Domain	Cluster Statement		Standard	Keep or Propose Change	Type of Change: Removed, Broken Up, Re-written	Quality Standards Rule	Reason for Proposed Change
The Complex Number System (N. CN)	Perform arithmetic operations with complex numbers.	N.CN.3	N.CN.3 (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.	Keep			
The Complex Number System (N. CN)	(+) Represent complex numbers and their operations on the complex plane.	N.CN.4	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.	Keep			
The Complex Number System (N. CN)	(+) Represent complex numbers and their operations on the complex plane.	N.CN.5	N.CN.5 (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation.	Keep			
The Complex Number System (N. CN)	(+) Represent complex numbers and their operations on the complex plane.	N.CN.6	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.	Keep			
The Complex Number System (N. CN)	(+) Represent complex numbers and their operations on the complex plane.	N.CN.8	N.CN.8 (+) Extend polynomial identities to the complex numbers. For example, rewrite x^2 + 4 as (x + 2i)(x - 2i).	Keep	Moved from Algebra to Year4	1,2	
The Complex Number System (N. CN)	(+) Represent complex numbers and their operations on the complex plane.	N.CN.9	N.CN.9 (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	Keep	Moved from Algebra to Year4	1,2	
Vector and Matrix Quantities (N.VM)	(+) Represent and model with vector quantities.	N.VM.1	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)~~.	Change	Get rid of example	3	
Vector and Matrix Quantities (N.VM)	(+) Represent and model with vector quantities.	N.VM.2	N.VM.2 (+) ~~Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.~~**Write a vector in component form**.	Change	Clarify	3	
Vector and Matrix Quantities (N.VM)	(+) Represent and model with vector quantities.	N.VM.3	N.VM.3 (+) Solve problems involving velocity and other quantities that can be represented by vectors.	Keep			

Domain	Cluster Statement		Standard	Keep or Propose Change	Type of Change: Removed, Broken Up, Re-written	Quality Standards Rule	Reason for Proposed Change
Vector and Matrix Quantities (N.VM)	(+) Perform operations on vectors.	N.VM.4	N.VM.4 (+) Add and subtract vectors. 4a. (+) 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. 4b. (+) Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. 4c. (+) Understand vector subtraction v – w as v + (–w), where –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.	Keep			
Vector and Matrix Quantities (N.VM)	(+) Perform operations on vectors.	N.VM.5	N.VM.5 (+) Multiply a vector by a scalar. 5a. (+) Represent scalar multiplication graphically by scaling vectors and/or ~~possibly~~ reversing their direction; perform scalar multiplication component-wise, ~~e.g., as c(vx, vy) = (cvx, cvy)~~. 5b. (+) Compute the magnitude of a scalar multiple cv ~~using ||cv|| = |c|v~~. Compute the direction of cv knowing that when $\|c\|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).	Change	Example not helpful	3	
Vector and Matrix Quantities (N.VM)	(+) Perform operations on matrices and use matrices in applications.	N.VM.6	N.VM.6 (+) Use matrices to represent and manipulate data, ~~e.g., to represent payoffs or incidence relationships in a network~~.	Change	Example not helpful	3	
Vector and Matrix Quantities (N.VM)	(+) Perform operations on matrices and use matrices in applications.	N.VM.7	N.VM.7 (+) Multiply matrices by scalars to produce new matrices, ~~e.g., as when all of the payoffs in a game are doubled.~~	Change	Example not helpful	3	
Vector and Matrix Quantities (N.VM)	(+) Perform operations on matrices and use matrices in applications.	N.VM.8	N.VM.8 (+) Add, subtract, and multiply matrices of appropriate dimensions.	Keep			
Vector and Matrix Quantities (N.VM)	(+) Perform operations on matrices and use matrices in applications.	N.VM.9	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.	Change	Clarify	3	
Vector and Matrix Quantities (N.VM)	(+) Perform operations on matrices and use matrices in applications.	N.VM.10	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. **Discover that t**he determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.	Change	Clarify the intent of the standard	3	

Domain	Cluster Statement		Standard	Keep or Propose Change	Type of Change: Removed, Broken Up, Re-written	Quality Standards Rule	Reason for Proposed Change
Vector and Matrix Quantities (N.VM)	(+) Perform operations on matrices and use matrices in applications.	N.VM.11	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.	Keep			
Vector and Matrix Quantities (N.VM)	(+) Perform operations on matrices and use matrices in applications.	N.VM.12	N.VM.12 (+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.	Keep			
Arithmetic with Polynomials and Rational Expressions (A. APR)	Use polynomial identities to solve problems.	A.APR.5*	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. ~~(The Binomial Theorem can be proved by mathematical induction or by a combinatorial argument.)~~	Change	Moved from Algebra to Year4 and removed parenthetical comment.	1,2	
Arithmetic with Polynomials and Rational Expressions (A.APR)	Rewrite rational expressions.	A.APR.7*	A.APR.7 (+) ~~Understand~~ **Discover** 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.	Change	Moved from Algebra to Year4	1,2	
Reasoning with Equations and Inequalities (A.REI)	Solve systems of equations.	A.REI.8	A.REI.8 (+) Represent a system of linear equations as a single matrix equation in a vector variable.	Keep			
Reasoning with Equations and Inequalities (A.REI)	Solve systems of equations.	A.REI.9	A.REI.9 (+) ~~Find the inverse of a matrix (if it exists) and use it to solve systems of linear equations~~ **Use matrices to solve systems of linear equations** (using technology for matrices of dimension 3 × 3 or greater).	Change	Clarify	3	
Reasoning with Equations and Inequalities	**Solve inequalities**	**A.REI.10**	**A.REI.10 (+) Solve linear, quadratic, polynomial, and rational inequalities in two variables algebraically and graphically.**	**ADD**	**Added for Pre-Calc course material**	1	
Seeing Structure in Expressions (A.SSE)	Write expressions in equivalent forms to solve problems.	A.SSE.4	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. (Uses Modeling)	Change	Moved from Algebra to Year4		

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Seeing Structure in Expressions (A.SSE)	Write expressions in equivalent forms to solve problems.	A.SSE.5	**A.SSE.5 (+) Use summation notation to describe the sums in a series.**	ADD	Added for Pre-Calc course material	1	
Interpreting Functions (F.IF)	**Analyze functions using different representations.**	**F.IF.7**	**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. (Uses Modeling)** **7d. (+) Graph rational functions, identify zeros and vertical, horizontal, and slant asymptotes ~~when suitable factorizations are available~~, and ~~showing~~ determine end behavior.** **7e. (+) Graph exponential and logarithmic functions, showing relationships, intercepts and end behavior.** **7f. (+) Graph all trigonometric functions ~~including sine and cosine~~, showing key features and applying transformations. ~~period, midline, and amplitude.~~**	Change	Add, based on conversation with Algebra I and II group	1,2,3	
Building Functions (F.BF)	Build a function that models a relationship between two quantities.	F.BF.1	F.BF.1 **(+)** Write a function that describes a relationship between two quantities. (Uses Modeling) 1c. (+) Compose functions **in context**. ~~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.~~	Change	Clarify	3	
Building Functions (F.BF)	Build new functions from existing functions.	F.BF.4	F.BF.4 **(+)** Find inverse functions. 4b. (+) Verify by composition that one function is the inverse of another. 4c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. 4d. (+) Produce an invertible function from a non-invertible function by restricting the domain.	Keep			
Building Functions (F.BF)	Build new functions from existing functions.	F.BF.5	F.BF.5 (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	Keep			

Domain	Cluster Statement		Standard	Keep or Propose Change	Type of Change: Removed, Broken Up, Re-written	Quality Standards Rule	Reason for Proposed Change
Building Functions (F.BF)	Build new functions from existing functions.	F.BF.6	**F.BF.6 (+) Use reciprocal properties to develop definitions for cotangent, cosecant, and secant.**	ADD	Added for Pre-Calc course material	1	
Trigonometric Functions (F.TF)	Extend the domain of trigonometric functions using the unit circle.	F.TF.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, cosine, and tangent for pi-x, pi+x, and 2pi–x in terms of their values for x, where x is any real number.	Keep	Be sure to use the symbol for pi in the standard		
Trigonometric Functions (F.TF)	Extend the domain of trigonometric functions using the unit circle.	F.TF.4	F.TF.4 (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	Keep			
Trigonometric Functions (F.TF)	Model periodic phenomena with trigonometric functions.	F.TF.6	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.	Keep			
Trigonometric Functions (F.TF)	Model periodic phenomena with trigonometric functions.	F.TF.7	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. (Uses Modeling)	Keep			
Trigonometric Functions (F.TF)	Prove and apply trigonometric identities.	F.TF.9	F.TF.9 (+) Prove the addition and subtraction**, half-angle, and double-angle** formulas for sine, cosine, and tangent and use them to solve problems.	Change	Added for Pre-Calc course material	1	
Trigonometric Functions (F.TF)	Prove and apply trigonometric identities.	F.TF.10	**F.TF.10 (+) Use fundamental trigonometric identities. 10a. (+) Verify trigonometric identities 10b. (+) Evaluate trigonometric functions 10c. (+) Write equivalent trigonometric expressions and 10d. (+) Solve trigonometric equations.**	ADD	Added for Pre-Calc course material	1	
Similarity, Right Triangles, and Trigonometry (G. SRT)	(+) Apply trigonometry to general triangles.	G.SRT.9	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 **and use the formula to solve problems**.	Change	Add applcation	1	
Similarity, Right Triangles, and Trigonometry (G. SRT)	(+) Apply trigonometry to general triangles.	G.SRT. 10	G.SRT.10 (+) Prove the Laws of Sines and Cosines and use them to solve problems **involving right and non-right triangles.**	Change	Remove redundancy by combining G.SRT. 10 and G.SRT.11	3	
~~Similarity, Right Triangles, and Trigonometry (G. SRT)~~	~~(+) Apply trigonometry to general triangles.~~	~~G.SRT. 11~~	~~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).~~	~~Keep~~			
Expressing Geometric Properties with Equations (G. GPE)	Translate between the geometric description and the equation for a conic section.	G.GPE.2	G.GPE.2 ~~Derive the equation of a parabola given a focus and directrix.~~	Moved from Geometry to 4th year	Replaced by the G. GPE.3 rewrite below	1	

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Expressing Geometric Properties with Equations (G. GPE)	Translate between the geometric description and the equation for a conic section.	G.GPE.3	~~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.~~ **G.GPE.3 (+) Analyze conic sections using equations and graphs. 3a. (+) Given a quadratic equation of the form Ax^2 +Bxy+Cy^2 + Dx + Ey + F =0 (where B = 0), determine whether the graph is a circle, parabola, ellipse, or hyperbola; 3b. (+) Use the process of completing the square to put the equation in standard form; and 3c. (+) When given a graph, be able to write the equation of the conic section, and vice versa.**	Change (from California standards)	Completely rewritten to better reflect the expectations of a high school student.	1	
Geometric Measurement and Dimension (G.GMD)	Explain volume formulas and use them to solve problems.	G.GMD.2	~~G.GMD.2 (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.~~	Move to Geometry and combine with G.GMD.1	Moved to Geometry, but they should add sphere to their list.	2	
Conditional Probability and the Rules of Probability (S.CP)	Use the rules of probability to compute probabilities of compound events in a uniform probability model.	S.CP.9	S.CP.9 (+) Use permutations and combinations to compute probabilities of compound events and solve problems.	Keep	Moved from Geometry	1	
Using Probability to Make Decisions (S. MD)	(+) Calculate expected values and use them to solve problems.	S.MD.1	S.MD.1 (+) ~~Define a random variable for a quantity of interest by a~~**A**ssign~~ing~~ a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.	Change	Clarified	3	
Using Probability to Make Decisions (S. MD)	(+) Calculate expected values and use them to solve problems.	S.MD.2	S.MD.2 (+) Calculate the expected value of a random variable; ~~interpret~~ **understand that** it **is** ~~as~~ the mean of the probability distribution.	Change	Re-written	3	
Using Probability to Make Decisions (S. MD)	(+) Calculate expected values and use them to solve problems.	S.MD.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~~ **calculate** 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.*	Change find to calculate	Re-written	3	
Using Probability to Make Decisions (S. MD)	(+) Calculate expected values and use them to solve problems.	S.MD.4	S.MD.4 (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; ~~find~~ **calculate** 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?*	Change find to calculate	Re-written	3	

Domain	Cluster Statement		Standard	Keep or Propose Change	Type of Change: Removed, Broken Up, Re-written	Quality Standards Rule	Reason for Proposed Change
Using Probability to Make Decisions (S. MD)	(+) Use probability to evaluate outcomes of decisions.	S.MD.5	S.MD.5 (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and ~~finding~~ **calculating the** expected values. 5a. (+) ~~Find~~ **Calculate** 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.* 5b. (+) 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.*	Change find to calculate	Re-written	3	
Using Probability to Make Decisions (S. MD)	(+) Use probability to evaluate outcomes of decisions.	S.MD.6	S.MD.6 (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	Change	Moved to Year 4 from Algebra	1	
Using Probability to Make Decisions (S. MD)	(+) Use probability to evaluate outcomes of decisions.	S.MD.7	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).	Change	Moved to Year 4 from Algebra	1	
Polar Coordinates	**Define polar coordinates and the relatationship between polar coordinates and Cartesian coordinates**	**PC.PC.1**	**PC.PC.1 (+) Define polar coordinates and the relatationship between polar coordinates and Cartesian coordinates with and without the use of technology.**	**ADD**	**Added for Pre-Calc course material**	1	
Polar Coordinates	**Define polar coordinates and the relatationship between polar coordinates and Cartesian coordinates**	**PC.PC.2**	**PC.PC.2 (+) Use polar equations to model and solve problems using graphs and algebraic properties.**	**ADD**	**Added for Pre-Calc course material**	1	
Parametric Equations	**Define parametric equations**	**PC.PE.1**	**PC.PE.1 (+) GIven equations for a parametric function, plot the graph and make conclusions about the geometric figure that results.**	**ADD**	**Added for Pre-Calc course material**	1	
Parametric Equations	**Define parametric equations**	**PC.PE.2**	**PC.PE.2 (+) Convert between a pair of parametric equations and an equation in x and y. Model and solve problems using parametric equations.**	**ADD**	**Added for Pre-Calc course material**	1	
Limits	**Define a continuous function**	**PC.L.1**	**PC.L.1 (+) Determine 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.**	**ADD**	**Added for Pre-Calc course material**	1	
Limits	**Define limits**	**PC.L.2**	**PC.L.2 (+) Demonstrate knowledge of both the definition and graphical interpretation of limits of values of functions and sequences.Verify and estimate limits using graphs, tables, and technology.**	**ADD**	**Added for Pre-Calc course material**	1	

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Limits	**Define limits**	**PC.L.3**	**PC.L.3 (+) Evaluate limits of functions and apply properties of limits, including one-sided limits and limits at infinity using algebra.**	**ADD**	**Added for Pre-Calc course material**	1	
Sequences	**Define sequences**	**PC.S**	**PC.S (+) Define arithmetic and geometric sequences and series. Model and solve word problems involving applications of sequences and series, interpret the solutions and determine whether the solutions are reasonable.**	**ADD**	**Added for Pre-Calc course material**	1	