Mathematics » High School: Number & Quantity						
The Real Number System						
Extend the properties of exponents to rational exponents.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
N-RN.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 $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.* • Understand that the denominator of the rational exponent is the root index and the numerator is the exponent of the radicand. For example, 51/2 = 5 • Extend the properties of exponents to justify that (51/2)2 = 5			3.4 (7-4)		4.4 (7.4)	
N-RN.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents. • Convert from radical representation to using rational exponents and vice versa.			3.4 (7-4)		4.3 (pg. 368)	
Use properties of rational and irrational numbers.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
N-RN.3. 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. • Know and justify that when adding or multiplying two rational numbers the result is a rational number • Know and justify that when adding a rational number and an irrational number the result is irrational. • Know and justify that when multiplying of a nonzero rational number and an irrational number the result is irrational	11.4, 11.5, 11.6, 11.8					
Quantities						

Reason quantitatively and use units to solve problems.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. • Interpret units in the context of the problem • When solving a multi-step problem, use units to evaluate the appropriateness of the solution. • Choose the appropriate units for a specific formula and interpret the meaning of the unit in that context. • Choose and interpret both the scale and the origin in graphs and data displays		throughout	throughout	3.6 (own)	throughout	throughout
N-Q.2. Define appropriate quantities for the purpose of descriptive modeling. • Determine and interpret appropriate quantities when using descriptive modeling.		throughout	throughout	3.6 (own)	throughout	throughout
N-Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. • Determine the accuracy of values based on their limitations in the context of the situation.		throughout	throughout		throughout	throughout
The Complex System						
Perform arithmetic operations with complex numbers.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

N-CN.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. • Know that every number is a complex number of the form a + bi, where a and b are real numbers. • Know that the complex number $i^2 = –1$.			2.6 (5-6)		2.6 (5-6)	
N-CN.2. Use the relation $i^2 = –1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. • Apply the fact that the complex number $i^2 = –1$. • Use the associative, commutative, and distributive properties, to add, subtract, and multiply complex numbers.			2.6 (5-6) 2.7 (5-8)		2.6 (5-6) 2.7 (5-8)	
N-CN.3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers. • Given a complex number, find its conjugate and use it to find quotients of complex numbers. • Find the magnitude (length), modulus (length) or absolute value (length), of the vector representation of a complex number.						
Represent complex numbers and their operations on the complex plane.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

N-CN.4. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number. • Transform complex numbers in a complex plane from rectangular to polar form and vice versa, • Know and explain why both forms, rectangular and polar, represent the same number.						Need to add?
N-CN.5. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. *For example,* $(-1 + \sqrt{3}\,i)^3 = 8$ *because* $(-1 + \sqrt{3}\,i)$ *has modulus* 2 *and argument* 120°. • Geometrically show addition, subtraction, and multiplication of complex numbers on the complex coordinate plane. • Geometrically show that the conjugate of complex numbers in a complex plane is the reflection across the x-axis. • Evaluate the power of a complex number, in rectangular form, using the polar form of that complex number.						Need to add?
N-CN.6. (+) 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. • Calculate the distance between values in the complex plane as the magnitude, modulus, of the difference, and the midpoint of a segment as the average of the coordinates of its endpoints.						Need to add?
Use complex numbers in polynomial identities and equations.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

N-CN.7. Solve quadratic equations with real coefficients that have complex solutions. • Solve quadratic equations with real coefficients that have solutions of the form a + bi and a – bi.	9.1, 9.3, 9.4, 9.5, 9.6, 9.7, 10.5, 10.6, 10.7, 12.4		2.7 (5-8)		2.7 (5-8)	
N-CN.8. (+) Extend polynomial identities to the complex numbers. *For example, rewrite* $x^2 + 4$ *as* $(x + 2i)(x – 2i)$. • Use polynomial identities to write equivalent expressions in the form of complex numbers	10.5, 10.6, 10.7, 10.8					Need to add?
N-CN.9. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials. • Understand The Fundamental Theorem of Algebra, which says that the number of complex solutions to a polynomial equation is the same as the degree of the polynomial. Show that this is true for a quadratic polynomial.	10.5, 10.6, 10.7, 10.8		2.7 (5-8) 4.2 (6-2)		2.7 (5-8) 4.2 (6-2)	
Vector and Matrix Quantities						

Represent and model with vector quantities.	Alg. I	Geo.	Alg. II A	Alg. II B	Alg. II	Pre-Calc.
N-VM.1. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., ***v***, |***v***|, ||***v***||, *v*). • Know that a vector is a directed line segment representing magnitude and direction. • Use the appropriate symbol representation for vectors and their magnitude.		5.10 (8-6)				Need to add?
N-VM.2. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. • Find the component form of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point, therefore placing the initial point of the vector at the origin.		5.10 (8-6)				Need to add?
N-VM.3. (+) Solve problems involving velocity and other quantities that can be represented by vectors. • Solve problems such as velocity and other quantities that can be represented using vectors.						Need to add?
Perform operations on vectors.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

N-VM.4. (+) Add and subtract vectors. a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. (Know how to add vectors head to tail, using the horizontal and vertical components, and by finding the diagonal formed by the parallelogram.) b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. (Understand that the magnitude of a sum of two vectors is not the sum of the magnitudes unless the vectors have the same heading or direction.) c. Understand vector subtraction $\boldsymbol{v} - \boldsymbol{w}$ as $\boldsymbol{v} + (-\boldsymbol{w})$, where $-\boldsymbol{w}$ is the additive inverse of ***w***, with the same magnitude as ***w*** and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise. (Know how to subtract vectors and that vector subtraction is defined much like subtraction of real numbers, in that v – w is the same as v + (–w), where –w is the additive inverse of w. The opposite of w, -w, has the same magnitude, but the direction of the angle differs by 180. Represent vector subtraction on a graph by connecting the vectors head to tail in the correct order and using the components of those vectors to find the difference.)		1.10 (8-6) basics only				Need to add?
N-VM.5. (+) Multiply a vector by a scalar. a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$. (Represent scalar multiplication of vectors on a graph by increasing or decreasing the magnitude of the vector by the factor of the given scalar. If the scalar is less than zero, the new vector's direction is opposite the original vector's direction. Represent scalar multiplication of vectors using the component form, such as c(vx, vy) = (cvx, cvy).) b. Compute the magnitude of a scalar multiple $c\boldsymbol{v}$ using $\lVert c\boldsymbol{v}\rVert = \lvert c\rvert\boldsymbol{v}$. Compute the direction of $c\boldsymbol{v}$ knowing that when $\lvert c\rvert\boldsymbol{v} \neq 0$, the direction of $c\boldsymbol{v}$ is either along $\boldsymbol{v}$ (for $c > 0$) or against $\boldsymbol{v}$ (for $c < 0$). (Find the magnitude of a scalar multiple, cv, is the magnitude of v multiplied by the factor of the $\lvert c \rvert$. Know when c > 0, the direction is the same, and when c < 0, then the direction of the vector is opposite the direction of the original vector.)						Need to add?
Perform operations on matrices and use matrices in applications.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

N-VM.6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network. • Represent and manipulate data using matrices, e.g., to organize merchandise, keep total sales, costs, and using graph theory and adjacency matrices to make predictions.						Need to add?
N-VM.7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled. • Multiply matrices by a scalar, e.g., when the inventory of jeans for July is twice that for January.						Need to add?
N-VM.8. (+) Add, subtract, and multiply matrices of appropriate dimensions. • Know that the dimensions of a matrix are based on the number of rows and columns. • Add, subtract, and multiply matrices of appropriate dimensions.						Need to add?
N-VM.9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties. • Understand that matrix multiplication is not commutative, AB BA, however it is associative and satisfies the distributive properties.						Need to add?
Perform operations on matrices and use matrices in applications.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

N-VM.10. (+) 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. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse. • Identify a zero matrix and understand that it behaves in matrix addition, subtraction, and multiplication, much like 0 in the real numbers system. • Identify an identity matrix for a square matrix and understand that it behaves in matrix multiplication much like the number 1 in the real number system. • Find the determinant of a square matrix, and know that it is a nonzero value if the matrix has an inverse. • Know that if a matrix has an inverse, then the determinant of a square matrix is a nonzero value.						Need to add?
N-VM.11. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors. • To translate the vector AB, where A(1,3) and B(4,9), 2 units to the right and 5 units up, perform the following matrix multiplication. $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 5 \\ 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} 1 & 4 \\ 3 & 9 \\ 1 & 1 \end{bmatrix}=\begin{bmatrix} 3 & 6 \\ 8 & 14 \\ 1 & 1 \end{bmatrix}$						Need to add?
N-VM.12. (+) Work with 2 × 2 matrices as a transformations of the plane, and interpret the absolute value of the determinant in terms of area. • Given the coordinates of the vertices of a parallelogram in the coordinate plane, find the vector representation for two adjacent sides with the same initial point. Write the components of the vectors in a 2x2 matrix and find the determinant of the 2x2 matrix. The absolute value of the determinant is the area of the parallelogram. (This is called the dot product of the two vectors.)						Need to add?
Mathematics » High School: Algebra » Seeing Structure in Expressions						

Interpret the structure of expressions.	Alg. I	Geo.	Alg. II A	Alg. II B	Alg. II	Pre-Calc.
A-SSE.1. Interpret expressions that represent a quantity in terms of its context.★ a. Interpret parts of an expression, such as terms, factors, and coefficients. (Identify the different parts of the expression and explain their meaning within the context of a problem.) b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.* (Decompose expressions and make sense of the multiple factors and terms by explaining the meaning of the individual parts.)	1.1, 1.2, 1.5, 2.3, 2.6, 8.1, 8.2, 8.3, 8.4, 8.5, 10.1, 10.4, 10.5, 10.6, 10.7, 10.8, pg. 777-778		throughout		throughout	throughout
A-SSE.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 $(x^2 – y^2)(x^2 + y^2)$.* • Rewrite algebraic expressions in different equivalent forms such as factoring or combining like terms. • Use factoring techniques such as common factors, grouping, the difference of two squares, the sum or difference of two cubes, or a combination of methods to factor completely. • Simplify expressions including combining like terms, using the distributive property and other operations with polynomials.	10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7		1.1 (1-2) 2.4 (5-4) 2.5 (5-5) 3.5 (7-6) 4.1 (6-1) 4.5 (9-4, 5)		1.1 (1-2) 2.4 (5-4) 2.5 (5-5) 3.5 (7-6) 4.1 (6-1) 4.5 (9-4, 5)	throughout
Write expressions in equivalent forms to solve problems.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

A-SSE.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. (Write expressions in equivalent forms by factoring to find the zeros of a quadratic function and explain the meaning of the zeros. Given a quadratic function explain the meaning of the zeros of the function. That is if f(x) = (x – c) (x – a) then f(a) = 0 and f(c) = 0. Given a quadratic expression, explain the meaning of the zeros graphically. That is for an expression (x – a) (x – c), a and c correspond to the x-intercepts (if a and c are real).) b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. (Write expressions in equivalent forms by completing the square to convey the vertex form, to find the maximum or minimum value of a quadratic function, and to explain the meaning of the vertex.) c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression* 1.15^t *can be rewritten as* $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ *to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.* (Use properties of exponents (such as power of a power, product of powers, power of a product, and rational exponents, etc.) to write an equivalent form of an exponential function to reveal and explain specific information about its approximate rate of growth or decay.)	a. 10.4, 10.5, 10.6, 10.7, 10.8 b. 12.4 c. 8.5, 8.6		2.4 (5-4) 2.5 (5-5) 3.3 (pg 368) 3.4 (7-4) 3.5 (7-6) 4.1 (6-1) 4.2 (6-2) 4.5 (9-4, 5)		2.4 (5-4) 2.5 (5-5) 3.3 (pg 368) 3.4 (7-4) 3.5 (7-6) 4.1 (6-1) 4.2 (6-2) 4.5 (9-4, 5)	
A-SSE.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.* • Develop the formula for the sum of a finite geometric series when the ratio is not 1. • Use the formula to solve real world problems such as calculating the height of a tree after n years given the initial height of the tree and the rate the tree grows each year. Calculate mortgage payments.				2.9 (11-5)	6.9 (11-5)	
Mathematics » High School: Algebra » Arithmetic with Polynomials & Rational Expressions						
Perform arithmetic operations on polynomials.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

A-APR.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. • Understand the definition of a polynomial. • Understand the concepts of combining like terms and closure. • Add, subtract, and multiply polynomials and understand how closure applies under these operations.	10.1, 10.2		3.5 (7-6) 4.1 (6-1)		3.5 (7-6) 4.1 (6-1	
Understand the relationship between zeros and factors of polynomials.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
A-APR.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). • Understand and apply the Remainder Theorem. • Understand how this standard relates to A.SSE.3a. • Understand that a is a root of a polynomial function if and only if x-a is a factor of the function.			Need to add 4.3 (6-3)		Need to add 4.3 (6-3)	
A-APR.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. • Find the zeros of a polynomial when the polynomial is factored. • Use the zeros of a function to sketch a graph of the function.	10.4		2.2 (5-2) 2.3 (5-3) 4.2 (6-2)		2.2 (5-2) 2.3 (5-3) 4.2 (6-2)	
Use polynomial identities to solve problems.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
A-APR.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.* • Understand that polynomial identities include but are not limited to	9.5, 10.3, 10.5, 10.6, 10.7, 10.8 I don’t		2.4 (5-4)		2.4 (5-4)	

the product of the sum and difference of two terms, the difference of two squares, the sum and difference of two cubes, the square of a binomial, etc . • Prove polynomial identities by showing steps and providing reasons. • Illustrate how polynomial identities are used to determine numerical relationships.	think I am as in depth as this standard wants me to be???					
A-APR.5. (+) Know and apply the Binomial Theorem for the expansion of (x + y)n in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle. • For small values of n, use Pascal's Triangle to determine the coefficients of the binomial expansion. • Use the Binomial Theorem to find the nth term in the expansion of a binomial to a positive power.				1.11 (Int 2)	5.11 (Int. 2)	
Rewrite rational expressions.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
A-APR.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. • Rewrite rational expressions by using factoring, long division, or synthetic division. Use a computer algebra system for complicated examples to assist with building a broader conceptual understanding.			4.5 (9-4, 5)		4.5 (9-4, 5)	
A-APR.7. (+) 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 rational expressions. • Simplify rational expressions by adding, subtracting, multiplying, or dividing. • Understand that rational expressions are closed under addition, subtraction, multiplication, and division (by a nonzero expression).			4.5 (9-4, 5)		4.5 (9-4, 5)	
Mathematics » High School: Algebra » Creating Equations						
Create equations that describe numbers or relationships.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

A-CED.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 and exponential functions.* • Create linear, quadratic, rational and exponential equations and inequalities in one variable and use them in a contextual situation to solve problems.	1.4, 3.5, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 8.5, 8.6, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.8, 11.8	Throughout—linear only	1.1 (1-2,3,4), 1.2 (1-3), 1.3(1-5), 2.5 (5-5), 3.1 (8-1), 3.7 (8-3, 6), 3.9 (8-5), 4.6 (9-6)		1.1 (1-2,3,4), 1.2 (1-3), 1.3(1-5), 2.5 (5-5), 3.1 (8-1), 3.7 (8-3, 6), 3.9 (8-5), 4.6 (9-6)	
A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. • Create equations in two or more variables to represent relationships between quantities. • Graph equations in two variables on a coordinate plane and label the axes and scales.	4.2, 4.3, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.5, 7.1, 7.4, 9.3, 9.4, 9.5, 9.7		1.5 (2-2) 1.9 (3-1,2,6), 2.2 (5-2), 2.3 (5-3), 4.2 (6-2), 4.7 (9-3)		1.5 (2-2) 1.9 (3-1,2,6), 2.2 (5-2), 2.3 (5-3), 4.2 (6-2), 4.7 (9-3)	
A-CED.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* • Write and use a system of equations and/or inequalities to solve a real world problem. Recognize that the equations and inequalities represent the constraints of the problem. Use the Objective Equation and the Corner Principle to determine the solution to the problem.	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.1, 6.2, 6.3, 6.4, 6.5, 7.1, 7.2, 7.3, 7.5, 8.5, 8.6		1.9 (3-1,2,6)		1.9 (3-1,2,6)	
A-CED.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.* • Solve multi-variable formulas or literal equations, for a specific variable.	3.7		1.2 (1-3)		1.2 (1-3)	
Mathematics » High School: Algebra » Reasoning with Equations & Inequalities						
Understand solving equations as a process of reasoning and explain the reasoning.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

A-REI.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. • Assuming an equation has a solution, construct a convincing argument that justifies each step in the solution process. Justifications may include the associative, commutative, and division properties, combining like terms, multiplication by 1, etc.	1.3, 1.4, 1.5, 3.1, 3.2, 3.3, 3.4, 3.7	2.5 (2-5)	1.1 (1-2,3,4), 1.2 (1-3)		1.1 (1-2,3,4), 1.2 (1-3)	
A-REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. • Solve simple rational and radical equations in one variable and provide examples of how extraneous solutions arise.	11.1, 12.3		4.4 (7-6) 4.6 (9-6)		4.4 (7-6) 4.6 (9-6)	
Solve equations and inequalities in one variable.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

	Alg. I	Geo.	Alg. II A	Alg. II B	Alg. II	Pre-Calc.
A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. • Solve linear equations in one variable, including coefficients represented by letters. • Solve linear inequalities in one variable, including coefficients represented by letters.	1.3, 1.4, 1.5, 3.1, 3.2, 3.3, 3.4, 3.7, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.1, 6.2, 6.3, 6.4	throughout	1.1 (1-2,3,4) Used throughout		1.1 (1-2,3,4) Used throughout	throughout
A-REI.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. (Transform a quadratic equation written in standard form to an equation in vertex form (x - p) = q 2 by completing the square. Derive the quadratic formula by completing the square on the standard form of a quadratic equation.) 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 $a \pm bi$ for real numbers a and b. (Solve quadratic equations in one variable by simple inspection, taking the square root, factoring, and completing the square. Understand why taking the square root of both sides of an equation yields two solutions. Use the quadratic formula to solve any quadratic equation, recognizing the formula produces all complex solutions. Write the solutions in the form a ± bi , where a and b are real numbers. Explain how complex solutions affect the graph of a quadratic equation.)	a. 12.4 b. 9.1, 9.3, 9.5, 9.7, 10.5, 10.6, 12.4,		2.5 (5-5), 2.7 (5-8)		2.5 (5-5), 2.7 (5-8)	

Mathematics » High School: Algebra » Reasoning with Equations & Inequalities

Solve systems of equations.	Alg. I	Geo.	Alg. II A	Alg. II B	Alg. II	Pre-Calc.

A-REI.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. • Solve systems of equations using the elimination method (sometimes called linear combinations). • Solve a system of equations by substitution (solving for one variable in the first equation and substitution it into the second equation).	a. 7.3 b. 7.2		1.9 (3-2)		1.9 (3-2)	
A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. • Solve systems of equations using graphs.	7.1		1.9 (3-1)		1.9 (3-1)	
A-REI.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 $x^2 + y^2 = 3$. • Solve a system containing a linear equation and a quadratic equation in two variables (conic sections possible) graphically and symbolically.	I do not do this, but I could add it to 9.3.		I do not do this, but could add in unit 2.		**Add to unit 2?**	
Solve systems of equations.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

A-REI.8. (+) Represent a system of linear equations as a single matrix equation in a vector variable. • Write a system of linear equations as a single matrix equation.			1.9 (3-6)		1.9 (3-6)	
A-REI.9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater). • Find the inverse of the coefficient matrix in the equation, if it exits. Use the inverse of the coefficient matrix to solve the system. Use technology for matrices with dimensions 3 by 3 or greater. • Find the dimension of matrices. • Understand when matrices can be multiplied. • Understand that matrix multiplication is not commutative. • Understand the concept of an identity matrix. • Understand why multiplication by the inverse of the coefficient matrix yields a solution to the system (if it exists).			1.9 (3-6) only used to solve systems		1.9 (3-6) only used to solve systems	Need to add
Represent and solve equations and inequalities graphically.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). • Understand that all solutions to an equation in two variables are contained on the graph of that equation.	4.2, 6.5, 8.5, 8.6, 9.3		1.9 (3-6) only used to solve systems		1.9 (3-6) only used to solve systems	
A-REI.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. • Explain why the intersection of y = f(x) and y = g(x) is the solution of f(x) = g(x) for any combination of linear, polynomial, rational, absolute value, exponential, and logarithmic functions. Find the solution(s) by: 1. Using technology to graph the equations and determine their point of intersection 2. Using tables of values 3. Using successive approximations that become closer and closer to the actual value	7.1, 7.6		1.9 (3-1) Linear only		1.9 (3-1) Linear only	
A-REI.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. • Graph the solutions to a linear inequality in two variables as a half-plane, excluding the boundary for non-inclusive inequalities. • Graph the solution set to a system of linear inequalities in two variables as the intersection of their corresponding half-planes.	6.5, 7.6		1.5 (2-2)		1.5 (2-2)	

Mathematics » High School: Functions » Interpreting Functions						
Understand the concept of a function and use function notation.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
F-IF.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. If *f* is a function and *x* is an element of its domain, then *f*(*x*) denotes the output of *f* corresponding to the input *x*. The graph of *f* is the graph of the equation *y* = *f*(*x*). • Use the definition of a function to determine whether a relationship is a function given a table, graph or words. • Given the function f(x), identify x as an element of the domain, the input, and f(x) is an element in the range, the output. • Know that the graph of the function, f, is the graph of the equation y=f(x).	1.7, 4.8, 8.5, 8.6, 9.3, 11.8,12.1		1.4 (2-1)		1.4 (2-1)	
F-IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. • When a relation is determined to be a function, use f(x) notation. • Evaluate functions for inputs in their domain. • Interpret statements that use function notation in terms of the context in which they are used.	1.7, 4.8, 8.5, 8.6, 9.3, 11.8, 12.1		1.4 (2-1)		1.4 (2-1)	
F-IF.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1. • Recognize that sequences, sometimes defined recursively, are functions whose domain is a subset of the set of integers.				2.6 (11-1) 2.7 (11-2,3) 2.8 (11-2,3)	6.6 (11-1) 6.7 (11-2,3) 6.8 (11-2,3)	
Interpret functions that arise in applications in terms of the context.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

F-IF.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*. • Given a function, identify key features in graphs and tables including: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. • Given the key features of a function, sketch the graph.	1.7, 4.8, 8.5, 8.6, 9.3, 11.8, 12.1		1.5 (2-2) 1.7 (2-5) 1.9 (3-1) 2.1 (5-1) 2.2 (5-2), 2.3 (5-3) 4.2 (6-2)		1.5 (2-2) 1.7 (2-5) 1.9 (3-1) 2.1 (5-1) 2.2 (5-2), 2.3 (5-3) 4.2 (6-2)	
F-IF.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 n engines in a factory, then the positive integers would be an appropriate domain for the function.* • Given the graph of a function, determine the practical domain of the function as it relates to the numerical relationship it describes.	1.7, 4.8, 8.5, 8.6, 9.3, 11.8, 12.1		1.6 (2-4)		1.6 (2-4)	
F-IF.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. • Calculate the average rate of change over a specified interval of a function presented symbolically or in a table. • Estimate the average rate of change over a specified interval of a function from the function's graph. • Interpret, in context, the average rate of change of a function over a specified interval.	1.7, 4.8, 8.5, 8.6, 9.3, 11.8, 12.1		1.5 (2-2), 2.1 (5-1), 3.1 (8-1)		1.5 (2-2), 2.1 (5-1), 3.1 (8-1)	
Mathematics » High School: Functions » Interpreting Functions						
Analyze functions using different representations.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

F-IF.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. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	a.4.2, 9.3 b. Need to add this c. Need to add this d. higher level e. 8.5, 8.6		a. 1.5 (2-2) 2.2 (5-2), 2.3 (5-3) b.1.7 (2-5) c. 4.2 (6-2) d. 4.7 (9-3) e. exp/log 3.1 (8-1), 3.7 (8-3)		a. 1.5 (2-2) 2.2 (5-2), 2.3 (5-3) b.1.7 (2-5) c. 4.2 (6-2) d. 4.7 (9-3) e. exp/log 3.1 (8-1), 3.7 (8-3)	
F-IF.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 = (1.2)t/10, and classify them as representing exponential growth or decay.	a. 10.4, 12.4 b. 8.5, 8.6		a. 2.5 (5-5) 4.2 (6-2) b.3.1 (8-1)		a. 2.5 (5-5) 4.2 (6-2) b.3.1 (8-1)	
F-IF.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.* • Compare the key features of two functions represented in different ways. For example, compare the end behavior of two functions, one of which is represented graphically and the other is represented symbolically.	1.7, 4.8, 8.5, 8.6, 9.3, 11.8, 12.1		1.5 (2-2) 2.2 (5-2), 2.3 (5-3), 4.2 (6-2)		1.5 (2-2) 2.2 (5-2), 2.3 (5-3), 4.2 (6-2)	
Mathematics » High School: Functions » Building Functions						
Build a function that models a relationship between two quantities.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

F-BF.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. (From context, write an explicit expression, define a recursive process, or describe the calculations needed to model a function between two quantities.) 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.* (Combine standard function types, such as linear and exponential, using arithmetic operations.) 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.*	I don't do any of this specifically.		b and c 3.5 (7-6)	a. 2.6 2.7 (11-1, 2, 3)	a. 6.6,7 (11-1,2,3) b/c.3.5 (7-6)	
F-BF.2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. • Write arithmetic sequences recursively and explicitly, use the two forms to model a situation, and translate between the two forms. • Write geometric sequences recursively and explicitly, use the two forms to model a situation, and translate between the two forms. • Understand that linear functions are the explicit form of recursively-defined arithmetic sequences and that exponential functions are the explicit form of recursively-defined geometric sequences.				2.6 (11-1) 2.7 (11-2,3) 2.8 (11-2, 3)	6.6 (11-1) 6.7 (11-2,3) 6.8 (11-2, 3)	
Build new functions from existing functions.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

F-BF.3. Identify the effect on the graph of replacing *f*(*x*) by *f*(*x*) + *k*, *kf*(*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. • Identify, through experimenting with technology, the effect on the graph of a function by replacing f(x) with f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative). • Given the graphs of the original function and a transformation, determine the value of (k). • Recognize even and odd functions from their graphs and equations.	This can easily be added to: 1.7, 4.8, 8.5, 8.6, 9.3, 11.8, 12.1		1.8 (2-6)		1.8 (2-6)	
F-BF.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.* (Solve a function for the dependent variable and write the inverse of a function by interchanging the values of the dependent and independent variables.) b. (+) Verify by composition that one function is the inverse of another. (Verify that one function is the inverse of another by illustrating that f-1(f(x)) = f(f-1(x)) = x.) 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. (Find the inverse of a function that is not one-to-one by restricting the domain.)	a. 11.3 b. Advanced c. Advanced d. Advanced		a. 3.6 (7-7) c. 3.6 (7-7) d.3.6 (7-7)		a. 3.6 (7-7) c. 3.6 (7-7) d.3.6 (7-7)	
F-BF.5. (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. • Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.			3.7 (8-3, 6), 3.9 (8-5)		3.7 (8-3, 6), 3.9 (8-5)	
Mathematics » High School: Functions » Linear, Quadratic, & Exponential Models*						
Construct and compare linear, quadratic, and exponential models and solve problems.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

F-LE.1. Distinguish between situations that can be modeled with linear functions and with exponential functions. (Given a contextual situation, describe whether the situation in question has a linear pattern of change or an exponential pattern of change.) a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. (Show that linear functions change at the same rate over time and that exponential functions change by equal factors over time.) b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. (Describe situations where one quantity changes at a constant rate per unit interval as compared to another.) c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. (Describe situations where a quantity grows or decays at a constant percent rate per unit interval as compared to another.)	a. 3.7, 4.8, 8.5, 8.6 b. I don't think I do this. c. 8.5, 8.6		3.1 (8-1)		3.1 (8-1)	
F-LE.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	3.7, 4.8, 8.5, 8.6		1.6 (2-4), 3.1 (8-1)	2.6 (11-1) 2.8 (11-2, 3)	6.6 (11-1) 6.8 (11-2,3)	

F-LE.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. • Make the connection, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or any other polynomial function.	1.7, 4.8, 8.5, 8.6, 9.3, 11.8, 12.1 (Needs work on making the connection)		1.1 (8-1) (also need to show this connection more)		1.1 (8-1) Throughout units 1-3	
F-LE.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. • Express logarithms as solutions to exponential functions using bases 2, 10, and e. • Use technology to evaluate a logarithm.			3.7 (8-3, 6)		3.7 (8-3, 6)	
Interpret expressions for functions in terms of the situation they model.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
F-LE.5. Interpret the parameters in a linear or exponential function in terms of a context. • Based on the context of a situation, explain the meaning of the coefficients, factors, exponents, and/or intercepts in a linear or exponential function.	1.7, 4.8, 8.5, 8.6, 9.3, 11.8, 12.1		1.6 (2-4), 3.1 (8-1)		1.6 (2-4), 3.1 (8-1)	

Mathematics » High School: Functions » Trigonometric Functions						
Extend the domain of trigonometric functions using the unit circle.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
F-TF.1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. • Know that if the length of an arc subtended by an angle is the same length as the radius of the circle, then the measure of the angle is 1 radian. • Know that the graph of the function, f, is the graph of the equation y=f(x).				4.3 (13-3)	8.3 (13-3	
F-TF.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. • Explain how radian measures of angles rotated counterclockwise in a unit circle are in a one-to-one correspondence with the nonnegative real numbers, and that angles rotated clockwise in a unit circle are in a one-to-one correspondence with the non-positive real numbers.				4.2 (13-2) 4.3 (13-3)	8.2 (13-2) 8.3 (13-3	
F-TF.3. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosines, and tangent for x, $\pi + x$, and $2\pi – x$ in terms of their values for x, where x is any real number. • Use 30º-60º-90º and 45º-45º-90º triangles to determine the values of sine, cosine, and tangent.				4.4 (13- 4,5,6)	8.4 (13- 4,5,6)	
F-TF.4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions. • Use the unit circle and periodicity to find values of sine, cosine, and tangent for any value of θ, such as $\pi+ \theta$, $2\pi +\theta$, where $\theta$is a real number. • Use the values of the trigonometric functions derived from the unit circle to explain how trigonometric functions repeat themselves. • Use the unit circle to explain that f(x) is an even function if f(-x) = f(x), for all x, and an odd function if f(-x) = -f(x). Also know that an even function is symmetric about the y-axis.				a and b 4.5 (13- 4,5,6)	a and b 8.5 (13- 4,5,6)	

Model periodic phenomena with trigonometric functions.	Alg. I	Geo.	Alg. II A	Alg. II B	Alg. II	Pre-Calc.
F-TF.5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. • Use sine and cosine to model periodic phenomena such as the ocean's tide or the rotation of a Ferris wheel. • Given the amplitude; frequency; and midline in situations or graphs, determine a trigonometric function used to model the situation.				Identify only 4.1 (13-1)	Identify only 4.1 (13-1)	
F-TF.6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed. • Know that the inverse for a trigonometric function can be found by restricting the domain of the function so it is always increasing or decreasing.				4.8 (14-2)	4.8 (14-2	
F-TF.7. (+) 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. • Use the inverse of trigonometric functions to solve equations that arise in real-world contexts. • Use technology to evaluate the solutions to the inverse trigonometric functions, and interpret their meaning in terms of the context.				4.8 (14-2)	4.8 (14-2)	
Prove and apply trigonometric identities.	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
F-TF.8. Prove the Pythagorean identity sin2(θ) + cos2(θ) = 1 and use it to find sin(θ), cos(θ), or tan(θ) given sin(θ), cos(θ), or tan(θ) and the quadrant of the angle. • Use the unit circle to prove the Pythagorean identity sin2(θ) + cos2(θ) = 1. • Given the value of the sin(θ) or cos(θ), use the Pythagorean identity sin2(θ) + cos2(θ) = 1 to calculate other trigonometric ratios.				4.7 (14-1)	4.7 (14-1)	
F-TF.9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems. • Prove the addition and subtraction formulas sin(ά±β), cos(ά±β), and tan(ά±β). • Use the addition and subtraction formulas to determine exact trigonometric values such as sin(75º) or cos(12).						

Mathematics » High School: Geometry » Congruence

Experiment with transformations in the plane	Alg. I	Geo.	Alg. II A	Alg. II B	Alg. II	Pre-Calc.

G.CO.1. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.		1.3 (1-3), 8.1 (11-1), 2. 7 (3-1), 1.1 (1-1)				
G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch). • Use various technologies such as transparencies, geometry software, interactive whiteboards, and digital visual presenters to represent and compare rigid and size transformations of figures in a coordinate plane. Comparing transformations that preserve distance and angle to those that do not. • Describe and compare function transformations on a set of points as inputs to produce another set of points as outputs, to include translations and horizontal and vertical stretching.		Unit 4 Add tech. examples				
G-CO.3. Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. • Describe the rotations and reflections of a rectangle, parallelogram, trapezoid, or regular polygon that maps each figure onto itself.		Need to add				
G-CO.4. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. • Using previous comparisons and descriptions of transformations, develop and understand the meaning of rotations, reflections, and translations based on angles, circles, perpendicular lines, parallel lines, and line segments.		?				
G-CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. • Transform a geometric figure given a rotation, reflection, or translation using graph paper, tracing paper, or geometric software. • Create sequences of transformations that map a geometric figure on to itself and another geometric figure.		Unit 4				
Understand congruence in terms of rigid motions	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

G-CO.6. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. • Use descriptions of rigid motion and transformed geometric figures to predict the effects rigid motion has on figures in the coordinate plane. • Knowing that rigid transformations preserve size and shape or distance and angle, use this fact to connect the idea of congruency and develop the definition of congruent.		Unit 4				
G-CO.7. Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. • Use the definition of congruence, based on rigid motion, to show two triangles are congruent if and only if their corresponding sides and corresponding angles are congruent.		3.3 (4-3)				
G-CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. • Use the definition of congruence, based on rigid motion, to develop and explain the triangle congruence criteria; ASA, SSS, and SAS.		3.3 (4-3)				
Prove geometric theorems	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

G-CO.9. Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints. • Prove theorems pertaining to lines and angles. • Prove vertical angles are congruent. • Prove when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angels are congruent. • Prove points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.		2.6 (2-6), 2.7 (3-1, 2, 3)5.1 (5-1)				
G-CO.10. Prove theorems about triangles. Theorems include: 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. • Prove theorems pertaining to triangles. • Prove the measures of interior angles of a triangle have a sum of 180º. • Prove base angles of isosceles triangles are congruent. • Prove the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length. • Prove the medians of a triangle meet at a point.		3.2 (4-2), 5.1 (5-2, 3)				
G-CO.11. Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals. • Prove theorems pertaining to parallelograms. • Prove opposite sides are congruent. • Prove opposite angles are congruent. • o Prove the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.		7.3 (6-2, 3)				
Make geometric constructions	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

G-CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line. • Copy a segment • Copy an angle. • Bisect a segment • Bisect an angle • Construct perpendicular lines, including the perpendicular bisector of a line segment. • Construct a line parallel to a given line through a point not on the line.		1.4 (1-2, 3) 2.8 (3-3,4)				
G-CO.13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. • Construct an equilateral triangle so that each vertex of the equilateral triangle is on the circle. • Construct a square so that each vertex of the square is on the circle. • Construct a regular hexagon so that each vertex of the regular hexagon is on the circle.		Need to add				

Mathematics » High School: Geometry » Similarity, Right Triangles, & Trigonometry						
Understand similarity in terms of similarity transformations	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
G-SRT.1. Verify experimentally the properties of dilations given by a center and a scale factor: a. 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. (Given a center and a scale factor, verify experimentally, that when dilating a figure in a coordinate plane, a segment of the pre-image that does not pass through the center of the dilation, is parallel to its image when the dilation is performed. However, a segment that passes through the center remains unchanged.) b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor. (Given a center and a scale factor, verify experimentally, that when performing dilations of a line segment, the pre-image, the segment which becomes the image is longer or shorter based on the ratio given by the scale factor.)		4.3 (12-7)				
G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. • Use the idea of dilation transformations to develop the definition of similarity. • Given two figures determine whether they are similar and explain their similarity based on the equality of corresponding angles and the proportionality of corresponding sides.		3.5 (7-2) 3.6 (7-3)				
G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. • Use the properties of similarity transformations to develop the criteria for proving similar triangles; AA.		3.6 (7-3)				
Prove theorems involving similarity	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

G-SRT.4. Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity. • Use AA, SAS, SSS similarity theorems to prove triangles are similar. • Use triangle similarity to prove other theorems about triangles • Prove a line parallel to one side of a triangle divides the other two proportionally, and its converse • Prove the Pythagorean Theorem using triangle similarity.		3.6 (7-3)				
G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. • Using similarity theorems, prove that two triangles are congruent. • Prove geometric figures, other than triangles, are similar and/or congruent.		3.6 (7-3)				
Define trigonometric ratios and solve problems involving right triangles	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
G-SRT.6. 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. • Using a corresponding angle of similar right triangles, show that the relationships of the side ratios are the same, which leads to the definition of trigonometric ratios for acute angles.		5.6 (8-2)				
G-SRT.7. Explain and use the relationship between the sine and cosine of complementary angles. • Explore the sine of an acute angle and the cosine of its complement and determine their relationship.		5.6 (8-2)				
G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. • Apply both trigonometric ratios and Pythagorean Theorem to solve application problems involving right triangles.		5.4 (5-7) 5.6 (8-3,4)				
Apply trigonometry to general triangles	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

G-SRT.9. (+) Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side. • For a triangle that is not a right triangle, draw an auxiliary line from a vertex, perpendicular to the opposite side and derive the formula, A=½ ab sin (C), for the area of a triangle, using the fact that the height of the triangle is, h=a sin(C).		5.9 (own)				
G-SRT.10. (+) Prove the Laws of Sines and Cosines and use them to solve problems. • Using trigonometry and the relationship among sides and angles of any triangle, such as sin(C)=(h/a) , prove the Law of Sines. • Using trigonometry and the relationship among sides and angles of any triangle and the Pythagorean Theorem to prove the Law of Cosines. • Use the Laws of Sines to solve problems. • Use the Laws of Cosines to solve problems.		5.7 (8-5) 5.8 (8-5)				
G-SRT.11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces). • Understand and apply the Law of Sines and the Law of Cosines to find unknown measures in right triangles. • Understand and apply the Law of Sines and the Law of Cosines to find unknown measures in non-right triangles.		5.7 (8-5) 5.8 (8-5)				
Mathematics » High School: Geometry » Circles						

Understand and apply theorems about circles	Alg. I	Geo.	Alg. II A	Alg. II B	Alg. II	Pre-Calc.
G-C.1. Prove that all circles are similar. • Using the fact that the ratio of diameter to circumference is the same for circles, prove that all circles are similar.		Need to add				
G-C.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. • Using definitions, properties, and theorems, identify and describe relationships among inscribed angles, radii, and chords. Include central, inscribed, and circumscribed angles. • Understand that inscribed angles on a diameter are right angles. • Understand that the radius of a circle is perpendicular to the tangent where the radius intersects the circle.		8.1 (11-1) 8.2 (11-2) 8.4 (11-4)				
G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle. • Construct inscribed circles of a triangle. • Construct circumscribed circles of a triangle. • Using definitions, properties, and theorems, prove properties of angles for a quadrilateral inscribed in a circle.		Need to add				
G-C.4. (+) Construct a tangent line from a point outside a given circle to the circle. • Construct a tangent line from a point outside a given circle to the circle.						
Find arc lengths and areas of sectors of circles	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
G-C.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. • Use similarity to derive the fact that the length of the arc intercepted by an angle is proportional to the radius, identifying the constant of proportionality as the radian measure of the angle. • Find the arc length of a circle. • Using similarity, derive the formula for the area of a sector. • Find the area of a sector in a circle.		8.3 (11-3)				

Mathematics » High School: Geometry » Expressing Geometric Properties with Equations						
Translate between the geometric description and the equation for a conic section	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
G-GPE.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. • Use the Pythagorean Theorem to derive the equation of a circle, given the center and the radius. • Given an equation of a circle, complete the square to find the center and radius of a circle.		8.6 (11-7) no complete square		2.2 (10-3)	6.2 (10-3)	
G-GPE.2. Derive the equation of a parabola given a focus and directrix. • Given a focus and directrix, derive the equation of a parabola. • Given a parabola, identify the vertex, focus, directrix, and axis of symmetry, noting that every point on the parabola is the same distance from the focus and the directrix.				2.5 (10-2)	6.5 (10-2)	
G-GPE.3. (+) 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. • Given the foci, derive the equation of an ellipse, noting that the sum of the distances from the foci to any fixed point on the ellipse is constant, identifying the major and minor axis. • Given the foci, derive the equation of a hyperbola, noting that the absolute value of the differences of the distances form the foci to a point on the hyperbola is constant, and identifying the vertices, center, transverse axis, conjugate axis, and asymptotes.				2.3 (10-4) 2.4 (10-5)	6.3 (10-4) 6.4 (10-5)	

Use coordinates to prove simple geometric theorems algebraically	Alg. I	Geo.	Alg. II A	Alg. II B	Alg. II	Pre-Calc.
G-GPE.4. Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2). • Use coordinate geometry to prove geometric theorems algebraically; such as prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).		7.6 (6-2/6)				
G-GPE.5. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). • Using slope, prove lines are parallel or perpendicular • Find equations of lines based on certain slope criteria such as; finding the equation of a line parallel or perpendicular to a given line that passes through a given point.	4.2, 4.3, 4.5, 4.6, 4.7, 4.8, 5.1, 5.2, 5.3, 5.5, 5.6	7.6 (6-2/6)	1.5 (2-2)		1.5 (2-2)	
G-GPE.6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio. • Given two points, find the point on the line segment between the two points that divides the segment into a given ratio.		1.8 (1-6)				
G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. • Use coordinate geometry and the distance formula to find the perimeters of polygons and the areas of triangles and rectangles.		Need to add				

Mathematics » High School: Geometry » Geometric Measurement and Dimension						
Explain volume formulas and use them to solve problems	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
G-GMD.1. 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. • Explain the formulas for the circumference of a circle and the area of a circle by determining the meaning of each term or factor. • Explain the formulas for the volume of a cylinder, pyramid and cone by determining the meaning of each term or factor.		6.1 (9-1) 6.2 (9-1)				
G-GMD.2. (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. • Using Cavalieri's Principle, provide informal arguments to develop the formulas for the volume of spheres and other solid figures.		6.11 (10-6, 7), 6.12 (10-8)				
G-GMD.3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. • Solve problems using volume formulas for cylinders, pyramids, cones, and spheres.		6.11 (10-6, 7)				
Visualize relationships between two-dimensional and three-dimensional objects	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
G-GMD.4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. • Given a three- dimensional object, identify the shape made when the object is cut into cross-sections. • When rotating a two- dimensional figure, such as a square, know the three-dimensional figure that is generated, such as a cylinder. Understand that a cross section of a solid is an intersection of a plane (two-dimensional) and a solid (three-dimensional).		6.6 (10-1) 6.7 (Int 2)				

Mathematics » High School: Geometry » Modeling with Geometry						
Apply geometric concepts in modeling situations	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

G-MG.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).		6.6 (10-1)				
G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot). • Use the concept of density when referring to situations involving area and volume models, such as persons per square mile.		Need to add				
G-MG.3. 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) • Solve design problems by designing an object or structure that satisfies certain constraints, such as minimizing cost or working with a grid system based on ratios (i.e., The enlargement of a picture using a grid and ratios and proportions)		Unit 6 project				
Mathematics » High School: Statistics & Probability » Interpreting Categorical & Quantitative Data						
Summarize, represent, and interpret data on a single count or measurement variable	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

S-ID.1. Represent data with plots on the real number line (dot plots, histograms, and box plots). • Construct dot plots, histograms and box plots for data on a real number line.	1.6, 2.1, 4.1, 6.6, 6.7			3.6 (own)	7.6 worksheets	
S-ID.2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. • Describe a distribution using center and spread. • Use the correct measure of center and spread to describe a distribution that is symmetric or skewed. • Identify outliers (extreme data points) and their effects on data sets. • Compare two or more different data sets using the center and spread of each.				3.7 (12-3), 3.8 (own)	7.7 (12-3), 7.8 (wksht)	
S-ID.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). • Interpret differences in different data sets in context. Interpret differences due to possible effects of outliers.				3.7 (12-3)	7.7 (12-3)	
S-ID.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. • Identify data sets as approximately normal or not. • Use the mean and standard deviation to fit it to a normal distribution where appropriate. • Use calculators, spreadsheets, and tables to estimate areas under the normal curve. • Interprets areas under a normal curve in context.				3.10 (12-7)	7.10 (12-7)	
Summarize, represent, and interpret data on two categorical and quantitative variables	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
S-ID.5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. • Create a two-way table from two categorical variables and read values from two way table. Interpret joint, marginal, and relative frequencies in context. • Recognize associations and trends in data from a two-way table.	I don't do this.			?		

S-ID.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. (Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values. Explain the meaning of the slope and y-intercept in context. Categorize data as exponential. Use algebraic methods and technology to fit an exponential function to the data. Use the function to predict values. Explain the meaning of the growth rate and y-intercept in context. Categorize data as quadratic. Use algebraic methods and technology to fit a quadratic function to the data. Use the function to predict values. Explain the meaning of the constant and coefficients in context.) b. Informally assess the fit of a function by plotting and analyzing residuals. (Calculate a residual. Create and analyze a residual plot.) c. Fit a linear function for a scatter plot that suggests a linear association. (Categorize data as linear or not. Use algebraic methods and technology to fit a linear function to the data. Use the function to predict values.)	4.1		1.6 (2-4), 2.1 (5-1), 3.1 (8-1), 4.1 (6-1)	3.12 (own)	1.6 (2-4), 2.1 (5-1), 3.1 (8-1), 4.1 (6-1)	
Interpret linear models	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
S-ID.7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. • Explain the meaning of the slope and y-intercept in context.	4.4, 4.5, 5.1, 5.2		1.5 (2-2), 1.6 (2-4)		1.5 (2-2), 1.6 (2-4)	

S-ID.8. Compute (using technology) and interpret the correlation coefficient of a linear fit. • Use a calculator or computer to find the correlation coefficient for a linear association. Interpret the meaning of the value in the context of the data.	I do not do this.		1.6 (2-4)		1.6 (2-4)	
S-ID.9. Distinguish between correlation and causation. • Explain the difference between correlation and causation.	5.4		I need to add this?	I need to add this?	Discuss during Scatterplots?	
Mathematics » High School: Statistics & Probability » Making Inferences & Justifying Conclusions						
Understand and evaluate random processes underlying statistical experiments	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

S-IC.1. Understand that statistics allows inferences to be made about population parameters based on a random sample from that population. • Explain in context the difference between values describing a population and a sample.				3.1 (12-5), 3.2 (Int 2)	7.1 (12-5), 7.2 (Int 2)	
S-IC.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? • Explain how well and why a sample represents the variable of interest from a population. • Demonstrate understanding of the different kinds of sampling methods. • Design simulations of random sampling: assign digits in appropriate proportions for events, carry out the simulation using random number generators and random number tables and explain the outcomes in context of the population and the known proportions.				1.1 (1-6), 3.2 (Int 2)	5.1 (1-6), 7.2 (Int 2	
Make inferences and justify conclusions from sample surveys, experiments, and observational studies	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

S-IC.3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. • Identify situations as either sample survey, experiment, or observational study. Discuss the appropriateness of each one's use in contexts with limiting factors. • Design or evaluate sample surveys, experiments and observational studies with randomization. Discuss the importance of randomization in these processes.				3.1 (12-5), 3.4 (own)	5.1 (12-5), 5.4 (own	
S-IC.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. • Use sample means and sample proportions to estimate population values. • Conduct simulations of random sampling to gather sample means and sample proportions. Explain what the results mean about variability in a population and use results to calculate margins of error for these estimates.				3.1 (12-5)	5.1 (12-5)	
S-IC.5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. • Evaluate effectiveness and differences in two treatments based on data from randomized experiments. Explain in context. • Use simulations to generate data simulating application of two treatments. Use results to evaluate significance of differences.				1.10 (12-6), 3.4 (own)	5.10 (12-6), 7.4 (own)	
S-IC.6. Evaluate reports based on data. • Read and explain in context data from outside reports.				Need to add	**Add in data analysis unit 7**	
Mathematics » High School: Statistics & Probability » Conditional Probability & the Rules of Probability						

Understand independence and conditional probability and use them to interpret data	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
S-CP.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”). • Define a sample space and events within the sample space. Identify subsets from sample space given defined events, including unions, intersections and complements of events.				1.2 (1-6)	5.2 (1-6)	
S-CP.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. • Identify two events as independent or not. Explain properties of Independence and Conditional Probabilities in context and simple English.				1.6 (9-7)	5.6 (9-7)	
S-CP.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. • Define and calculate conditional probabilities. Use the Multiplication Principal to decide if two events are independent and to calculate conditional probabilities.				1.8 (12-2)	5.8 (12-2)	

S-CP.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. • Construct and interpret two-way frequency tables of data for two categorical variables. Calculate probabilities from the table. Use probabilities from the table to evaluate independence of two variables.				1.8 (12-2)	5.8 (12-2)	
S-CP.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. • Recognize and explain the concepts of independence and conditional probability in everyday situations.				1.8 (12-2)	5.8 (12-2)	

Use the rules of probability to compute probabilities of compound events in a uniform probability model	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
S-CP.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. • Calculate conditional probabilities using the definition: ―the conditional probability of A given B as the fraction of B's outcomes that also belong to A‖. Interpret the probability in context.				1.8 (12-2)	5.8 (12-2)	
S-CP.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. • Identify two events as disjoint (mutually exclusive). Calculate probabilities using the Addition Rule. Interpret the probability in context.				1.6 (9-7)	5.6 (9-7)	
S-CP.8. (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model. • Calculate probabilities using the General Multiplication Rule. Interpret in context.				1.6 (9-7)	5.6 (9-7)	
S-CP.9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems. • Identify situations as appropriate for use of a permutation or combination to calculate probabilities. Use permutations and combinations in conjunction with other probability methods to calculate probabilities of compound events and solve problems.				1.3 (6-7), 1.4 (6-7)	5.3 (6-7), 5.4 (6-7)	

Mathematics » High School: Statistics & Probability » Using Probability to Make Decisions						
Calculate expected values and use them to solve problems	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**
S-MD.1. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions. • Understand what a random variable is and the properties of a random variable. • Given a probability situation (theoretical or empirical), be able to define a random variable, assign probabilities to its sample space, create a table and graph of the distribution of the random variable.				1.7 (12-1)	5.7 (12-1)	
S-MD.2. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution. • Calculate and interpret in context the expected value of a random variable.	Advanced			1.9 (Int 3)	5.9 (Int 3)	
S-MD.3. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes. • Develop a theoretical probability distribution and find the expected value.				1.10 (12-6)	5.10(12-6)	
S-MD.4. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households? • Develop an empirical probability distribution and find the expected value.				1.1 (1-6)	5.1 (1-6)	
Use probability to evaluate outcomes of decisions	**Alg. I**	**Geo.**	**Alg. II A**	**Alg. II B**	**Alg. II**	**Pre-Calc.**

S-MD.5. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. (Set up a probability distribution for a random variable representing payoff values in a game of chance.) a. Find the expected payoff for a game of chance. For example, find the expected winnings from a state lottery ticket or a game at a fast-food restaurant. b. Evaluate and compare strategies on the basis of expected values. For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.				1.9 (Int 3)	5.9 (Int 3	
S-MD.6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator). • Make decisions based on expected values. Use expected values to compare long term benefits of several situations.				1.1 (1-6), 1.9 (Int 3)	5.1 (1-6), 5.9 (Int 3)	
S-MD.7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game). • Explain in context decisions made based on expected values.				throughout Unit 1	Unit 5(all)	