Math Maps & Unit CCRS Priorities
2016-2017
K10 SBCSC

ISTEP+
Instructional and Assessment Guidance

Prioritizing Instruction

In an effort to empower teachers and focus on college and career readiness, the Office of Student Assessment has created Instructional and Assessment Guidance ("Guidance") documents for grades 3-8. The Content Priority of each Standard is delineated in the Guidance as one of three designations:

Critical –identified as "All of the Indiana Academic Standards represent valuable content, and the Guidance documents are designed to assist teachers in planning and prioritizing instructional time to ensure student success.

1) Critical identified as "check +"
2) Important –identified as "check"
3) Additional –identified as "check –"

All of the Indiana Academic Standards represent valuable content, and the Guidance documents are designed to assist teachers in planning and prioritizing instructional time to ensure student success.

A Final Note

The Guidance documents, as well as the CCRS Standards themselves, are not meant to be used as a **"check list."** Rather, when teachers take into consideration the instructional priorities and deliver rich, meaningful lessons, the Standards come to life in the classroom.

Grade 9/Algebra/Unit 1A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 1-4	Algebra I **Real Numbers And Expressions** LD ✓ – AI.RNE.1: Understand the hierarchy and relationships of numbers and sets of numbers within the real number system. LD ✓ – AI.RNE.2: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. LD ✓ AI.RNE.3: Rewrite and evaluate numeric expressions with positive rational exponents using the properties of exponents.

Grade 9/Algebra/Unit 1B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 5-9	Algebra I **Linear Equations, Inequalities, and Functions** LD ✓+ AI.L.1: Understand that the steps taken when solving linear equations create new equations that have the same solution as the original. Solve fluently linear equations and inequalities in one variable with integers, fractions, and decimals as coefficients. Explain and justify each step in solving an equation, starting from the assumption that the original equation has a solution. Justify the choice of a solution method. LD ✓+ AI.L.2: Represent real-world problems using linear equations and inequalities in one variable and solve such problems. Interpret the solution and determine whether it is reasonable. LD ✓ – AI.L.3: Represent real-world and other mathematical problems using an algebraic proportion that leads to a linear equation and solve such problems. LD ✓ AI.L.8: Solve compound linear inequalities in one variable, and represent and interpret the solution on a number line. Write a

	compound linear inequality given its number line representation. LD ✓− AI.L.9: Solve absolute value linear equations in one variable. LD ✓ AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables.

Grade 9/Algebra/Unit 2A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 10-14	**Functions** LD ✓ AI.F.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. Understand that if f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. Understand the graph of f is the graph of the equation y = f(x). LD ✓ AI.F.2: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. Identify independent and dependent variables and make predictions about the relationship. LD ✓− AI.F.3: Identify the domain and range of relations represented in tables, graphs, verbal descriptions, and equations. LD ✓ AI.F.4: Understand and interpret statements that use function notation in terms of a context; relate the domain of the function to its graph and to the quantitative relationship it describes. **Linear Equations, Inequalities, and Functions** LD ✓+ AI.L.4: Represent linear functions as graphs from equations (with and without technology), equations from graphs, and equations from tables and other given information (e.g., from a given point on a line and the slope of the line). LD ✓+ AI.L.5: Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables; translate fluently among these representations, and interpret the slope and intercepts. LD ✓ AI.L.6: Translate among equivalent forms of equations for linear functions, including slope-intercept, point-slope, and standard. Recognize that different forms reveal more or less information about a given situation.

	LD ✓+ AI.L.7: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other linear inequalities in two variables by graphing.
	LD ✓– AI.L.10: Graph absolute value linear equations in two variables.
	LD ✓ AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables.

Grade 9/Algebra/Unit 2B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 15-18	**Systems of Equations and Inequalities**
	LD ✓ AI.SEI.1: Understand the relationship between a solution of a pair of linear equations in two variables and the graphs of the corresponding lines. Solve pairs of linear equations in two variables by graphing; approximate solutions when the coordinates of the solution are non-integer numbers.
	LD ✓+ AI.SEI.2: Understand that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. Solve pairs of linear equations in two variables using substitution and elimination.
	LD ✓+ AI.SEI.3: Write a system of two linear equations in two variables that represents a real-world problem and solve the problem with and without technology. Interpret the solution and determine whether the solution is reasonable.
	LD ✓ AI.SEI.4: Represent real-world problems using a system of two linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other pairs of linear inequalities by graphing with and without technology.

Grade 9/Algebra/Unit 3A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 19-22	**Real Numbers And Expressions** LD ✓ AI.RNE.3: Rewrite and evaluate numeric expressions with positive rational exponents using the properties of exponents. LD ✓ AI.RNE.4: Simplify square roots of non-perfect square integers and algebraic monomials. LD ✓+ AI.RNE.5: Simplify algebraic rational expressions, with numerators and denominators containing monomial bases with integer exponents, to equivalent forms. LD ✓+ AI.RNE.6: Factor common terms from polynomials and factor polynomials completely. Factor the difference of two squares, perfect square trinomials, and other quadratic expressions. LD ✓+ AI.RNE.7: Understand polynomials are closed under the operations of addition, subtraction, and multiplication with integers; add, subtract, and multiply polynomials and divide polynomials by monomials.

Grade 9/Algebra/Unit 3B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 23-26	**Real Numbers And Expressions** LD ✓ AI.RNE.3: Rewrite and evaluate numeric expressions with positive rational exponents using the properties of exponents. LD ✓ AI.RNE.4: Simplify square roots of non-perfect square integers and algebraic monomials. LD ✓+ AI.RNE.5: Simplify algebraic rational expressions, with numerators and denominators containing monomial bases with integer exponents, to equivalent forms. LD ✓+ AI.RNE.6: Factor common terms from polynomials and factor polynomials completely. Factor the difference of two squares, perfect square trinomials, and other quadratic expressions. LD ✓+ AI.RNE.7: Understand polynomials are closed under the operations of addition, subtraction, and multiplication with

	integers; add, subtract, and multiply polynomials and divide polynomials by monomials.

Grade 9/Algebra/Unit 4A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 28-31	**IN: High School** **Process Standards for Mathematics** LD PS.1: Make sense of problems and persevere in solving them. LD PS.2: Reason abstractly and quantitatively. LD PS.3: Construct viable arguments and critique the reasoning of others. LD PS.4: Model with mathematics. LD PS.5: Use appropriate tools strategically. LD PS.6: Attend to precision. LD PS.7: Look for and make use of structure. LD PS.8: Look for and express regularity in repeated reasoning

Grade 9/Algebra/Unit 4B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 32-35	**Geometry** **Triangles** LD G.T.8: Develop the distance formula using the Pythagorem Theorem. Find the lengths and midpoints of line segments in one- or two-dimensional coordinate systems. Find measures of the sides of polygons in the coordinate plane; apply this technique to compute the perimeters and areas of polygons in real-world and mathematical problems. **Algebra I** **Data Analysis And Statistics** LD ✓ AI.DS.1: Distinguish between random and non-random sampling methods, identify possible sources of bias in sampling, describe how such bias can be controlled and reduced, evaluate the characteristics of a good survey and well-designed experiment, design simple experiments or investigations to collect data to answer questions of interest, and make inferences from sample results. LD ✓ – AI.DS.6: Understand that statistics and data are non-neutral and designed to serve a particular interest. Analyze the possibilities for whose interest might be served and how the representations might be misleading. **Probability and Statistics** **Data Analysis** LD PS.DA.1: Create, compare, and evaluate different graphic displays of the same data, using histograms, frequency polygons, cumulative frequency distribution functions, pie charts, scatterplots, stem-and-leaf plots, and box-and-whisker plots. Draw these with and without technology. LD PS.DA.2: Compute and use mean, median, mode, weighted mean, geometric mean, harmonic mean, range, quartiles, variance, and standard deviation. Use tables and technology to estimate areas under the normal curve. Fit a data set to a normal distribution and estimate population percentages. Recognize that there are data sets not normally distributed for which such procedures are inappropriate.

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 1-4	Algebra I **Functions** LD ✓ AI.F.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. Understand that if f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. Understand the graph of f is the graph of the equation y = f(x). LD ✓ − AI.F.3: Identify the domain and range of relations represented in tables, graphs, verbal descriptions, and equations. LD ✓ AI.F.4: Understand and interpret statements that use function notation in terms of a context; relate the domain of the function to its graph and to the quantitative relationship it describes. **Linear Equations, Inequalities, and Functions** LD ✓+ AI.L.1: Understand that the steps taken when solving linear equations create new equations that have the same solution as the original. Solve fluently linear equations and inequalities in one variable with integers, fractions, and decimals as coefficients. Explain and justify each step in solving an equation, starting from the assumption that the original equation has a solution. Justify the choice of a solution method. LD ✓+ AI.L.2: Represent real-world problems using linear equations and inequalities in one variable and solve such problems. Interpret the solution and determine whether it is reasonable. LD ✓+ AI.L.4: Represent linear functions as graphs from equations (with and without technology), equations from graphs, and equations from tables and other given information (e.g., from a given point on a line and the slope of the line). LD ✓+ AI.L.5: Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables; translate fluently among these representations, and interpret the slope and intercepts. LD ✓ AI.L.6: Translate among equivalent forms of equations for linear functions, including slope-intercept, point-slope, and standard. Recognize that different forms reveal more or less information about a given situation. LD ✓+ AI.L.7: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other linear inequalities in two variables by graphing. LD ✓ − AI.L.9: Solve absolute value linear equations in one variable.

	LD ✓ – AI.L.10: Graph absolute value linear equations in two variables. LD ✓ AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables. Algebra II **Functions** LD AII.F.1: Determine whether a relation represented by a table, graph, or equation is a function. LD AII.F.5: Describe the effect on the graph of f(x) by replacing f(x) with f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative) with and without technology. Find the value of k given the graph of f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k). **Polynomial, Rational, and Other Equations and Functions** LD AII.PR.2: Graph relations and functions including polynomial, square root, and piecewise-defined functions (including step functions and absolute value functions) with and without technology. Identify and describe features, such as intercepts, zeros, domain and range, end behavior, and lines of symmetry. LD AII.PR.3: Solve real-world and other mathematical problems involving rational and radical equations, including direct, inverse, and joint variation. Give examples showing how extraneous solutions may arise. **Data Analysis, Statistics, and Probability** LD AII.DSP.2: Use technology to find a linear, quadratic, or exponential function that models a relationship for a bivariate data set to make predictions; compute (using technology) and interpret the correlation coefficient.

Grade 9/Algebra II/Unit 1B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 5-9	**Systems of Equations and Inequalities**

	LD ✓ AI.SEI.1: Understand the relationship between a solution of a pair of linear equations in two variables and the graphs of the corresponding lines. Solve pairs of linear equations in two variables by graphing; approximate solutions when the coordinates of the solution are non-integer numbers.
	LD ✓+ AI.SEI.2: Understand that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. Solve pairs of linear equations in two variables using substitution and elimination.
	LD ✓+ AI.SEI.3: Write a system of two linear equations in two variables that represents a real-world problem and solve the problem with and without technology. Interpret the solution and determine whether the solution is reasonable.
	LD ✓ AI.SEI.4: Represent real-world problems using a system of two linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other pairs of linear inequalities by graphing with and without technology.
	Algebra II
	Systems of Equations
	LD AII.SE.1: Solve a system of equations consisting of a linear equation and a quadratic equation in two variables algebraically and graphically with and without technology (e.g., find the points of intersection between the line y = –3x and the circle x^2 + y^2 = 3).
	LD AII.SE.2: Solve systems of two or three linear equations in two or three variables algebraically and using technology.
	LD AII.SE.3: Represent real-world problems using a system of linear equations in three variables and solve such problems with and without technology. Interpret the solution and determine whether it is reasonable.
	Polynomial, Rational, and Other Equations and Functions
	LD AII.PR.3: Solve real-world and other mathematical problems involving rational and radical equations, including direct, inverse, and joint variation. Give examples showing how extraneous solutions may arise.

Grade 9/Algebra II/Unit 2A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES

Weeks 10-14	Algebra I **Real Numbers And Expressions** LD AI.RNE.6: Factor common terms from polynomials and factor polynomials completely. Factor the difference of two squares, perfect square trinomials, and other quadratic expressions. **Quadratic and Exponential Equations and Functions** LD AI.QE.4: Solve quadratic equations in one variable by inspection (e.g., for x^2 = 49), finding square roots, using the quadratic formula, and factoring, as appropriate to the initial form of the equation. LD AI.QE.5: Represent real-world problems using quadratic equations in one or two variables and solve such problems with and without technology. Interpret the solution and determine whether it is reasonable. LD AI.QE.6: Use the process of factoring to determine zeros, lines of symmetry, and extreme values in real-world and other mathematical problems involving quadratic functions; interpret the results in the real-world contexts. LD AI.QE.7: Describe the relationships among the solutions of a quadratic equation, the zeros of the function, the x-intercepts of the graph, and the factors of the expression Algebra II **Complex Numbers and Expressions** LD AII.CNE.1: Know there is an imaginary number, i, such that i^2 = -1, and every complex number can be written in the form a + bi, with a and b real. Use the relation i^2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. **Functions** LD AII.F.5: Describe the effect on the graph of f(x) by replacing f(x) with f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative) with and without technology. Find the value of k given the graph of f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k). **Quadratic Equations and Functions** LD AII.Q.1: Represent real-world problems that can be modeled with quadratic functions using tables, graphs, and equations; translate fluently among these representations. Solve such problems with and without technology. Interpret the solutions and determine whether they are reasonable. LD AII.Q.2: Use completing the square to rewrite quadratic functions into the form y = a(x + h)^2 + k, and graph these functions with and without technology. Identify intercepts, zeros, domain and range, and lines of symmetry. Understand the relationship

	between completing the square and the quadratic formula. LD AII.Q.3: Use the discriminant to determine the number and type of solutions of a quadratic equation in one variable with real coefficients; find all solutions and write complex solutions in the form of a ± bi for real numbers a and b.

Grade 9/Algebra II/Unit 2B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 15-18	Algebra I **Real Numbers And Expressions** LD ✓+ AI.RNE.6: Factor common terms from polynomials and factor polynomials completely. Factor the difference of two squares, perfect square trinomials, and other quadratic expressions. LD ✓+ AI.RNE.7: Understand polynomials are closed under the operations of addition, subtraction, and multiplication with integers; add, subtract, and multiply polynomials and divide polynomials by monomials. Algebra II **Complex Numbers and Expressions** LD AII.CNE.4: Rewrite algebraic rational expressions in equivalent forms (e.g., using laws of exponents and factoring techniques). LD AII.CNE.5: Rewrite 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 long division and synthetic division. **Polynomial, Rational, and Other Equations and Functions** LD AII.PR.1: Solve real-world and other mathematical problems involving polynomial equations with and without technology. Interpret the solutions and determine whether the solutions are reasonable. LD AII.PR.2: Graph relations and functions including polynomial, square root, and piecewise-defined functions (including step functions and absolute value functions) with and without technology. Identify and describe features, such as intercepts, zeros, domain and range, end behavior, and lines of symmetry. LD AII.PR.3: Solve real-world and other mathematical problems involving rational and radical equations, including direct, inverse, and joint variation. Give examples showing how extraneous solutions may arise.

Grade 9/Algebra II/Unit 3A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 19-22	Algebra II **Complex Numbers and Expressions** LD AII.CNE.2: Translate expressions between radical and exponent form and simplify them using the laws of exponents. LD AII.CNE.3: Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide algebraic rational expressions. LD AII.CNE.4: Rewrite algebraic rational expressions in equivalent forms (e.g., using laws of exponents and factoring techniques). **Functions** LD AII.F.2: Understand composition of functions and combine functions by composition. LD AII.F.3: Understand that an inverse function can be obtained by expressing the dependent variable of one function as the independent variable of another, as f and g are inverse functions if and only if f(x)=y and g(y)=x, for all values of x in the domain of f and all values of y in the domain of g. Find the inverse of a function that has an inverse. LD AII.F.4: Understand that if the graph of a function contains a point (a, b), then the graph of the inverse relation of the function contains the point (b, a); the inverse is a reflection over the line y = x.

Grade 9/Algebra II/Unit 3B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES

Weeks 23-26	Algebra II **Functions** LD AII.F.3: Understand that an inverse function can be obtained by expressing the dependent variable of one function as the independent variable of another, as f and g are inverse functions if and only if f(x)=y and g(y)=x, for all values of x in the domain of f and all values of y in the domain of g. Find the inverse of a function that has an inverse. LD AII.F.4: Understand that if the graph of a function contains a point (a, b), then the graph of the inverse relation of the function contains the point (b, a); the inverse is a reflection over the line y = x. LD AII.F.5: Describe the effect on the graph of f(x) by replacing f(x) with f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative) with and without technology. Find the value of k given the graph of f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k). **Exponential and Logarithmic Equations and Functions** LD AII.EL.2: Graph exponential functions with and without technology. Identify and describe features, such as intercepts, zeros, domain and range, and asymptotic and end behavior. LD AII.EL.3: Identify the percent rate of change in exponential functions written as equations, such as y = (1.02)^t, y = (0.97)^t, y = (1.01)12^t, y = (1.2)^t/10, and classify them as representing exponential growth or decay. LD AII.EL.4: Use the properties of exponents to transform expressions for exponential functions (e.g., the expression 1.15^t can be rewritten as (1.15^1/12)^12t ≈ 1.012^12t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%). LD AII.EL.5: Know that the inverse of an exponential function is a logarithm. Represent exponential and logarithmic functions using graphing technology and describe their inverse relationship. LD AII.EL.6: Use the laws of exponents to derive the laws of logarithms. Use the laws of logarithms and the inverse relationship between exponential functions and logarithms to evaluate expressions and solve equations in one variable. LD AII.EL.7: Represent real-world problems using exponential equations in one or two variables and solve such problems with and without technology. Interpret the solutions and determine whether they are reasonable.

Grade 9/Geometry/Unit 1A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES

Weeks 1-4	**Logic and Proofs** LD G.LP.1: Understand and describe the structure of and relationships within an axiomatic system (undefined terms, definitions, axioms and postulates, methods of reasoning, and theorems). Understand the differences among supporting evidence, counterexamples, and actual proofs. LD G.LP.2: Know precise definitions for angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, and plane. Use standard geometric notation. LD G.LP.3: State, use, and examine the validity of the converse, inverse, and contrapositive of conditional ("if – then") and bi-conditional ("if and only if") statements. LD G.LP.4: Develop geometric proofs, including direct proofs, indirect proofs, proofs by contradiction and proofs involving coordinate geometry, using two- column, paragraphs, and flow charts formats. **Points, Lines, Angles** LD G.PL.1: Identify, justify, and apply properties of planes. LD G.PL.2: Describe the intersection of two or more geometric figures in the same plane. LD G.PL.3: Prove and apply theorems about lines and angles, including the following: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent, alternate exterior angles are congruent, and corresponding angles are congruent; when a transversal crosses parallel lines, same side interior angles are supplementary; and points on a perpendicular bisector of a line segment are exactly those equidistant from the endpoints of the segment. LD G.PL.5: Explain and justify the process used to construct, with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.), congruent segments and angles, angle bisectors, perpendicular bisectors, altitudes, medians, and parallel and perpendicular lines.

Grade 9/ Geometry /Unit 1B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES

Weeks 5-9	**Logic and Proofs** LD G.LP.1: Understand and describe the structure of and relationships within an axiomatic system (undefined terms, definitions, axioms and postulates, methods of reasoning, and theorems). Understand the differences among supporting evidence, counterexamples, and actual proofs. LD G.LP.3: State, use, and examine the validity of the converse, inverse, and contrapositive of conditional ("if – then") and bi-conditional ("if and only if") statements. LD G.LP.4: Develop geometric proofs, including direct proofs, indirect proofs, proofs by contradiction and proofs involving coordinate geometry, using two- column, paragraphs, and flow charts formats. **Points, Lines, Angles** LD G.PL.3: Prove and apply theorems about lines and angles, including the following: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent, alternate exterior angles are congruent, and corresponding angles are congruent; when a transversal crosses parallel lines, same side interior angles are supplementary; and points on a perpendicular bisector of a line segment are exactly those equidistant from the endpoints of the segment. LD G.PL.4: Know that parallel lines have the same slope and perpendicular lines have opposite reciprocal slopes. Determine if a pair of lines are parallel, perpendicular, or neither by comparing the slopes in coordinate graphs and in equations. Find the equation of a line, passing through a given point, that is parallel or perpendicular to a given line. LD G.PL.5: Explain and justify the process used to construct, with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.), congruent segments and angles, angle bisectors, perpendicular bisectors, altitudes, medians, and parallel and perpendicular lines.

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES

Weeks 10-14	**Triangles** LD G.T.1: Prove and apply theorems about triangles, including the following: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point; a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem, using triangle similarity; and the isosceles triangle theorem and its converse. LD G.T.2: Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. LD G.T.3: Explain and justify the process used to construct congruent triangles with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).

Grade 9/ Geometry /Unit 2B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 15-18	**Triangles** LD G.T.8: Develop the distance formula using the Pythagorem Theorem. Find the lengths and midpoints of line segments in one- or two-dimensional coordinate systems. Find measures of the sides of polygons in the coordinate plane; apply this technique to compute the perimeters and areas of polygons in real-world and mathematical problems. **Quadrilaterals and Other Polygons** LD G.QP.1: Prove and apply theorems about parallelograms, including the following: opposite sides are congruent; opposite angles are congruent; the diagonals of a parallelogram bisect each other; and rectangles are parallelograms with congruent diagonals. LD G.QP.2: Prove that given quadrilaterals are parallelograms, rhombuses, rectangles, squares or trapezoids. Include coordinate proofs of quadrilaterals in the coordinate plane. LD G.QP.3: Find measures of interior and exterior angles of polygons. Explain and justify the method used. LD G.QP.4: Identify types of symmetry of polygons, including line, point, rotational, and self-congruencies. **IN: HS: Geometry** Congruence

	G-CO Prove geometric theorems LD 11. Prove theorems about parallelograms. Expressing Geometric Properties with Equations **G-GPE Use coordinates to prove simple geometric theorems algebraically** LD 4. Use coordinates to prove simple geometric theorems algebraically.

Grade 9/ Geometry /Unit 3A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 19-22	**Triangles** LD G.T.4: Given two triangles, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides, and to establish the AA criterion for two triangles to be similar. LD G.T.7: State and apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle. Understand and use the geometric mean to solve for missing parts of triangles. **Transformations** LD G.TR.1: Use geometric descriptions of rigid motions to transform figures and to predict and describe the results of translations, reflections and rotations on a given figure. Describe a motion or series of motions that will show two shapes are congruent. LD G.TR.2: Understand a dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. Verify experimentally the properties of dilations given by a center and a scale factor. Understand the dilation of a line segment is longer or shorter in the ratio given by the scale factor.

Grade 9/ Geometry /Unit 3B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 23-26	**Triangles**

	LD G.T.9: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. LD G.T.10: Use trigonometric ratios (sine, cosine and tangent) and the Pythagorean Theorem to solve real-world and mathematical problems involving right triangles. LD G.T.11: Use special right triangles (30° - 60° and 45° - 45°) to solve real-world and mathematical problems.

Grade 9/ Geometry /Unit 4A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 28-31	**IN: HS: Geometry** Geometric Measurement & Dimension **G-GMB Explain volume formulas and use them to solve problems** LD 1. Give an informal argument for the formulas for the volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments. LD 2. (+) Given an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. LD 3. Use volume formulas for cylinders, pyramids, cones and spheres to solve problems.★ **G-GMB Visualize the relation between two-dimensional and three-dimensional objects** LD 4. Identify cross-sectional shapes of slices of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. Modeling with Geometry **G-MG Apply geometric concepts in modeling situations** LD 1. Use geometric shapes, their measures and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★ LD 2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★ LD 3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy constraints or minimize cost; working with typographic grid systems based on ratios).★

Grade 9/ Geometry /Unit 4B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 32-35	Congruence **G-CO Make geometric constructions** LD 13. Construct an equilateral triangle, a square and a regular hexagon inscribed in a circle. Circles **G-C Understand and apply theorems about circles** LD 1. Prove that all circles are similar. LD 2. Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle. LD 3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. LD 4. (+) Construct a tangent line from a point outside a given circle to the circle. **G-C Find arc lengths and areas of sectors of circles** LD 5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. Expressing Geometric Properties with Equations **G-GPE Translate between the geometric description and the equation for a conic section** LD 1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. **G-GPE Use coordinates to prove simple geometric theorems algebraically** LD 4. Use coordinates to prove simple geometric theorems algebraically. Show details Geometric Measurement & Dimension

	G-GMB Explain volume formulas and use them to solve problems LD 1. Give an informal argument for the formulas for the volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments. Modeling with Geometry **G-MG Apply geometric concepts in modeling situations** LD 1. Use geometric shapes, their measures and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★

Grade 9/Integrated Math I/Unit 1A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 1-4	**Real Numbers And Expressions**

	LD ✓ – AI.RNE.1: Understand the hierarchy and relationships of numbers and sets of numbers within the real number system. LD ✓ – AI.RNE.2: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. LD ✓ AI.RNE.3: Rewrite and evaluate numeric expressions with positive rational exponents using the properties of exponents. LD ✓ AI.RNE.4: Simplify square roots of non-perfect square integers and algebraic monomials. **Data Analysis And Statistics** LD ✓ AI.DS.3: Use technology to find a linear function that models a relationship for a bivariate data set to make predictions; interpret the slope and y- intercept, and compute (using technology) and interpret the correlation coefficient. LD ✓ – AI.DS.6: Understand that statistics and data are non-neutral and designed to serve a particular interest. Analyze the possibilities for whose interest might be served and how the representations might be misleading.

Grade 9/ Integrated Math I /Unit 1B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 5-9	**Linear Equations, Inequalities, and Functions** LD ✓+ AI.L.1: Understand that the steps taken when solving linear equations create new equations that have the same solution as the original. Solve fluently linear equations and inequalities in one variable with integers, fractions, and decimals as coefficients. Explain and justify each step in solving an equation, starting from the assumption that the original equation has a solution. Justify the choice of a solution method. LD ✓+ AI.L.2: Represent real-world problems using linear equations and inequalities in one variable and solve such problems. Interpret the solution and determine whether it is reasonable. LD ✓ – AI.L.3: Represent real-world and other mathematical problems using an algebraic proportion that leads to a linear equation and solve such problems. LD ✓ AI.L.8: Solve compound linear inequalities in one variable, and represent and interpret the solution on a number line. Write a compound linear inequality given its number line representation.

	LD ✓ – AI.L.9: Solve absolute value linear equations in one variable. LD ✓ AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables.

Grade 9/ Integrated Math I /Unit 2A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 10-14	**Functions** LD ✓ AI.F.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. Understand that if f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. Understand the graph of f is the graph of the equation y = f(x). LD ✓ AI.F.2: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. Identify independent and dependent variables and make predictions about the relationship. LD ✓ – AI.F.3: Identify the domain and range of relations represented in tables, graphs, verbal descriptions, and equations. LD ✓ AI.F.4: Understand and interpret statements that use function notation in terms of a context; relate the domain of the function to its graph and to the quantitative relationship it describes. **Linear Equations, Inequalities, and Functions** LD ✓ + AI.L.4: Represent linear functions as graphs from equations (with and without technology), equations from graphs, and equations from tables and other given information (e.g., from a given point on a line and the slope of the line). LD ✓ + AI.L.5: Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables; translate fluently among these representations, and interpret the slope and intercepts. LD ✓ AI.L.6: Translate among equivalent forms of equations for linear functions, including slope-intercept, point-slope, and standard. Recognize that different forms reveal more or less information about a given situation. LD ✓ + AI.L.7: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret

	the solution set and determine whether it is reasonable. Solve other linear inequalities in two variables by graphing. LD ✓− AI.L.10: Graph absolute value linear equations in two variables. LD ✓ AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables.

Grade 9/ Integrated Math I /Unit 2B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 15-18	**Linear Equations, Inequalities, and Functions** LD ✓+ AI.L.7: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other linear inequalities in two variables by graphing. **Systems of Equations and Inequalities** LD ✓ AI.SEI.1: Understand the relationship between a solution of a pair of linear equations in two variables and the graphs of the corresponding lines. Solve pairs of linear equations in two variables by graphing; approximate solutions when the coordinates of the solution are non-integer numbers. LD ✓+ AI.SEI.2: Understand that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. Solve pairs of linear equations in two variables using substitution and elimination. LD ✓+ AI.SEI.3: Write a system of two linear equations in two variables that represents a real-world problem and solve the problem with and without technology. Interpret the solution and determine whether the solution is reasonable. LD ✓ AI.SEI.4: Represent real-world problems using a system of two linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other pairs of linear inequalities by graphing with and without technology. Algebra II **Systems of Equations** LD AII.SE.2: Solve systems of two or three linear equations in two or three variables algebraically and using technology.

Grade 9/Integrated Math I/Unit 3A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 19-22	**Quadratic and Exponential Equations and Functions** LD ✓ AI.QE.1: Distinguish between situations that can be modeled with linear functions and with exponential functions. Understand that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Compare linear functions and exponential functions that model real-world situations using tables, graphs, and equations. LD ✓ AI.QE.2: Represent real-world and other mathematical problems that can be modeled with exponential functions using tables, graphs, and equations of the form y = ab^x (for integer values of x > 1, rational values of b > 0 and b ≠ 1); translate fluently among these representations and interpret the values of a and b. LD ✓+ AI.QE.3: Graph exponential and quadratic equations in two variables with and without technology. Algebra II **Functions** LD AII.F.5: Describe the effect on the graph of f(x) by replacing f(x) with f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative) with and without technology. Find the value of k given the graph of f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k). **Exponential and Logarithmic Equations and Functions** LD AII.EL.1: Write arithmetic and geometric sequences both recursively and with an explicit formula; use them to model situations and translate between the two forms. LD AII.EL.7: Represent real-world problems using exponential equations in one or two variables and solve such problems with and without technology. Interpret the solutions and determine whether they are reasonable.

Grade 9/ Integrated Math I /Unit 3B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 23-26	**Logic and Proofs**

	LD G.LP.1: Understand and describe the structure of and relationships within an axiomatic system (undefined terms, definitions, axioms and postulates, methods of reasoning, and theorems). Understand the differences among supporting evidence, counterexamples, and actual proofs. LD G.LP.2: Know precise definitions for angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, and plane. Use standard geometric notation. LD G.LP.3: State, use, and examine the validity of the converse, inverse, and contrapositive of conditional ("if – then") and bi-conditional ("if and only if") statements. LD G.LP.4: Develop geometric proofs, including direct proofs, indirect proofs, proofs by contradiction and proofs involving coordinate geometry, using two- column, paragraphs, and flow charts formats.

Grade 9/ Integrated Math I /Unit 4A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 28-31	Geometry **Points, Lines, Angles** LD G.PL.3: Prove and apply theorems about lines and angles, including the following: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent, alternate exterior angles are congruent, and corresponding angles are congruent; when a transversal crosses parallel lines, same side interior angles are supplementary; and points on a perpendicular bisector of a line segment are exactly those equidistant from the endpoints of the segment. LD G.PL.5: Explain and justify the process used to construct, with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.), congruent segments and angles, angle bisectors, perpendicular bisectors, altitudes, medians, and parallel and perpendicular lines. **Triangles** LD G.T.3: Explain and justify the process used to construct congruent triangles with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). **Quadrilaterals and Other Polygons** LD G.QP.4: Identify types of symmetry of polygons, including line, point, rotational, and self-congruencies. **Transformations** LD G.TR.1: Use geometric descriptions of rigid motions to transform figures and to predict and describe the results of translations, reflections and rotations on a given figure. Describe a motion or series of motions that will show two shapes are congruent.

Grade 9/ Integrated Math I /Unit 4B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 32-35	Geometry **Points, Lines, Angles** LD G.PL.3: Prove and apply theorems about lines and angles, including the following: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent, alternate exterior angles are congruent, and corresponding angles are congruent; when a transversal crosses parallel lines, same side interior angles are supplementary; and points on a perpendicular bisector of a line segment are exactly those equidistant from the endpoints of the segment. LD G.PL.4: Know that parallel lines have the same slope and perpendicular lines have opposite reciprocal slopes. Determine if a pair of lines are parallel, perpendicular, or neither by comparing the slopes in coordinate graphs and in equations. Find the equation of a line, passing through a given point, that is parallel or perpendicular to a given line. **Triangles** LD G.T.1: Prove and apply theorems about triangles, including the following: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point; a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem, using triangle similarity; and the isosceles triangle theorem and its converse. LD G.T.2: Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Grade 9/Integrated Math II/Unit 1A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 1-4	**Logic and Proofs** LD G.LP.1: Understand and describe the structure of and relationships within an axiomatic system (undefined terms, definitions, axioms and postulates, methods of reasoning, and theorems). Understand the differences among supporting evidence, counterexamples, and actual proofs. LD G.LP.2: Know precise definitions for angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, and plane. Use standard geometric notation. **Points, Lines, Angles**

	LD G.PL.1: Identify, justify, and apply properties of planes. LD G.PL.2: Describe the intersection of two or more geometric figures in the same plane. LD G.PL.3: Prove and apply theorems about lines and angles, including the following: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent, alternate exterior angles are congruent, and corresponding angles are congruent; when a transversal crosses parallel lines, same side interior angles are supplementary; and points on a perpendicular bisector of a line segment are exactly those equidistant from the endpoints of the segment. LD G.PL.4: Know that parallel lines have the same slope and perpendicular lines have opposite reciprocal slopes. Determine if a pair of lines are parallel, perpendicular, or neither by comparing the slopes in coordinate graphs and in equations. Find the equation of a line, passing through a given point, that is parallel or perpendicular to a given line. LD G.PL.5: Explain and justify the process used to construct, with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.), congruent segments and angles, angle bisectors, perpendicular bisectors, altitudes, medians, and parallel and perpendicular lines. **Triangles** LD G.T.8: Develop the distance formula using the Pythagorem Theorem. Find the lengths and midpoints of line segments in one- or two-dimensional coordinate systems. Find measures of the sides of polygons in the coordinate plane; apply this technique to compute the perimeters and areas of polygons in real-world and mathematical problems.

Grade 9/ Integrated Math II /Unit 1B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 5-9	**Logic and Proofs** LD G.LP.3: State, use, and examine the validity of the converse, inverse, and contrapositive of conditional (“if – then”) and bi-conditional (“if and only if”) statements. LD G.LP.4: Develop geometric proofs, including direct proofs, indirect proofs, proofs by contradiction and proofs involving coordinate geometry, using two- column, paragraphs, and flow charts formats. **Points, Lines, Angles** LD G.PL.5: Explain and justify the process used to construct, with a variety of tools and methods (compass and straightedge, string,

	reflective devices, paper folding, dynamic geometric software, etc.), congruent segments and angles, angle bisectors, perpendicular bisectors, altitudes, medians, and parallel and perpendicular lines. **Triangles** LD G.T.1: Prove and apply theorems about triangles, including the following: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point; a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem, using triangle similarity; and the isosceles triangle theorem and its converse. LD G.T.6: Prove and apply the inequality theorems, including the following: triangle inequality, inequality in one triangle, and the hinge theorem and its converse. **Circles** LD G.CI.7: Construct the inscribed and circumscribed circles of a triangle with or without technology, and prove properties of angles for a quadrilateral inscribed in a circle. **Three-Dimensional Solids** LD G.TS.6: Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Grade 9/ Integrated Math II /Unit 2A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 10-14	**Logic and Proofs** LD G.LP.2: Know precise definitions for angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, and plane. Use standard geometric notation. **Quadrilaterals and Other Polygons** LD G.QP.5: Deduce formulas relating lengths and sides, perimeters, and areas of regular polygons. Understand how limiting cases of such formulas lead to expressions for the circumference and the area of a circle.

	Circles LD G.CI.1: Define, identify and use relationships among the following: radius, diameter, arc, measure of an arc, chord, secant, tangent, and congruent concentric circles. LD G.CI.2: Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius; derive the formula for the area of a sector. LD G.CI.3: Identify and describe relationships among inscribed angles, radii, and chords, including the following: the relationship that exists between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; and the radius of a circle is perpendicular to a tangent where the radius intersects the circle. LD G.CI.4: Solve real-world and other mathematical problems that involve finding measures of circumference, areas of circles and sectors, and arc lengths and related angles (central, inscribed, and intersections of secants and tangents). LD G.CI.6: Construct a tangent line to a circle through a point on the circle, and construct a tangent line from a point outside a given circle to the circle; justify the process used for each construction. **Three-Dimensional Solids** LD G.TS.3: Know properties of congruent and similar solids, including prisms, regular pyramids, cylinders, cones, and spheres; solve problems involving congruent and similar solids. LD G.TS.4: Describe sets of points on spheres, including chords, tangents, and great circles. LD G.TS.5: Solve real-world and other mathematical problems involving volume and surface area of prisms, cylinders, cones, spheres, and pyramids, including problems that involve algebraic expressions. LD G.TS.6: Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Grade 9/ Integrated Math II /Unit 2B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 15-18	**Functions** LD ✓ AI.F.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. Understand that if f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. Understand the graph of f is the graph of the equation y = f(x).

LD ✓ AI.F.2: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. Identify independent and dependent variables and make predictions about the relationship.

Linear Equations, Inequalities, and Functions

LD ✓+ AI.L.1: Understand that the steps taken when solving linear equations create new equations that have the same solution as the original. Solve fluently linear equations and inequalities in one variable with integers, fractions, and decimals as coefficients. Explain and justify each step in solving an equation, starting from the assumption that the original equation has a solution. Justify the choice of a solution method.

LD ✓+ AI.L.2: Represent real-world problems using linear equations and inequalities in one variable and solve such problems. Interpret the solution and determine whether it is reasonable.

LD ✓+ AI.L.4: Represent linear functions as graphs from equations (with and without technology), equations from graphs, and equations from tables and other given information (e.g., from a given point on a line and the slope of the line).

LD ✓+ AI.L.5: Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables; translate fluently among these representations, and interpret the slope and intercepts.

LD ✓ AI.L.6: Translate among equivalent forms of equations for linear functions, including slope-intercept, point-slope, and standard. Recognize that different forms reveal more or less information about a given situation.

LD ✓+ AI.L.7: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other linear inequalities in two variables by graphing.

LD ✓− AI.L.9: Solve absolute value linear equations in one variable.

LD ✓ AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables.

Systems of Equations and Inequalities

LD ✓+ AI.SEI.2: Understand that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. Solve pairs of linear equations in two variables using substitution and elimination.

Grade 9/ Integrated Math II /Unit 3A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 19-22	**Real Numbers And Expressions** LD ✓ AI.RNE.3: Rewrite and evaluate numeric expressions with positive rational exponents using the properties of exponents. LD ✓+ AI.RNE.5: Simplify algebraic rational expressions, with numerators and denominators containing monomial bases with integer exponents, to equivalent forms. **Linear Equations, Inequalities, and Functions** LD ✓– AI.L.10: Graph absolute value linear equations in two variables. Algebra II **Complex Numbers and Expressions** LD AII.CNE.2: Translate expressions between radical and exponent form and simplify them using the laws of exponents. LD AII.CNE.4: Rewrite algebraic rational expressions in equivalent forms (e.g., using laws of exponents and factoring techniques). **Functions** LD AII.F.3: Understand that an inverse function can be obtained by expressing the dependent variable of one function as the independent variable of another, as f and g are inverse functions if and only if f(x)=y and g(y)=x, for all values of x in the domain of f and all values of y in the domain of g. Find the inverse of a function that has an inverse. LD AII.F.4: Understand that if the graph of a function contains a point (a, b), then the graph of the inverse relation of the function contains the point (b, a); the inverse is a reflection over the line y = x. LD AII.F.5: Describe the effect on the graph of f(x) by replacing f(x) with f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative) with and without technology. Find the value of k given the graph of f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k). **Exponential and Logarithmic Equations and Functions** LD AII.EL.2: Graph exponential functions with and without technology. Identify and describe features, such as intercepts, zeros, domain and range, and asymptotic and end behavior. LD AII.EL.3: Identify the percent rate of change in exponential functions written as equations, such as y = (1.02)^t, y = (0.97)^t, y =

	(1.01)12^t, y = (1.2)^t/10, and classify them as representing exponential growth or decay. LD AII.EL.4: Use the properties of exponents to transform expressions for exponential functions (e.g., the expression 1.15^t can be rewritten as (1.15^1/12)^12t ≈ 1.012^12t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%). LD AII.EL.7: Represent real-world problems using exponential equations in one or two variables and solve such problems with and without technology. Interpret the solutions and determine whether they are reasonable. **Polynomial, Rational, and Other Equations and Functions** LD AII.PR.2: Graph relations and functions including polynomial, square root, and piecewise-defined functions (including step functions and absolute value functions) with and without technology. Identify and describe features, such as intercepts, zeros, domain and range, end behavior, and lines of symmetry.

Grade 9/Algebra/Unit 3B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 23-26	**Real Numbers And Expressions** LD ✓+ AI.RNE.6: Factor common terms from polynomials and factor polynomials completely. Factor the difference of two squares, perfect square trinomials, and other quadratic expressions. LD ✓+ AI.RNE.7: Understand polynomials are closed under the operations of addition, subtraction, and multiplication with integers; add, subtract, and multiply polynomials and divide polynomials by monomials. **Quadratic and Exponential Equations and Functions** LD ✓+ AI.QE.4: Solve quadratic equations in one variable by inspection (e.g., for x^2 = 49), finding square roots, using the quadratic formula, and factoring, as appropriate to the initial form of the equation.

	LD ✓+ AI.QE.5: Represent real-world problems using quadratic equations in one or two variables and solve such problems with and without technology. Interpret the solution and determine whether it is reasonable.
	LD ✓ AI.QE.6: Use the process of factoring to determine zeros, lines of symmetry, and extreme values in real-world and other mathematical problems involving quadratic functions; interpret the results in the real-world contexts.

Grade 9/ Integrated Math II /Unit 4A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 28-31	**Real Numbers And Expressions** LD ✓– AI.RNE.2: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. LD ✓ AI.RNE.4: Simplify square roots of non-perfect square integers and algebraic monomials. **Functions** LD ✓ AI.F.2: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. Identify independent and dependent variables and make predictions about the relationship. **Linear Equations, Inequalities, and Functions** LD ✓ AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables. **Quadratic and Exponential Equations and Functions** LD ✓ AI.QE.1: Distinguish between situations that can be modeled with linear functions and with exponential functions. Understand that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Compare linear functions and exponential functions that model real-world situations using tables, graphs, and equations. LD ✓+ AI.QE.3: Graph exponential and quadratic equations in two variables with and without technology.

LD ✓+ AI.QE.4: Solve quadratic equations in one variable by inspection (e.g., for x^2 = 49), finding square roots, using the quadratic formula, and factoring, as appropriate to the initial form of the equation.

LD ✓+ AI.QE.5: Represent real-world problems using quadratic equations in one or two variables and solve such problems with and without technology. Interpret the solution and determine whether it is reasonable.

LD ✓ AI.QE.6: Use the process of factoring to determine zeros, lines of symmetry, and extreme values in real-world and other mathematical problems involving quadratic functions; interpret the results in the real-world contexts.

LD ✓− AI.QE.7: Describe the relationships among the solutions of a quadratic equation, the zeros of the function, the x-intercepts of the graph, and the factors of the expression

Algebra II

Complex Numbers and Expressions

LD AII.CNE.1: Know there is an imaginary number, i, such that i^2 = -1, and every complex number can be written in the form a + bi, with a and b real. Use the relation i^2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

LD AII.CNE.2: Translate expressions between radical and exponent form and simplify them using the laws of exponents.

Functions

LD AII.F.5: Describe the effect on the graph of f(x) by replacing f(x) with f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative) with and without technology. Find the value of k given the graph of f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k).

Systems of Equations

LD AII.SE.1: Solve a system of equations consisting of a linear equation and a quadratic equation in two variables algebraically and graphically with and without technology (e.g., find the points of intersection between the line y = –3x and the circle x^2 + y^2 = 3).

Quadratic Equations and Functions

LD AII.Q.1: Represent real-world problems that can be modeled with quadratic functions using tables, graphs, and equations; translate fluently among these representations. Solve such problems with and without technology. Interpret the solutions and determine whether they are reasonable.

LD AII.Q.2: Use completing the square to rewrite quadratic functions into the form y = a(x + h)^2 + k, and graph these functions with and without technology. Identify intercepts, zeros, domain and range, and lines of symmetry. Understand the relationship between completing the square and the quadratic formula.

	LD AII.Q.3: Use the discriminant to determine the number and type of solutions of a quadratic equation in one variable with real coefficients; find all solutions and write complex solutions in the form of a ± bi for real numbers a and b.

Grade 9/ Integrated Math II /Unit 4B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 32-35	**Triangles** LD G.T.1: Prove and apply theorems about triangles, including the following: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point; a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem, using triangle similarity; and the isosceles triangle theorem and its converse. LD G.T.2: Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. LD G.T.4: Given two triangles, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides, and to establish the AA criterion for two triangles to be similar. LD G.T.7: State and apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle. Understand and use the geometric mean to solve for missing parts of triangles. LD G.T.9: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. LD G.T.10: Use trigonometric ratios (sine, cosine and tangent) and the Pythagorean Theorem to solve real-world and mathematical problems involving right triangles. LD G.T.11: Use special right triangles (30° - 60° and 45° - 45°) to solve real-world and mathematical problems. **Transformations** LD G.TR.2: Understand a dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged. Verify experimentally the properties of dilations given by a center and a scale factor. Understand the dilation of a line segment is longer or shorter in the ratio given by the scale factor. **Three-Dimensional Solids** LD G.TS.6: Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or

	minimize cost; working with typographic grid systems based on ratios). Algebra II **Data Analysis, Statistics, and Probability** LD AII.DSP.4: Record multiple observations (or simulated samples) of random events and construct empirical models of the probability distributions. Construct a theoretical model and apply the law of large numbers to show the relationship between the two models. LD AII.DSP.5: Understand dependent and independent events, and conditional probability; apply these concepts to calculate probabilities. LD AII.DSP.6: Understand the multiplication counting principle, permutations, and combinations; apply these concepts to calculate probabilities.

Grade 9/Pre Calculus/Unit 1A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 1-4	**Functions** LD PC.F.1: 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. LD PC.F.2: Find linear models by using median fit and least squares regression methods. Decide which among several linear models gives a better fit. Interpret the slope and intercept in terms of the original context. LD PC.F.4: Determine if a graph or table has an inverse, and justify if the inverse is a function, relation, or neither. Identify the values of an inverse function/relation from a graph or a table, given that the function has an inverse. Derive the inverse equation from the values of the inverse. LD PC.F.5: Produce an invertible function from a non-invertible function by restricting the domain.

	LD PC.F.6: Describe 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 graph f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k). Experiment with cases and illustrate an explanation of the effects on the graph using technology. Recognize even and odd functions from their graphs and algebraic expressions. LD PC.F.7: Decide if a function is continuous at a point. Find the types of discontinuities of a function and relate them to finding limits of a function. Use the concept of limits to describe discontinuity and end-behavior of the function. **Quadratic, Polynomial, and Rational Equations and Functions** LD PC.QPR.1: Use the method of completing the square to transform any quadratic equation into an equation of the form (x – p)^2 = q that has the same solutions. Derive the quadratic formula from this form. LD PC.QPR.2: Graph rational functions with and without technology. Identify and describe features such as intercepts, domain and range, and asymptotic and end behavior. **Exponential and Logarithmic Functions and Equations** LD PC.EL.4: Use technology to find a quadratic, exponential, logarithmic, or power function that models a relationship for a bivariate data set to make predictions; compute (using technology) and interpret the correlation coefficient.

Grade 9/ Pre Calculus /Unit 1B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 5-9	**Functions** LD PC.F.1: 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. LD PC.F.5: Produce an invertible function from a non-invertible function by restricting the domain. LD PC.F.6: Describe 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 graph f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k). Experiment with cases and illustrate an explanation of the effects on the graph using technology. Recognize even and odd functions from their graphs and algebraic expressions. LD PC.F.7: Decide if a function is continuous at a point. Find the types of discontinuities of a function and relate them to finding limits

	of a function. Use the concept of limits to describe discontinuity and end-behavior of the function. **Quadratic, Polynomial, and Rational Equations and Functions** LD PC.QPR.2: Graph rational functions with and without technology. Identify and describe features such as intercepts, domain and range, and asymptotic and end behavior. LD PC.QPR.3: 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). LD PC.QPR.4: Understand the Fundamental Theorem of Algebra. Find a polynomial function of lowest degree with real coefficients when given its roots. **Exponential and Logarithmic Functions and Equations** LD PC.EL.4: Use technology to find a quadratic, exponential, logarithmic, or power function that models a relationship for a bivariate data set to make predictions; compute (using technology) and interpret the correlation coefficient.

Grade 9/ Pre Calculus /Unit 2A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 10-14	**Functions** LD PC.F.1: 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. LD PC.F.3: Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. LD PC.F.4: Determine if a graph or table has an inverse, and justify if the inverse is a function, relation, or neither. Identify the values of an inverse function/relation from a graph or a table, given that the function has an inverse. Derive the inverse equation from the values of the inverse. LD PC.F.6: Describe 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 graph f(x) and the graph of f(x) + k, k f(x), f(kx), or f(x + k). Experiment with cases and illustrate an explanation of the effects on the graph using technology. Recognize even and odd functions from their graphs and algebraic expressions. **Quadratic, Polynomial, and Rational Equations and Functions** LD PC.QPR.2: Graph rational functions with and without technology. Identify and describe features such as intercepts, domain and range, and asymptotic and end behavior. **Exponential and Logarithmic Functions and Equations** LD PC.EL.1: Use the definition of logarithms to convert logarithms from one base to another and prove simple laws of logarithms. LD PC.EL.2: Use the laws of logarithms to simplify logarithmic expressions and find their approximate values. LD PC.EL.3: Graph and solve real-world and other mathematical problems that can be modeled using exponential and logarithmic equations and inequalities; interpret the solution and determine whether it is reasonable. LD PC.EL.4: Use technology to find a quadratic, exponential, logarithmic, or power function that models a relationship for a bivariate data set to make predictions; compute (using technology) and interpret the correlation coefficient.

Grade 9/ Pre Calculus /Unit 2B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 15-18	**Unit Circles** LD TR.UC.1: Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. LD TR.UC.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. LD TR.UC.3: Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions. **Geometry** LD TR.G.2: Explain and use the relationship between the sine and cosine of complementary angles. LD TR.G.3: Use special triangles to determine the values of sine, cosine, and tangent for π/3, π/4, and π/6. Apply special right

	triangles to the unit circle and use them to express the values of sine, cosine, and tangent for x, π + x, and 2π – x in terms of their values for x, where x is any real number. LD TR.G.4: Prove the Laws of Sines and Cosines and use them to solve problems. LD TR.G.5: Understand and apply the Laws of Sines and Cosines to solve real-world and other mathematical problems involving right and non-right triangles. LD TR.G.6: Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line. Use the formula to find areas of triangles. **Periodic Functions** LD TR.PF.1: Find a sinusoidal function to model a data set and explain the parameters of the model. LD TR.PF.2: Graph trigonometric functions with and without technology. Use the graphs to model and analyze periodic phenomena, stating amplitude, period, frequency, phase shift, and midline (vertical shift). LD TR.PF.3: Construct the inverse trigonometric functions of sine, cosine, and tangent by restricting the domain. LD TR.PF.4: Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context. LD TR.PF.5: Prove the addition and subtraction formulas for sine, cosine, and tangent. Use the formulas to solve problems. LD TR.PF.6: Prove the double- and half-angle formulas for sine, cosine, and tangent. Use the formulas to solve problems. LD TR.PF.7: Define and use the trigonometric ratios (sine, cosine, tangent, cotangent, secant, cosecant) in terms of angles of right triangles and the coordinates on the unit circle. **Identities** LD TR.ID.1: Prove the Pythagorean identity sin^2(x) + cos^2(x) = 1 and use it to find trigonometric ratios, given sin(x), cos(x), or tan(x), and the quadrant of the angle. LD TR.ID.2: Verify basic trigonometric identities and simplify expressions using these and other trigonometric identities.

Grade 9/ Pre Calculus /Unit 3A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES

Weeks 19-22	**Polar Coordinates and Complex Numbers** LD PC.PCN.1: Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints. LD PC.PCN.2: Understand and use complex numbers, including real and imaginary numbers, on the complex plane in rectangular and polar form, and explain why the rectangular and polar forms of a given complex number represent the same number. LD PC.PCN.3: Understand and use addition, subtraction, multiplication, and conjugation of complex numbers, including real and imaginary numbers, on the complex plane in rectangular and polar form. LD PC.PCN.4: State, prove, and use DeMoivre's Theorem. Trigonometry **Polar** LD TR.PC.1: Define polar coordinates and relate polar coordinates to Cartesian coordinates. LD TR.PC.2: Translate equations from rectangular coordinates to polar coordinates and from polar coordinates to rectangular coordinates. Graph equations in the polar coordinate plane. **Vectors** LD TR.V.1: Solve problems involving velocity and other quantities that can be represented by vectors. LD TR.V.2: Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as c(vx, vy) = (cvx, cvy). LD TR.V.3: Compute the magnitude of a scalar multiple cv using ||cv|| = |c|v. Compute the direction of cv knowing that when |c|v ≠ 0, the direction of cv is either along v (for c > 0) or against v (for c < 0).

Grade 9/ Pre Calculus /Unit 3B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 23-26	**Conics** LD TR.CO.1: Determine how the graph of a parabola changes if a, b and c changes in the equation y = a(x – b)^2 + c. Find an equation for a parabola when given sufficient information. LD TR.CO.2: Derive the equation of a parabola given a focus and directrix.

	LD TR.CO.3: Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. LD TR.CO.4: Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant. LD TR.CO.5: Graph conic sections. Identify and describe features like center, vertex or vertices, focus or foci, directrix, axis of symmetry, major axis, minor axis, and eccentricity. LD TR.CO.6: Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.

Grade 9/ Pre Calculus /Unit 4A

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 28-31	Algebra II **Complex Numbers and Expressions** LD AII.CNE.6: Find partial sums of arithmetic and geometric series and represent them using sigma notation. Pre-Calculus **Functions** LD PC.F.3: Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. LD PC.F.10: Describe the concept of the limit of a sequence and a limit of a function. Decide whether simple sequences converge or diverge. Recognize an infinite series as the limit of a sequence of partial sums.

Grade 9/ Pre Calculus /Unit 4B

APPROXIMATE TIME FRAME	IDOE CCRS PRIORITIES
Weeks 32-35	**Matrices** LD FM.MA.1: Add, subtract, and multiply matrices of appropriate dimensions (i.e. up to 3x3 matrices). Multiply matrices by scalars. Calculate row and column sums for matrix equations. LD FM.MA.2: Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers.

	LD	FM.MA.3: Understand the determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.	⊗
	LD	FM.MA.4: Solve problems represented by matrices using row-reduction techniques and properties of matrix multiplication, including identity and inverse matrices.	⊗
	LD	FM.MA.5: Use matrices to solve real-world problems that can be modeled by a system of equations (i.e. up to 3 linear equations) in two or three variables using technology.	⊗
	LD	FM.MA.6: Build and use matrix representations to model polygons, transformations, and computer animations.	