7	12/16 - 01/16
Total	44	22	

3rd Nine Weeks

VII. Exponential and Logarithmic Functions and Equations

STEM Lessons - Model Eliciting Activities

- Plants versus Pollutants Model Eliciting Activity
- The Friendly Confines or The Nat - who has the best ballpark?
- My first credit card!

A. Sequences and Series
B. Exponential Functions
C. Modeling with Exponential and Other Functions
D. Logarithmic Functions
E. Logarithmic Properties and Exponential Equations

VIII. Trigonometric Functions – Part A

A. Unit-Circle Definition of Trigonometric Functions

Total Days Allotted for Instruction, Testing, and "Catch-Up" days:

	T	B	Dates
Topic VII	31	15	01/17 – 03/03
Topic VIII	13	6	03/04 – 03/20
Total	44	21	

4th Nine Weeks

IX. Trigonometric Functions – Part B

A. Graphing Trigonometric Functions

X. Probability

A. Introduction to Probability
B. Conditional Probability and Independence of Events
C. Probability and Decision Making

XI. Statistics

STEM Lessons - Model Eliciting Activities

- 5K and No More - Producing Data
- Corn Conundrum
- Got You Covered!
- Preserving Our Marine Ecosystems
- The Election Resource
- Which Brand of Chocolate Chip Cookie Would You Buy?

A. Gathering and Displaying Data
B. Data Distributions
C. Making Inferences

Total Days Allotted for Instruction, Testing, and "Catch-Up" days:

	T	B	Dates
Topic IX	14	7	03/30 – 04/17
Topic X	15	7	04/20 – 05/08
Topic XI	17	9	05/11 – 06/03
Total	46	23	

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YEAR-AT-A-GLANCE

Algebra II | **2019 – 20120** | **Course Code: 120033001**

1st Nine Weeks

I. Functions
MAFS.912.F-IF.2.4
MAFS.912.F-IF.2.5
MAFS.912.F-IF.2.6
MAFS.912.F-IF.3.7b
MAFS.912.F-IF.3.9
MAFS.912.F-BF.2.3
MAFS.912.F-BF.2.4
MAFS.912.A-CED.1.1
MAFS.912.A-CED.1.2

II. Quadratic Functions, Equations, and Relations
MAFS.912.A-CED.1.2
MAFS.912.A-CED.1.3
MAFS.912.A-CED.1.4
MAFS.912.A-REI.2.4
MAFS.912.A-REI.3.6
MAFS.912.A-REI.3.7
MAFS.912.A-REI.4.11
MAFS.912.A-SSE.2.3
MAFS.912.F-IF.3.8
MAFS.912.G-GPE.1.2
MAFS.912.N-CN.1.1
MAFS.912.N-CN.1.2
MAFS.912.N-CN.3.7

III. Polynomial Functions, Expressions, and Equations
MAFS.912.F-BF.2.3
MAFS.912.F-IF.3.7c

Total Days Allotted for Instruction, Testing, and "Catch-Up" days:

	T	B	Dates
Topic I	19	9	08/19 – 09/13
Topic II	23	11	09/16 – 10/18
Topic III	4	2	10/21 – 10/24
Total	46	23	

2nd Nine Weeks

IV. Polynomial Functions, Expressions, and Equations
MAFS.912.A-APR.1.1
MAFS.912.A-APR.2.2
MAFS.912.A-APR.2.3
MAFS.912.A-APR.3.4
MAFS.912.A-APR.4.6
MAFS.912.A-SSE.1.1a
MAFS.912.A-SSE.1.2

V. Rational Functions, Expressions, and Equations
MAFS.912.A-REI.1.1
MAFS.912.A-REI.1.2
MAFS.912.A-APR.4.6
MAFS.912.F-BF.2.3
MAFS.912.F-IF.3.7d

VI. Radical Functions, Expressions, and Equations
MAFS.912.A-REI.1.2
MAFS.912.F-BF.2.3
MAFS.912.F-BF.2.4
MAFS.912.F-IF.2.6
MAFS.912.F-IF.3.7b
MAFS.912.N-RN.1.1
MAFS.912.N-RN.1.2

Total Days Allotted for Instruction, Testing, and "Catch-Up" days:

	T	B	Dates
Topic IV	18	9	10/28 – 11/22
Topic V	12	6	11/25 – 12/13
Topic VI	14	7	12/16 - 01/16
Total	44	22	

3rd Nine Weeks

VII. Exponential and Logarithmic Functions and Equations
MAFS.912.A-CED.1.2
MAFS.912.A-SSE.2.3
MAFS.912.A-SSE.2.4
MAFS.912.A-REI.4.11
MAFS.912.F-BF.1.1
MAFS.912.F-BF.1.2
MAFS.912.F-BF.2.3
MAFS.912.F-BF.2.a
MAFS.912.F-IF.3.7e
MAFS.912.F-IF.3.8
MAFS.912.F-LE.1.4
MAFS.912.F-LE.2.5

VIII. Trigonometric Functions
MAFS.912.F-TF.1.1
MAFS.912.F-TF.1.2
MAFS.912.F-TF.3.8

Total Days Allotted for Instruction, Testing, and "Catch-Up" days:

	T	B	Dates
Topic VII	31	15	01/17 – 03/03
Topic VIII	13	6	03/04 – 03/20
Total	44	21	

4th Nine Weeks

IX. Trigonometric Functions
MAFS.912.F-IF.3.7
MAFS.912.F-TF.2.5

X. Probability
MAFS.912.S-CP.1.1
MAFS.912.S-CP.1.2
MAFS.912.S-CP.1.3
MAFS.912.S-CP.1.4
MAFS.912.S-CP.1.5
MAFS.912.S-CP.2.6
MAFS.912.S-CP.2.7

XI. Statistics
MAFS.912.S-IC.1.1
MAFS.912.S-IC.1.2
MAFS.912.S-IC.2.3
MAFS.912.S-IC.2.4
MAFS.912.S-IC.2.5
MAFS.912.S-IC.2.6
MAFS.912.S-ID.1.4

Total Days Allotted for Instruction, Testing, and "Catch-Up" days:

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MAFS.912.N-RN.1.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define to be the cube root of 5 because we want $\left(5^{\frac{1}{3}}\right)^3 = 5^{\left(\frac{1}{3}\right)^3}$ to hold, so $5^{\left(\frac{1}{3}\right)^3}$ must equal 5.	MAFS.8.EE.1.1 MAFS.8.EE.1.2	
MAFS.912.N-RN.1.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.		
MAFS.912.N-CN.1.1 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.	MAFS.8.EE.1.2	
MAFS.912.N-CN.1.2 Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	MAFS.7.EE.1.1	
MAFS.912.N-CN.3.7 Solve quadratic equations with real coefficients that have complex solutions.		
MAFS.912.A-SSE.1.1 Interpret expressions that represent a quantity in terms of its context. ★ a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret as the product of P and a factor not depending on P.	MAFS.6.EE.1.2 MAFS.7.EE.1.2	
MAFS.912.A-SSE.1.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$, as $(x^2)^2 - (y^2)^2$ thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.	MAFS.6.EE.1.3 MAFS.7.EE.1.1	

Algebra II Standards	Previous Grade Standards	Algebra I Standard
MAFS.912.A-SSE.2.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★ a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. For example the expression can be rewritten as $\left(1.15^{\frac{1}{12}}\right)^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.	MAFS.6.EE.1.3 MAFS.7.EE.1.1 MAFS.8.EE.1.1	X
MAFS.912.A-SSE.2.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage payments.* ★		
MAFS.912.A-APR.1.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	MAFS.6.EE.1.3 MAFS.6.EE.1.4 MAFS.7.EE.1.1 MAFS.8.EE.1.1	X
MAFS.912.A-APR.2.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).	MAFS.912.A-SSE.2.3a	
MAFS.912.A-APR.2.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	MAFS.7.EE.1.1	X
MAFS.912.A-APR.3.4 Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.		Algebra 1 Honors
MAFS.912.A-APR.4.6 Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.	MAFS.7.NS.1.2	Algebra 1 Honors

Algebra II Standards	Previous Grade Standards	Algebra I Standard
MAFS.912.A-CED.1.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational, absolute, and exponential functions.★	MAFS.7.EE.2.4 MAFS.8.EE.3.7	X
MAFS.912.A-CED.1.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. ★	MAFS.8.EE.3.8 MAFS.8.F.1.3 MAFS.8.F.2.4	X
MAFS.912.A-CED.1.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. ★		X
MAFS.912.A-CED.1.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R. ★		X
MAFS.912.A-REI.1.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	MAFS.7.EE.2.4 MAFS.8.EE.3.7	X
MAFS.912.A-REI.1.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	MAFS.7.EE.2.4 MAFS.8.EE.3.7	Algebra 1 Honors
MAFS.912.A-REI.2.4 Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.	MAFS.8.EE.1.2 MAFS.7.EE.1.1 MAFS.8.EE.1.2	X
MAFS.912.A-REI.3.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	MAFS.8.EE.3.8	X

Algebra II Standards	Previous Grade Standards	Algebra I Standard
MAFS.912.A-REI.3.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$.		
MAFS.912.A-REI.4.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. ★	MAFS.8.EE.3.8	X
MAFS.912.F-IF.2.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. ★	MAFS.8.F.2.5	X
MAFS.912.F-IF.2.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble engines in a factory, then the positive integers would be an appropriate domain for the function. ★		X
MAFS.912.F-IF.2.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★	MAFS.8.F.2.4	X

Algebra II Standards	Previous Grade Standards	Algebra I Standard
MAFS.912.F-IF.3.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ★ a. Graph linear and quadratic functions and show intercepts, maxima, and minima. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. d. Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. *(Algebra II)* e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude, and using phase shift.	MAFS.8.EE.2.5 MAFS.8.F.1.3	X
MAFS.912.F-IF.3.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (0.97)^{\frac{t}{10}}$, and classify them as representing exponential growth or decay.		X
MAFS.912.F-IF.3.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.		X

Algebra II Standards	Previous Grade Standards	Algebra I Standard
MAFS.912.F-BF.1.1 Write a function that describes a relationship between two quantities. ★ a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. c. Compose functions. For example, if $T(y)$ is the temperature in the atmosphere as a function of height, and $h(t)$ is the height of a weather balloon as a function of time, then $T(h(t))$ is the temperature at the location of the weather balloon as a function of time.	MAFS.8.F.2.4	X
MAFS.912.F-BF.1.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. ★		Algebra 1 Honors
MAFS.912.F-BF.2.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k, k f(x), f(kx), and$ $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.		X
MAFS.912.F-BF.2.4 Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. *For example, f(x) =2 x^3 or f(x) = (x+1)/(x–1) for x ≠ 1.* b. Verify by composition that one function is the inverse of another. c. Read values of an inverse function from a graph or a table, given that the function has an inverse. d. Produce an invertible function from a non-invertible function by restricting the domain.		Algebra 1 Honors
MAFS.912.F-BF.2.a Use the change of base formula.		
MAFS.912.F-LE.1.4 For exponential models, express as a logarithm the solution to ab^{ct} = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. ★		
MAFS.912.F-LE.2.5 Interpret the parameters in a linear or exponential function in terms of a context. ★		

Algebra II Standards	Previous Grade Standards	Algebra I Standard
MAFS.912.F-TF.1.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle; Convert between degrees and radians.	MAFS.912.G-C.2.5	
MAFS.912.F-TF.1.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	MAFS.912.G-SRT.3.8 MAFS.912.G-GPE.1.1	
MAFS.912.F-TF.2.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. ★	MAFS.912.F-LE.1.1b	
MAFS.912.F-TF.3.8 Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to calculate trigonometric ratios.		
MAFS.912.G-GPE.1.2 Derive the equation of a parabola given a focus and directrix.	MAFS.912.G-GPE.1.1	
MAFS.912.S-CP.1.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”). ★	MAFS.7.SP.3.8	
MAFS.912.S-CP.1.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent. ★		
MAFS.912.S-CP.1.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B. ★		
MAFS.912.S-CP.1.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.* ★	MAFS.912.S-ID.2.5	

Algebra II Standards	Previous Grade Standards	Algebra I Standard
MAFS.912.S-CP.1.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.* ★		
MAFS.912.S-CP.2.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model. ★		
MAFS.912.S-CP.2.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model. ★		
MAFS.912.S-IC.1.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population. ★	MAFS.7.SP.1.2	
MAFS.912.S-IC.1.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*	MAFS.7.SP.3.7	
MAFS.912.S-IC.2.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. ★		
MAFS.912.S-IC.2.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. ★		
MAFS.912.S-IC.2.5 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. ★		
MAFS.912.S-IC.2.6 Evaluate reports based on data. ★		

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Algebra II Standards	Previous Grade Standards	Algebra I Standard
MAFS.912.S-ID.1.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve. ★	MAFS.912.S-ID.1.1 MAFS.912.S-ID.1.2	

Detailed Description of the Content and Skills Measured by the SAT Math Test

SAT HEART OF ALGEBRA DOMAIN

Heart of Algebra questions ask students to:

1. **Create, solve, or interpret a linear expression or equation in one variable** that represents a context. The expression or equation will have rational coefficients, and multiple steps may be required to simplify the expression, simplify the equation, or solve for the variable in the equation.
   Sample Items
   College Board - item 6 | Ivy Global - item 1 | Ivy Global - item 6 | Ivy Global - section 3, item 1 | Ivy Global - section 4, item 31 | Learnerator - Solve variable linear equations in context
2. **Create, solve, or interpret linear inequalities in one variable** that represent a context. The inequality will have rational coefficients, and multiple steps may be required to simplify or solve for the variable.
   Sample Items
   College Board - item 9 | College Board - item 12 | Ivy Global - item 2 | Ivy Global - section 3, items 4 & 16 | Ivy Global - section 4, item 14 | Learnerator - Single variable linear inequalities in context
3. **Build a linear function that models a linear relationship between two quantities.** The student will describe a linear relationship that models a context using either an equation in two variables or function notation. The equation or function will have rational coefficients, and multiple steps may be required to build and simplify the equation or function.
   Sample Items
   College Board - item 17 | College Board item 19 | Ivy Global - item 4 | Ivy Global - section 4, item 8 | Learnerator - Modeling linear relationships
4. **Create, solve, and interpret systems of linear inequalities in two variables**. The student will analyze one or more constraints that exist between two variables by creating, solving, or interpreting an inequality in two variables or a system of inequalities in two variables to represent a context. Multiple steps may be required to create the inequality or system of inequalities or to determine whether a given point is in the solution set.
   Sample Items
   College Board - item 1 | Ivy Global - item 3 | Learnerator - Solving systems of linear equations
5. **Create, solve, and interpret systems of two linear equations in two variables**. The student will analyze one or more constraints that exist between two variables by creating, solving, or analyzing a system of linear equations to represent a context. The equations will have rational coefficients, and multiple steps may be required to simplify or solve the system.
   Sample Items
   College Board - item 18 | Learnerator - Solving systems of equations in context
6. **Algebraically solve linear equations (or inequalities) in one variable**. The equation (or inequality) will have rational coefficients and may require multiple steps to solve for the variable; the equation may yield no solution, one solution, or infinitely many solutions. The student may also be asked to determine the value of a constant or coefficient for an equation with no solution or infinitely many solutions.
   Sample Items
   Ivy Global - section 3, items 9 & 18 | Learnerator - Solving single variable linear equations

SAT HEART OF ALGEBRA DOMAIN (Cont.)

Heart of Algebra questions ask students to:

7. **Algebraically solve systems of two linear equations in two variables**. The equations will have rational coefficients, and the system may yield no solution, one solution, or infinitely many solutions. The student may also be asked to determine the value of a constant or coefficient of an equation in which the system has no solution, one solution, or infinitely many solutions.
   Sample Items
   Ivy Global - items 5 & 7 | Ivy Global - section 4, item 27 | Learnerator - Systems of linear equations
8. **Interpret the variables and constants in expressions for linear functions within the context presented**. The student will make connections between a context and the linear equation that models the context and will identify or describe the real-life meaning of a constant term, a variable, or a feature of the given equation.
   Sample Items
   Ivy Global - item 8 | Learnerator - Interpreting variables and constants
9. Understand connections between algebraic and graphical representations. The student will select a graph described by a given linear equation, select a linear equation that describes a given graph, determine the equation of a line given a verbal description of its graph, determine key features of the graph of a linear function from its equation, or determine how a graph may be affected by a change in its equation.
   Sample Items
   College Board - item 4 | College Board - item 27 | Ivy Global - section 3, items 2 & 10 | Ivy Global - section 4, items 7, 9, & 19 | Learnerator - Algebraic & graphical relationships

SAT PROBLEM SOLVING AND DATA ANALYSIS DOMAIN

Problem Solving and Data Analysis questions ask students to:

1. **Use ratios, rates, proportional relationships, and scale drawings to solve single- and multistep problems.** The student will use a proportional relationship between two variables to solve a multistep problem to determine a ratio or rate; calculate a ratio or rate and then solve a multistep problem; or take a given ratio or rate and solve a multistep problem.
   Sample Items
   Ivy Global - item 1 | Learnerator - Rates, ratios, & proportions
2. **Solve single- and multistep problems involving percentages.** The student will solve a multistep problem to determine a percentage; calculate a percentage and then solve a multistep problem; or take a given percentage and solve a multistep problem.
   Sample Items
   Ivy Global - item 2 | Learnerator - Multistep problems with percentages
3. **Solve single- and multistep problems involving measurement quantities, units, and unit conversion**. The student will solve a multistep problem to determine a unit rate; calculate a unit rate and then solve a multistep problem; solve a multistep problem to complete a unit conversion; solve a multistep problem to calculate density; or use the concept of density to solve a multistep problem.
   Sample Items
   College Board - item 22 | College Board - item 25 | College Board - item 26 | Ivy Global - item 3 | Learnerator - Measurement quantities, units, & conversions
4. **Given a scatterplot, use linear, quadratic, or exponential models to describe how the variables are related**. The student will, given a scatterplot, select the equation of a line or curve of best fit; interpret the line in the context of the situation; or use the line or curve of best fit to make a prediction
   Sample Items
   College Board - item 3 | College Board - item 5 | College Board - item 20 | College Board - item 21 | Ivy Global - item 4 | Learnerator - Scatterplots & statistical models

SAT PROBLEM SOLVING AND DATA ANALYSIS DOMAIN (Cont.)

Problem Solving and Data Analysis questions ask students to:

5. **Use the relationship between two variables to investigate key features of the graph**. The student will make connections between the graphical representation of a relationship and properties of the graph by selecting the graph that represents the properties described, or using the graph to identify a value or set of values.
   Sample Items
   Ivy Global - item 6 | Learnerator - Investigating graphical relationships
6. **Compare linear growth with exponential growth**. The student will infer the connection between two variables given a context in order to determine what type of model fits best.
   Sample Items
   Ivy Global - item 5 | Learnerator - Linear & exponential growth
7. **Use two-way tables to summarize categorical data and relative frequencies, and calculate conditional probability**. The student will summarize categorical data or use categorical data to calculate conditional frequencies, conditional probabilities, association of variables, or independence of events.
   Sample Items
   College Board - item 8 | College Board - item 10 | College Board - item 11 | Ivy Global - item 7 | Learnerator - Two-way tables and probability
8. **Make inferences about population parameters based on sample data**. The student will estimate a population parameter given the results from a random sample of the population. The sample statistics may mention confidence intervals and measurement error that the student should understand and make use of, but need not calculate.
   Sample Items
   Ivy Global - item 9
9. **Use statistics to investigate measures of center of data and analyze shape, center, and spread**. The student will calculate measures of center and/or spread for a given set of data or use given statistics to compare two separate sets of data. The measures of center that may be calculated include mean, median, and mode, and the measures of spread that may be calculated include range. When comparing two data sets, the student may investigate mean, median, mode, range, and/or standard deviation.
   Sample Items
   College Board - item 13 | Ivy Global - item 8 | Learnerator - Measures of center
10. **Evaluate reports to make inferences, justify conclusions, and determine appropriateness of data collection methods**. The reports may consist of tables, graphs, or text summaries.
    Sample Items
    College Board - item 2 | College Board - item 14 | Ivy Global - item 10 | Learnerator - Data collection methods

SAT PASSPORT TO ADVANCED MATH DOMAIN

Passport to Advanced Math questions ask students to:

1. **Create a quadratic or exponential function** or equation that models a context. The equation will have rational coefficients and may require multiple steps to simplify or solve the equation.
   Sample Items
   College Board - item 15 | Ivy Global - item 1 | Learnerator - Quadratic & exponential functions
2. **Determine the most suitable form of an expression or equation** to reveal a particular trait, given a context..
   Sample Items

College Board - item 7 | Ivy Global - item 2

SAT PASSPORT TO ADVANCED MATH DOMAIN (Cont.)

Passport to Advanced Math questions ask students to:

3. **Create equivalent expressions involving rational exponents** and radicals, including simplifying or rewriting in other forms.
   Sample Items
   College Board - item 6 | Ivy Global - item 3
4. **Create an equivalent form of an algebraic expression** by using structure and fluency with operations.
   Sample Items
   Ivy Global - item 4 | Ivy Global - section 3, item 4
5. **Solve a quadratic equation** having rational coefficients. The equation can be presented in a wide range of forms to reward attending to algebraic structure and can require manipulation in order to solve.
   Sample Items
   College Board - item 3 | Ivy Global - item 5 | Learnerator - Solving quadratic equations
6. **Add, subtract, and multiply polynomial expressions** and simplify the result. The expressions will have rational coefficients.
   Sample Items
   College Board - item 5 | Ivy Global - item 6 | Learnerator - Operations on polynomials
7. **Solve an equation in one variable that contains radicals or contains the variable in the denominator of a fraction**. The equation will have rational coefficients, and the student may be required to identify when a resulting solution is extraneous.
   Sample Items
   College Board - item 18 | Ivy Global - item 7 | Learnerator - Solving radical & rational equations
8. **Solve a system of one linear equation and one quadratic equation**. The equations will have rational coefficients.
   Sample Items
   College Board - item 23 | Ivy Global - item 8
9. **Rewrite simple rational expressions**. Students will add, subtract, multiply, or divide two rational expressions or divide two polynomial expressions and simplify the result. The expressions will have rational coefficients.
   Sample Items
   College Board - item 29 | Ivy Global - item 9 | Learnerator - Radicals & rational exponents
10. **Interpret parts of nonlinear expressions in terms of their context**. Students will make connections between a context and the nonlinear equation that models the context to identify or describe the real-life meaning of a constant term, a variable, or a feature of the given equation.
    Sample Items
    College Board - item 14 | Ivy Global - item 10
11. **Understand the relationship between zeros and factors of polynomials**, and use that knowledge to sketch graphs. Students will use properties of factorable polynomials to solve conceptual problems relating to zeros, such as determining whether an expression is a factor of a polynomial based on other information provided.
    Sample Items
    College Board - item 28 | Ivy Global - item 11

SAT PASSPORT TO ADVANCED MATH DOMAIN (Cont.)

Passport to Advanced Math questions ask students to:

12. **Understand a nonlinear relationship between two variables** by making connections between their algebraic and graphical representations. The student will select a graph corresponding to a given nonlinear equation; interpret graphs in the context of solving systems of equations; select a nonlinear equation corresponding to a given graph; determine the equation of a curve given a verbal description of a graph; determine key features of the graph of a linear function from its equation; or determine the impact on a graph of a change in the defining equation.
    Sample Items
    College Board - item 7 | Ivy Global - item 14 | Learnerator - Non-linear relationships between two variables
13. **Use function notation, and interpret statements using function notation**. The student will use function notation to solve conceptual problems related to transformations and compositions of functions.
    Sample Items
    Ivy Global - item 12 | Learnerator - Function notation
14. **Use structure to isolate or identify a quantity of interest** in an expression or isolate a quantity of interest in an equation. The student will rearrange an equation or formula to isolate a single variable or a quantity of interest.
    Sample Items
    College Board - item 4 | Ivy Global - item 13 | Learnerator - Isolating quantities using structure

SAT ADDITIONAL TOPICS IN MATH DOMAIN

Additional Topics in Math questions ask students to:

1. **Solve problems using volume formulas**. The student will use given information about figures, such as length of a side, area of a face, or volume of a solid, to calculate missing information. Any required volume formulas will be provided to students either on the formula sheet or within the question.
    Sample Items
    College Board - item 24 | Learnerator - volume formulas
2. **Use trigonometric ratios and the Pythagorean theorem** to solve applied problems involving right triangles. The student will use information about triangle side lengths or angles presented in a context to calculate missing information using the Pythagorean theorem and/or trigonometric ratios.
    Sample Items
    College Board - item 24 | Learnerator - Trigonometric Ratios & Pythagorean Theorem
3. Add, subtract, multiply, divide, and simplify **complex numbers**.
    Sample Items
    Learnerator - Operations on complex numbers
4. **Convert between degrees and radians and use radians to determine arc lengths; use trigonometric functions of radian measure**. The student will convert between angle measures in degrees and radians in order to calculate arc lengths by recognizing the relationship between an angle measured in radians and an arc length, evaluating trigonometric functions of angles in radians.
    Sample Items
    College Board - item 12 | College Board - item 16 | College Board - item 30 | Ivy Global - item 4 | Learnerator - Degrees & radians

SAT ADDITIONAL TOPICS IN MATH DOMAIN (Cont.)

Additional Topics in Math questions ask students to:

5. **Apply theorems about circles to find arc lengths, angle measures, chord lengths, and areas of sectors**. The student will use given information about circles and lines to calculate missing values for radius, diameter, chord length, angle, arc, and sector area.
   Sample Items
   College Board - item 15 | Ivy Global - 5 | Learnerator - Theorems of circles
6. **Use concepts and theorems about congruence and similarity to solve problems about lines, angles, and triangles**. The student will use theorems about triangles and intersecting lines to determine missing lengths and angle measures of triangles. The student may also be asked to provide a missing length or angle to satisfy a given theorem.
   Sample Items
   College Board - item 16 | Ivy Global - item 6 | Learnerator - Congruence & geometric similarity
7. **Use the relationship between similarity, right triangles, and trigonometric ratios; use the relationship between sine and cosine of complementary angles.** The student will use trigonometry and theorems about triangles and intersecting lines to determine missing lengths and angle measures of right triangles. The student may also be asked to provide a missing length or angle that would satisfy a given theorem.
   Sample Items
   Ivy Global - item 7 | Learnerator - Lengths & angles of triangles
8. **Create or use an equation in two variables to solve a problem about a circle in the coordinate plane**. The student will create an equation or use properties of an equation of a circle to demonstrate or determine a property of the circle's graph.
   Sample Items
   College Board - item 17 | Ivy Global - item 8 | Learnerator - Circular equations

	WIDA CAN DO Descriptors: Grade Level Cluster 9-12				
	Level 1 Entering	**Level 2 Emerging**	**Level 3 Developing**	**Level 4 Expanding**	**Level 5 Bridging**
LISTENING	• Point to or show basic parts, components, features, characteristics, and properties of objects, organisms, or persons named orally • Match everyday oral information to pictures, diagrams, or photographs • Group visuals by common traits named orally (e.g., "These are polygons.") • Identify resources, places, products, figures from oral statements, and visuals	• Match or classify oral descriptions to real-life experiences or visually- represented, content-related examples • Sort oral language statements according to time frames • Sequence visuals according to oral directions	• Evaluate information in social and academic conversations • Distinguish main ideas from supporting points in oral, content-related discourse • Use learning strategies described orally • Categorize content-based examples described orally	• Distinguish between multiple meanings of oral words or phrases in social and academic contexts • Analyze content-related tasks or assignments based on oral discourse • Categorize examples of genres read aloud • Compare traits based on visuals and oral descriptions using specific and some technical language	• Interpret cause and effect scenarios from oral discourse • Make inferences from oral discourse containing satire, sarcasm, or humor • Identify and react to subtle differences in speech and register (e.g., hyperbole, satire, comedy) • Evaluate intent of speech and act accordingly
SPEAKING	• Answer yes/no or choice questions within context of lessons or personal experiences • Provide identifying information about self • Name everyday objects and pre-taught vocabulary • Repeat words, short phrases, memorized chunks of language	• Describe persons, places, events, or objects • Ask WH- questions to clarify meaning • Give features of content- based material (e.g., time periods) • Characterize issues, situations, regions shown in illustrations	• Suggest ways to resolve issues or pose solutions • Compare/contrast features, traits, characteristics using general and some specific language • Sequence processes, cycles, procedures, or events • Conduct interviews or gather information through oral interaction • Estimate, make predictions or pose hypotheses from models	• Take a stance and use evidence to defend it • Explain content-related issues and concepts • Compare and contrast points of view • Analyze and share pros and cons of choices • Use and respond to gossip, slang, and idiomatic expressions • Use speaking strategies (e.g., circumlocution)	• Give multimedia oral presentations on grade-level material • Engage in debates on content-related issues using technical language • Explain metacognitive strategies for solving problems (e.g., "Tell me how you know it.") • Negotiate meaning in pairs or group discussions
READING	• Match visual representations to words/phrases • Read everyday signs, symbols, schedules, and school-related words/phrases • Respond to WH- questions related to illustrated text • Use references (e.g., picture dictionaries, bilingual glossaries, technology)	• Match data or information with its source or genre • Classify or organize information presented in visuals or graphs • Follow multi-step instructions supported by visuals or data • Match sentence-level descriptions to visual representations • Compare content-related features in visuals and graphics • Locate main ideas in a series of related sentences	• Apply multiple meanings of words/phrases to social and academic contexts • Identify topic sentences or main ideas and details in paragraphs • Answer questions about explicit information in texts • Differentiate between fact and opinion in text • Order paragraphs or sequence information within paragraphs	• Compare/contrast authors' points of view, characters, information, or events • Interpret visually- or graphically-supported information • Infer meaning from text • Match cause to effect • Evaluate usefulness of data or information supported visually or graphically	• Interpret grade-level literature • Synthesize grade-level expository text • Draw conclusions from different sources of informational text • Infer significance of data or information in grade-level material • Identify evidence of bias and credibility of source

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WRITING	• Label content-related diagrams, pictures from word/phrase banks • Provide personal information on forms read orally • Produce short answer responses to oral questions with visual support • Supply missing words in short sentences	• Make content-related lists of words, phrases, or expressions • Take notes using graphic organizers or models • Formulate yes/no, choice and WH- questions from models • Correspond for social purposes (e.g., memos, e-mails, notes)	• Complete reports from templates • Compose short narrative and expository pieces • Outline ideas and details using graphic organizers • Compare and reflect on performance against criteria (e.g., rubrics)	• Summarize content-related notes from lectures or text • Revise work based on narrative or oral feedback • Compose narrative and expository text for a variety of purposes • Justify or defend ideas and opinions • Produce content-related reports	• Produce research reports from multiple sources • Create original pieces that represent the use of a variety of genres and discourses • Critique, peer-edit and make recommendations on others' writing from rubrics • Explain, with details, phenomena, processes, procedures

MATHEMATICAL PRACTICES	
MAFS.K12.MP.1.1	**Make sense of problems and persevere in solving them.** Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***
MAFS.K12.MP.2.1	**Reason abstractly and quantitatively.** Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***

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MATHEMATICAL PRACTICES	
MAFS.K12.MP.3.1	**Construct viable arguments and critique the reasoning of others.** Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***
MAFS.K12.MP.4.1	**Model with mathematics.** Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***

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MATHEMATICAL PRACTICES	
MAFS.K12.MP.5.1	**Use appropriate tools strategically.** Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts. ***Cognitive Complexity: Level 2: Basic Application of Skills & Concepts***
MAFS.K12.MP.6.1	**Attend to precision.** Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***
MAFS.K12.MP.7.1	**Look for and make use of structure.** Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 – 3(x – y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y. ***Cognitive Complexity: Level 2: Basic Application of Skills & Concepts***

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MATHEMATICAL PRACTICES	
MAFS.K12.MP.8.1	**Look for and express regularity in repeated reasoning.** Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y – 2)/(x – 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x – 1)(x + 1)$, $(x – 1)(x^2 + x + 1)$, and $(x – 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***

LITERACY STANDARDS	
ELD.K12.ELL.MA.1	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Mathematics.
ELD.K12.ELL.SI.1	English language learners communicate for social and instructional purposes within the school setting.
LAFS.910.SL.1.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***
LAFS.910.SL.1.2	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***
LAFS.910.SL.1.3	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***
LAFS.910.SL.2.4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***
LAFS.910.RST.1.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. ***Cognitive Complexity: Level 2: Basic Application of Skills & Concepts***
LAFS.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

LITERACY STANDARDS	
	Cognitive Complexity: Level 2: Basic Application of Skills & Concepts
LAFS.910.RST.3.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. ***Cognitive Complexity: Level 2: Basic Application of Skills & Concepts***
LAFS.1112.WHST.1.1	Write arguments focused on discipline-specific content. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from or supports the argument presented. ***Cognitive Complexity: Level 4: Extended Thinking &Complex Reasoning***
LAFS.1112.WHST.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***
LAFS.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research. ***Cognitive Complexity: Level 3: Strategic Thinking & Complex Reasoning***