NĀ UNUHI CCSS O KA PAE PAPA 9-12 NO KA MAKEMAKIKA/PILIHELU

Domain	Cluster	Code	Common Core State Standard	Hawaiian Interpretation	Notes
The Real Number System	Extend the properties of exponents to rational exponents.	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) x 3] to hold, so [5^(1/3)]^3 must equal 5.	Wehewehe i ka loaʻa ʻana o ka manaʻo o ka pāhoʻonui *rational* mai ka hoʻoloa ʻia ʻana o ke ʻanopili o ka pāhoʻonui helu integer i ia mau waiwai, me ka malama ʻana i ke kauhelu no ka helu *radical* e pili i nā helu pāhoʻonui *rational.*	radical?
		N.RN.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	Kākākau i ka haʻihelu o ka helu *radical* a o ka helu pāhoʻonui *rational* me ka hoʻohana ʻana i ke ʻanopili o nā helu pāhoʻonui.	
	Use properties of rational and irrational numbers.	N.RN.3	Explain why the sum or product of 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.	Wehewehe i ke kumu he helu *rational* ka huinanui a i ʻole ka hua loaʻa o ka helu *rational*; a he helu *irrational* ka huinanui o ka helu *rational* a me ka helu *irrational*; a he helu *irrational* ka hua loaʻa o ka helu *rational,* koe naʻe ka ʻole, a me ka helu *irrational* .	
Quantities	Reason quantitatively and use units to solve problems.	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.	Hoʻohana i ke anakahi no ka maopopo ʻana o nā polopolema/nane haʻi a no ka hoʻokele ʻana i ka haʻina o nā nane haʻi/polopolema kaʻina lehulehu; koho a unuhi i nā anakahi ma nā haʻilula me ka maʻa mau; koho a unuhi i ka pālakio a me ka piko o nā pakuhi a me ka hōʻikeʻike ʻikepili/ʻike.	
		N.Q.2	Define appropriate quantities for the purpose of descriptive modeling.	Wehewehe ʻano i nā nui kūpono no ka pahuhopu o ke kūkohu wehewehe.	

		N.Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Koho i ka pae pololei e kohu i nā palena o nā ana i ka haʻiʻōlelo ʻana i ka nui.	
The Complex Number System	Perform arithmetic operations with complex numbers.	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.	ʻIke he helu nōhihi/paʻakikī ʻo *i* e kū i ka haʻilula i^2 = ?1, a he kino a + bi ko nā helu nōhihi/paʻakikī a pau, me a me b he mau helu ʻoiaʻiʻo.	
		N.CN.2	Use the relation i^2 = -1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	Hoʻohana i ka pilina i^2 = -1 a me nā ʻanopili hoʻi hope, hoʻolike, a hoʻoili e hoʻonui, hoʻolawe, a hoʻonui i nā helu nōhihi/paʻakikī.	
		N.CN.3	Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.	ʻImi a loaʻa i ka helu ʻaui o ka helu nōhihi/paʻakikī; hoʻohana i nā helu ʻaui e huli i nā *moduli* a me ka helu puka o nā helu nōhihi/paʻakikī.	moduli??
	Represent complex numbers and their operations on the complex plane.	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.	Hōʻike i nā helu nōhihi/paʻakikī ma ka papa nōhihi ma ke kinona huinahāloa a kaʻapuni (me nā helu maoli a moeā/hoʻomeamea), a wehewehe i ke kumu e hōʻike ana ke kinona huinahāloa a kaʻapuni o kekahi helu nōhihi/paʻakikī i ia helu hoʻokahi.	
		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 ± ?3i)^3 = 8 because (-1 ±?3i) has modulus 2 and argument 120°.	Hōʻike ma ke anahonua i ka hoʻohui ʻana, ka hoʻolawe ʻana, ka hoʻonui ʻana, a me ka hōʻaui ʻana i nā helu nōhihi/paʻakikī ma ka papa nōhihi/paʻakikī; hoʻohana i nā ʻanopili o kēia hōʻike ʻana no ka helu ʻana.	

		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.	Hoʻonohonoho helu i ke kaʻawale o nā helu ma ka papa nōhihi/paʻakikī ʻo ia hoʻi ka *modulus* o ke koena, a ʻo ke kiko kauwaena o ka ʻāpana kaha ka ʻawelike o nā helu ma kona mau piko.	
	Use complex numbers in polynomial identities and equations.	N.CN.7	Solve quadratic equations with real coefficients that have complex solutions.	Hoʻomākalakala i nā haʻihelu pāhoʻonui lua me nā kaʻilau ʻoiaʻiʻo nona ka haʻina nōhihi/paʻakikī.	
		N.CN.8	Extend polynomial identities to the complex numbers. For example, rewrite x^2 + 4 as (x + 2i)(x - 2i).	Hoʻoloa i nā *polynomial identities* a i ka helu nōhihi/paʻakikī. He laʻana, e kākākau i ke x^2 + 4 ma ke ʻano hou he (x + 2i)(x - 2i).	*polynomial identities*
		N.CN.9	Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.	ʻIke i ka Manaʻohaʻi *Fundamental* o ka Hōʻailona Helu; hōʻike i kona ʻoiaʻiʻo no nā *polynomials* pāhoʻonui lua.	
Vector and Matrix Quantities	Represent and model with vector quantities.	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).	Hoʻokūʻike he nui a he kuhina ko nā *vector quantities*. Hōʻike i ka *vector quantities* ma o ka ʻāpana kaha laina i kuhi ʻia, a hoʻohana i nā hōʻailona kohu i ka *vectors* a i ko lākou nui (e laʻa, v, |v|, ||v||, v).	
		N.VM.2	Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.	Huli a loaʻa nā ʻūmaupaʻa/mahele o ka *vector* ma ka hoʻolawe ʻana i nā paʻa helu kuhikuhina o ke kiko mua mai nā paʻa helu kuhikuhina o ke kiko kuahope.	
		N.VM.3	Solve problems involving velocity and other quantities that can be represented by vectors.	Hoʻomākalakala i nā polopolema/nane haʻi e pili i ka welokiko/māmā holo a me nā nui e hiki ke hōʻike ʻia e nā *vectors.*	
	Perform operations on vectors.	N.VM.4	Add and subtract vectors. a. Add vectors end-to-end, component-wise, and by the	Hoʻohui a hoʻolawe i nā *vector.* a. Hoʻohui i nā *vector* i hoʻonoho papa ʻia, ma ka ʻūmaupaʻa/mahele, a ma ka	End to end?

			parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. c. 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.	lula huinahāpilipā/huinahā moelike. Maopopo ka nui o ka huina o ʻelua *vector*, a ʻaʻole naʻe ʻo ia ka huinanui o nā nui. e. No ʻelua *vector* ma ke kino o ka nui a me ke kuhina, hoʻoholo i ka nui a me ke kuhina o ko lāua huinanui. i. Maopopo ka hoʻolawe *vector* v - w ʻo ia hoʻi ʻo v + (-w), ʻoiai (-w) ka huli hope hoʻohui o w, me ka nui he w a e kuhi ana i ka ʻaoʻao ʻēkoʻa. Hōʻike i ka hoʻolawe *vector* ʻana ma kekahi ʻano kiʻi me ka pākuʻi ʻana i nā welau i ke kaʻina kūpono, a hana i ka hoʻolawe *vector* ma ka ʻūmaupaʻa/mahele.	
		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(vx, vy) = (cvx, cvy). b. Compute the magnitude of a scalar multiple cv using ||cv|| = |c|v. Compute the direction of cv knowing that when |c|v =? 0, the direction of cv is either along v (for c > 0) or against v (for c < 0).	Hoʻonui i ka *vector* i ka *scalar.* a. Hōʻike i ka hoʻonui *scalar* ma kekahi ʻano kiʻi me ka *scaling vectors* a me ka hoʻi hope ʻana i kona kuhina; hana i ka hoʻonui *scalar* ma ka ʻūmaupaʻa/mahele, e laʻa, c(vx, vy) = (cvx, cvy). e. Helu i ka nui o ka helu māhua *scalar* cv me ka hoʻohana ʻana i ||cv|| = |c|v. Helu i ke kuhina o cv me ka ʻike ke loaʻa |c|v =? 0 a laila, ʻo ke kuhina o cv he mea pili iā v (for c > 0) a i ʻole kūʻē iā v (no c < 0).	scalar: is it related to scale therefore pālakio?
	Perform operations on matrices & use matrices	N.VM.6	Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.	Hoʻohana i ka haʻimaulia/*matrices* e hōʻike a e hoʻokele i ka ʻikepili/ʻike, e laʻa, no ka hōʻike ʻana i ka uku hope a i ʻole ke alapine o ka pilina ma kekahi	

	in applications.			pūnaewele.	
		N.VM.7	Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.	Hoʻonui i ka haʻimaulia/*matrices* me ka *scaler* e hoʻopuka i nā haʻimaulia hou.	
		N.VM.8	Add, subtract, and multiply matrices of appropriate dimensions.	Hoʻohui, hoʻolawe, a hoʻonui i nā haʻimaulia/*matrices* o ke ana kūpono.	
		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.	Maopopo he mea ʻokoʻa ka hoʻonui haʻimaulia/*matrix* i nā haʻimaulia/*matrix* a he mea ʻokoʻa ka hoʻonui helu, no ka mea, ʻaʻole ʻo ia he hana hoʻomākalakala kaʻina hoʻi hope, akā mau nō kona kō ʻana i nā ʻanopili hoʻolike a hoʻoili.	
		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.	Maopopo he mau kuleana ko ka haʻimaulia 0 a *identity* i ka hoʻohui haʻimaulia a me ka hoʻonui haʻimaulia e like me ke kuleana o ka 0 a me ka 1 no nā helu ʻoiaʻiʻo. ʻO ka mea hoʻoholo o ka haʻimaulia kuea ka *nonzero* inā nō he hoʻi hope hoʻonui ko ka haʻimaulia.	
		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.	Hoʻonui i ka *vector* (ʻo ia nō ka haʻimaulia nona hoʻokahi kolamu) me ka haʻimauloa nona nā ana kohu i ka hoʻokumu ʻana i kekahi *vector* hou. Hana me nā haʻimauloa ma ke ʻano he loli o nā *vector.*	
		N.VM.12	Work with 2 X 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.	Hana me nā haʻimaulia 2X2 ma ke ʻano he loli o ka papa, a unuhi i ka waiwai ʻiʻo o ka mea hoʻoholo ma ka nānā ʻana i ka ʻili.	
Seeing	Interpret the	A.SSE.1	Interpret expressions that	Unuhi i nā haʻihelu e hōʻike ana i ka nui	

Structure in Expressions	structure of expressions		represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.	e pili i kona pōʻaiapili. a. Unuhi i kekahi māhele o ka haʻihelu, ʻo ia hoʻi nā huaʻōlelo, nā helu hoʻonui, a me nā kaʻilau. e. Unuhi i nā haʻihelu nōhihi/paʻakikī ma ka nānā ʻana i hoʻokahi a ʻoi māhele ma ke ʻano he mea hoʻokahi.	
		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 $(x^2 - y^2)(x^2 + y^2)$.	Hoʻohana i ka hoʻonohonoho ʻia ʻana o kekahi haʻihelu e hoʻomaopopo i nā hana like ʻole e kākākau.	
	Write expressions in equivalent forms to solve problems	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. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. c. Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15^t can be	Koho a hoʻopuka i ke kino kaulike o ka haʻihelu e hoʻomāʻikeʻike a e wehewehe i nā ʻanopili o ka nui i hōʻike ʻia e ka haʻihelu. a. Heluhana i ka haʻihelu pāhoʻonui lua e hoʻomāʻikeʻike i nā ʻole o ka hahaina e wehewehe ʻia e ia haʻihelu. e. Hoʻopau i ka pāhoʻonui lua o ka haʻihelu pāhoʻonui lua e hoʻomāʻikeʻike i ka palena waiwai nui a me ka palena waiwai liʻiliʻi o ka hahaina e wehewehe ʻia e ia haʻihelu. i. Hoʻohana i nā ʻanopili o nā pāhoʻonui e hoʻololi i ka haʻihelu no nā hahaina pāhoʻonui.	How to say "to factor" instead of factor? Helu hoʻonui vs. heluhana? Not sure.

			rewritten as [1.15^(1/12)]^(12t) ? 1.012^(12t) to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.		
		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.	Loaʻa ka haʻilula no ka huinanui o ka moʻo pili anahonua kaupalena ʻia (ʻoiai ʻaʻole ka 1 ka lakio like) a hoʻohana i ka haʻilula e hoʻomākalakala i nā nane haʻi/polopolema.	
Arithmetic with Polynomials and Rational Expressions	Perform arithmetic operations on polynomials	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.	Maopopo ka hoʻokumu ʻōnaehana ʻana o nā *polynomial* e ʻano like i nā helu *integers*, ʻo ia hoʻi, ua pani i ka hana hoʻomākalakala o ka hoʻohui ʻana, ka hoʻolawe ʻana, a me ka hoʻohui ʻana, ka hoʻolawe ʻana, a me ka hoʻonui ʻana; hoʻohui, hoʻolawe, a hoʻonui i nā *polynomial.*	
	Understand the relationship between zeros and factors of polynomials	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).	ʻIke a e hoʻohana i ka Manaʻohaʻi Koena: No ka polynomial p(x) a me ka helu a, ʻo ke koena ma ka puʻunaue ʻana i ke x - a he p(a), no laila p(a) = 0 inā nō he helu hoʻonui ke (x - a) o p(x).	Is that last half of the phrase backwards ?
		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.	Hoʻomaopopo i nā ʻole o nā *polynomial* ke loaʻa ka heluhana kūpono, a hoʻohana i nā ʻole e kūkulu i ka pakuhi kāmua o ka hahaina i wehewehe ʻia e ia *polynomial.*	Rough graph-pakuhi kā? First draft? Factorization?
	Use polynomial identities to	A.APR.4	Prove polynomial identities and use them to describe numerical relationships. For example, the	Hōʻoiaʻiʻo i nā *polynomial identities* a hoʻohana no ka wehewehe ʻana i ka pilina helu.	

	solve problems		polynomial identity $(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples.		
		A.APR.5	Know and apply that the Binomial Theorem gives 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.)	ʻIke a hoʻohana i ka Manaʻohaʻi *Binomial* e hōʻike i ka pāhoʻonui ʻana o $(x + y)^n$ i ka pāhoʻonui o x a me y no ka helu *interger* ʻiʻo n, ʻoiai ʻo x a me y kekahi mau helu, me nā kaʻilau i hoʻoholo ʻia he laʻana na *Pascal‘s Triangle.* (Hiki ke hōʻoiaʻiʻo ʻia ka Manaʻohaʻi *Binomial* e ka hōʻoia lula makemakika/pili helu a i ʻole e ke kahua manaʻo/kumu manaʻo hoʻohui.)	
	Rewrite rational expressions	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.	Kākākau i nā haʻihelu nōhie/maʻalahi a *rational* ma nā ʻano like ʻole; e kākau a(x)/b(x) me ke ʻano q(x) + r(x)/b(x), ʻoiai ʻo a(x), b(x), q(x), a me r(x) nā *polynomial* me ke mana o r(x) i emi mai i ka mana o b(x), a me ka hoʻohana ʻana i ka nānā pono, ka puʻunaue lōʻihi, a i ʻole, no nā laʻana nōhihi/papakikī aʻe, i ka ʻōnaehana hōʻailona helu kamepiula/lolo uila.	Degree=mana? E kūkā.
		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.	Maopopo ka hoʻokumu ʻana o nā haʻihelu *rational* i ka ʻōnaehana i ʻano pili i nā helu rational, i pani ʻia ma lalo o ka hoʻohui ʻana, ka hoʻolawe ʻana, ka hoʻonui ʻana, a me ka puʻunaue ʻana e ka haʻihelu *rational* me ka ʻole o ka ʻole; hoʻohui, hoʻolawe, hoʻonui, a puʻunaue i nā haʻihelu *rational.*	
Creating	Create	A.CED.1	Create equations and inequalities	Hoʻokumu i ka haʻihelu a me nā haʻihelu	

Equations	equations that describe numbers or relationships		in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*	kaulike ʻole ma hoʻokahi hualau a hoʻohana no ka hoʻomākalakala ʻana i nā nane haʻi/polopolema. A nānā hoʻi i nā haʻihelu e ea mai nā hahaina pili laina a me nā hahaina pāhoʻonui lua, a mai nā hahaina *rational* maʻalahi/nōhie a me nā hahaina pāhoʻonui.	
		A.CED.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.*	Haku i nā haʻihelu ma ʻelua a ʻoi hualau e hōʻike i ka pilina o nā nui; kākuhi i nā haʻihelu ma ka iho kuhikuhina me ka lēpili a me ka pālākiō.	
		A.CED.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*	Hōʻike i nā mea kāohi ʻia e nā haʻihelu a i ʻole nā haʻihelu kaulike ʻole, a e ka ʻōnaehana o nā haʻihelu a me/a i ʻole ka haʻihelu kaulike ʻole, a unuhi i ka haʻina he koho i hiki a i ʻole hiki ʻole ke hana ʻia ma ka pōʻaiapili e hoʻokūkohu ai.	
		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.*	Hoʻonohonoho hou i ka haʻilula e kālele ai ka nui o ka uku paneʻe, me ka hoʻohana ʻana i ka noʻonoʻo kūpili like me ka hoʻomākalakala ʻana i nā haʻihelu.	
Reasoning with Equations and Inequalities	Understand solving equations as a process of reasoning and explain the reasoning	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	Wehewehe i ke kaʻina hana pākahi a pau ma ka hoʻomākalakala ʻana i nā haʻihelu nōhie/maʻalahi e kupu mai ana mai ke kūlana kaulike o nā helu i hōʻoia ʻia mai ke kaʻina mua aʻe, me ka hoʻomaka ʻana ma ke kuhi ʻana he haʻina ko ka haʻihelu mua. Kūkulu i ke	

			justify a solution method.	kahua manaʻo/kumu manaʻo kūpono e hoʻāpono i ke kiʻina hana haʻina.	
		A.REI.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.	Hoʻomākalakala i ka haʻihelu *rational* nōhie/maʻalahi a me ka haʻihelu *radical* nōhie/maʻalahi ma hoʻokahi hualau, a hoʻopuka i ka laʻana e hōʻike ana i ke ʻano e ulu ai ka haʻina kaulele.	
	Solve equations and inequalities in one variable	A.REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Hoʻomākalakala i ka haʻihelu pili laina a me ka haʻihelu kaulike ʻole ma hoʻokahi hualau, a me nā haʻihelu no lākou nā kaʻilau i hōʻike ʻia e ka huapalapala.	we have to determine a word for linear equation
		A.REI.4	Solve quadratic equations in one variable. a. Use the method of completing the square to transforms any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.	Hoʻomākalakala i ka haʻihelu pāhoʻonui lua ma hoʻokahi hualau. a. Hoʻohana i ke kiʻina hana o ka hoʻopau ʻana i nā pāhoʻonui lua e hoʻololi i kekahi haʻihelu pāhoʻonui lua ma x i ka haʻihelu he $(x - p)^2 = q$ nona ka haʻina hoʻokahi. Loaʻa ka haʻilula pāhoʻonui lua mai ia kino mai. e. Hoʻomākalakala i nā haʻihelu pāhoʻonui lua ma o ka nānā pono ʻana (e laʻa, no $x^2 = 49$), ma o ke kumu pāhoʻonui lua, ma o ka hoʻopau ʻana i ka pāhoʻonui lua, ma o ka haʻihelu pāhoʻonui lua a me ka heluhana, e like me ka mea e pono ai ke kino mua o ka haʻihelu. Hoʻokūʻike i ka manawa e loaʻa ai ka haʻina nōhihi/maʻalahi ma muli o ka haʻihelu pāhoʻonui lua a kākau ma $a \pm bi$ no nā helu iʻo a a me b.	
	Solve systems of equations	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	Hōʻoiaʻiʻo i ka hoʻopuka ʻana i ka ʻōnaehana nona ka haʻina hoʻokahi, inā aia ka ʻōnaehana o ʻelua haʻihelu, a kuapo ʻia kekahi haʻihelu me ka	

			multiple of the other produces a system with the same solutions.	huinanui o ia haʻihelu a me ka helu māhua o ka haʻihelu i koe.	
		A.REI.6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	Hoʻomākalakala i nā ʻōnaehana haʻihelu pili laina me ka pilikahi/kikoʻī a me ke kokekau nō hoʻi (e laʻa, me nā pakuhi), me ke kālele ʻana i nā paʻa haʻihelu pili laina ma ʻelua hualau.	
		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.	Hoʻomākalakala i ka ʻōnaehana maʻalahi/nōhie o ka haʻihelu kūlana kahi a me ka haʻihelu pāhoʻonui lua ma ʻelua hualau ma o ka hōʻailona helu a me ke kiʻi.	
		A.REI.8	Represent a system of linear equations as a single matrix equation in a vector variable.	Hōʻike i ka ʻōnaehana o ka haʻihelu pili laina ma hoʻokahi haʻihelu haʻimaulia ma ke hualau *vector.*	
		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).	Huli a loaʻa ka huli hope o ka haʻimaulia inā nō loaʻa he huli hope, a hoʻohana iā ia e hoʻomākalakala i ka ʻōnaehana haʻihelu pili laina (me ka hoʻohana ʻana i nā haʻimaulia ʻenehana o ka nui 3 x 3 a ʻoi).	
	Represent and solve equations and inequalities graphically	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).	Maopopo ka pakuhi o ka haʻihelu ma ʻelua hualau he ʻōpaʻa/hui o nā haʻina a pau i kākuhi ʻia ma ka papa kuhikuhina, a ʻo ka pio nō ia kona kinona maʻamau (a he laina paha nō ia kekahi).	
		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	Wehewehe i ke kumu he mau haʻina o ka haʻihelu f(x) = g(x) ke kuhikuhina x o nā kiko ma kahi o ka huina o nā pakuhi o nā haʻihelu y = f(x) a me y = g(x); huli	

			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.*	a loaʻa ka haʻina kokekau, e laʻa, hoʻohana i ka ʻenehana e kākuhi i nā hahaina, e hana i nā pakuhi papa o nā waiwai, a i ʻole e huli a loaʻa nā kokekau helu papa. Hoʻokomo pū ʻia nā laʻana o nā hahaina likeʻole o f(x) a me/a i ʻole g(x), e laʻa me ka hahaina pili laina, *polynomial, rational*, waiwai ʻiʻo, pāhoʻonui, a huhui helu.	
		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.	Kākuhi i nā haʻina o ka haʻihelu kulana kahi kaulike ʻole ma ʻelua hualau ma ka papa hapalua (me ʻole ka palena pau ma ka laʻana o ka haʻihelu kaulike ʻole hāiki), kākuhi i ka ʻōpaʻa/hui haʻina i ka ʻōnaehana o ka haʻihelu kulana kahi kaulike ʻole ma ʻelua hualau, ʻo ia nō ka huina o nā papa hapalua e kū pili ana.	
Interpreting Functions	Understand the concept of a function and use function notation	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).	Maopopo ka hoʻopili ʻana o ka hahaina mai kekahi ʻōpaʻa/hui (kapa ʻia ka pōʻai) a i kekahi ʻōpaʻa/hui (kapa ʻia ka laulā) i nā kumumea pākahi a pau o ka pōʻai he hoʻokahi wale nō mea o ka laulā. Inā ʻo f ka hahaina a ʻo x ke kumumea o kona pōʻai, a laila ʻo f(x) ka mea e hoʻohuli i ka hoʻopuka o f e pili ana i ka huakomo x. ʻO ka pakuhi o f ka pakuhi o ka haʻihelu y = f(x).	
		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.	Hoʻohana i ka hahaina kauhelu, loiloi i nā hahaina no nā huakomo i loko o ka pōʻai, a unuhi i nā ʻōlelo no nā hahaina kauhelu e pili i kekahi pōʻaiapili.	

		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 (n is greater than or equal to 1).	Hoʻokūʻike he mau hahaina nā kaʻina hana, i wehewehe ʻia ma ka pīnaʻi ʻana i kekahi manawa, nona ka pōʻai ma ka ʻōpaʻa/hui lalo o nā helu *integer*.	
	Interpret functions that arise in applications in terms of the context	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.*	No ka hahaina e kūkohu ana i ka pilina o ʻelua nui, unuhi i nā hiʻohiʻona nui o nā pakuhi a me nā pakuhi papa ma ka nānā ʻana i nā nui, a e kahakiʻi i nā pakuhi e hōʻike ana i nā hiʻohiʻona nui ma ka haʻi ʻia ʻana o ka pilina. Pēnei nā hiʻohiʻona nui: ka huina pā; nā wā o nā hahaina e nui aʻe ana, e emi ana, he ʻiʻo, he ʻiʻo ʻole; nā palena nui me nā palena iki e pili; nā ʻālikelike; nā hana hopena; ka wā pinepine/pā wā.	
		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.*	Hoʻopili i ka pōʻai o ka hahaina i kona pakuhi a, ke kūpono, i ka pilina ana nui e wehewehe ʻia.	
		F.IF.6	Calculate and interpret the	Hoʻonohonoho helu a unuhi i kā pālākiō	

			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.*	ʻawelike o ka loli ʻana o kekahi hahaina (i hōʻike ʻia ma ka hōʻailona a i ʻole ma ka papa pakuhi) kekahi wā kikoʻī/pilikahi. Koho/Kuhi i ka pālākiō o ka loli ʻana mai ka pakuhi.	
	Analyze functions using different representatio ns	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.	Kākuhi i nā hahaina i hōʻike hōʻailona ʻia a hōʻike i nā hiʻohiʻona nui o ka pakuhi, ma ka lima no nā mea nōhie/maʻalahi a ma ka hoʻohana ʻana i ka ʻenehana no nā mea nōhihi/paʻakikī aʻe. a. Kākuhi i nā hahaina pili laina a pāhoʻonui lua a hōʻike i ka huina pā, nā palena nui, a me nā palena iki. e. Kākuhi i ke kumu pāhoʻonui lua, ke kumu pāhoʻonui kolu, a me ka hahaina i wehewehe ʻia ma nā mahele, a me ka hoʻokomo ʻana i nā hahaina kaʻina hana a i ka hahaina waiwai ʻiʻo. i. Kākuhi i nā hahaina *polynomial*, hoʻomaopopo i nā ʻole ke loaʻa nā heluhana e kohu, a hōʻike i ka hana hopena. o. Kākuhi i nā hahaina rational, hoʻomaopopo i nā ʻole a me ka *asymptotes* ke loaʻa nā heluhana e kohu, a hōʻike i ka hana hopena. u. Kākuhi i nā hahaina pāhoʻonui a me nā hahaina huhui helu, me ka hōʻike ʻana i nā huina pā a me ka hana hopena, a i ka hahaina ana huinakolu, me hōʻike ʻana i ka wā, ka papa waena, a me ka *amplitude.*	piecewise - with respect to a number of discrete intervals, sets, or pieces
		F.IF.8	Write a function defined by an expression in different but equivalent forms to reveal and	Kākau i ka hahaina i wehewehe ʻia e ka haʻihelu ma nā kino ʻokoʻa akā nō naʻe he kaulike nō i mea e hoʻomāʻikeʻike ai	

			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 e wehewehe ai i nā ʻanopili ʻokoʻa o ka hahaina. a. Hoʻohana i ke kiʻina hana o ka heluhana ʻana a o ka hoʻopau ʻana i ka pāhoʻonui lua ma ka hahaina pāhoʻonui lua e hōʻike i nā ʻole, nā waiwai ʻoi loa aku, ka ʻālikelike o ka pakuhi, a unuhi i kēia mau mea ma o kona pōʻaiapili. e. Hoʻohana i nā ʻanopili o nā pāhoʻonui e unuhi i nā haʻihelu no nā hanaina pāhoʻonui.	
		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.	Hoʻohālikelike i nā ʻanopili o ʻelua hahaina e hōʻike ʻia lāua pākahi ma kekahi ʻano ʻokoʻa (ma ka hōʻailona helu, ma ka pakuhi, ma nā helu o ka pakuhi papa, a i ʻole ma ka haʻi waha ʻana i ka wehewehe).	
Building Functions	Build a function that models a relationship between two quantities	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.	Kākau i ka hahaina e wehewehe ana i ka pilina o ʻelua nui. a. Hoʻoholo i ka haʻihelu hualau kūʻokoʻa, he kaʻina hana pīnaʻi, a i ʻole nā kaʻina hana no ka hoʻonohonoho helu mai kekahi pōʻaiapili. e. Hoʻohui pū i nā ʻano hahaina	explicit - *of a mathematical function*: defined by an expression

			b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. c. Compose functions. For example, if T(y) is the temperature in the atmosphere as a function of height, and h(t) is the height of a weather balloon as a function of time, then T(h(t)) is the temperature at the location of the weather balloon as a function of time. (+)	maʻamau ma ka hana hoʻomākalakala helu. i. Haku i nā hahaina.	containing only independent variables
		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.*	Kākau i nā kaʻina hana no ka hana helu a me ke anahonua ma ka pīnaʻi ʻana a ma ka haʻilula hualau kūʻokoʻa, a hoʻohana i ia mau kaʻina hana e kūkohu i nā pōʻaiapili, a e unuhi i nā ʻano ʻelua.	
	Build new functions from existing functions	F.BF.3	Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	Hoʻomaopopo i ka hopena ma ka pakuhi i ke kuapo ʻana iā f(x) me f(x) + k, k f(x), f(kx),a me f(x+k) no kekahi waiwai pilikahi/kikoʻī o k (ka ʻiʻo a me ka ʻiʻo ʻole); huli a loaʻa i ka waiwai o k i ka hāʻawi ʻia o nā pakuhi. Hoʻokolohua i nā laʻana a kahakiʻi i ka wehewehe ʻia o ka hopena ma ka pakuhi me ka hoʻohana i ka ʻenehana. Hoʻopākuʻi i ka hoʻokūʻike ʻana i nā hahaina kaulike a paʻewa mai ko lākou pakuhi ʻia ʻana a me nā haʻihelu hōʻailona helu no lākou.	
		F.BF.4	Find inverse functions.	Huli a loaʻa ka hahaina huli hope.	compositio

			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) for x > 0 or f(x) = (x+1)/(x-1) for x =? 1 (x not equal to 1). b. Verify by composition that one function is the inverse of another. (+) c. Read values of an inverse function from a graph or a table, given that the function has an inverse. (+) d. Produce an invertible function from a non-invertible function by restricting the domain. (+)	a. Hoʻomākalakala i ka haʻihelu ma ke kino f(x) = c no ka hahaina nōhie/maʻalahi he f nona ka huli hope a kākau i ka haʻihelu no ka huli hope. e. Hoʻoiaʻiʻo i kekahi hahaina he hahaina huli hope o kekahi aʻe ma o ke *composition*. (+) i. Heluhelu i ka waiwai o ka hahaina huli hope ma ka pakuhi a i ʻole ka pakuhi papa, inā nō he huli hope ko ka hahaina. (+) o. Hoʻopuka i ka hahaina e hiki ke huli hope mai ka hahaina e hiki ʻole ke huli hope ʻole ma o ke kaupalena ʻana i ka pōʻai.	n - **:** the operation of forming a composite function; *also* **:** composite function - **:** a function whose values are found from two given functions by applying one function to an independent variable and then applying the second function to the result and whose domain consists of those values of the independent variable for which

					the result yielded by the first function lies in the domain of the second Hana hoʻomākala kala hahaina huihuina???
		F.BF.5	Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.	Maopopo ka pilina huli hope o nā pāhoʻonui a me nā huhui helu a hoʻohana i ia pilina e hoʻomākalakala i nā polopolema/nane haʻi no lākou nā huhui helu a me nā pahoʻonui.	
Linear, Quadratic, and Exponential Models	Construct and compare linear and exponential models and solve problems	F.LE.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.* a. Prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.* b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.* c. Recognize situations in which a quantity grows or decays by a	Hoʻōkoʻa/Waeleʻa/Hōʻoia i nā pōʻaiapili e hiki ke kūkohu ʻia me nā hahaina pili laina a me nā hahaina pāhoʻonui. a. Hoʻoiaʻiʻo i ka ulu ʻana o nā hahaina pili laina ma nā koena kaulike ma nā wā kaulike a ulu nā hahaina pāhoʻonui ma nā helu hoʻonui kaulike ma nā wā kaulike. e. Hoʻokūʻike i nā pōʻaiapili e loli ai kekahi nui ma ka lākiō kūpaʻa o nā wā anakahi pākahi e pili i kekahi aʻe. i. Hoʻokūʻike i nā pōʻaiapili e ulu ai a i ʻole e emi ai ka nui ma ka lākiō pākēneka kūpaʻa o ka wā anakahi pākahi e pili i kekahi aʻe	

			constant percent rate per unit interval relative to another.*		
		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).*	Kūkulu i nā hahaina pili laina a i nā hahaina pāhoʻonui, me nā laukaʻina huina helu a me nā laukaʻina anahonua, ke hāʻawi ʻia ka pakuhi, i ka wehewehe ʻana i ka pilina, a i ʻole ʻelua paʻa helu huakomo-huapuka (me ka heluhelu ʻana nō hoʻi i ia mau mea ma ka pakuhi papa).	
		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.*	Nānā pono ma ka hoʻohana ʻana i nā pakuhi a me nā pakuhi papa i ka ʻoi ʻana aku o kekahi nui e pāhoʻonui ana ma mua o kekahi nui hou aku e hoʻonui wale aku ana nō ma ke kaha laina, ma ka pāhoʻonui lua, a i ʻole (me ka laulā) ma ke ʻano he hahaina *polynomial*.	
		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.*	No nā kūkohu pāhoʻonui, hōʻike ma ka huhui helu i ka haʻina o ab^(ct) = d ʻoiai he mau helu ʻo a, c, a me d a he 2, he 10, a i ʻole he e ke kumu pāhoʻonui b; loiloi i ka huhui helu me ka hoʻohana ʻana i ka ʻenehana.	
	Interpret expressions for functions in terms of the situation they model	F.LE.5	Interpret the parameters in a linear, quadratic, or exponential function in terms of a context.*	Unuhi i nā *parameter* o ka hahaina pili laina, pāhoʻonui lua, a i ʻole pāhoʻonui ma kekahi pōʻaiapili.	
Trigonometric Functions	Extend the domain of trigonometric functions using the unit	F.TF.1	Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.	Maopopo ke ana *radian* o ka huina he lōʻihi o ka piʻo ma ka pōʻai anakahi i hoʻopili laina ʻia e ka huina.	
		F.TF.2	Explain how the unit circle in the	Wehewehe i ka hiki ʻana ke hoʻoloa ʻia	

	circle		coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	ka hahaina ana huinakolu no nā helu maoli a pau e ka pōʻai anakahi ma ka iho kuhikuhina, me ka unuhi ʻia he ana *radian* o nā huina e kaʻapuni kōʻai hema ana i ka pōʻai anakahi.	
		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 x, [(pi) + x], and [2(pi) - x] in terms of their values for x, where x is any real number.	Hoʻohana i nā huinakolu kūikawā e hoʻoholo ma o ke ana honua ʻana i ka waiwai o ka *sine, cosine*, a me *tangent* no (pi)/3, (pi)/4 a me (pi)/6, a hoʻohana i ka pōʻai anakahi e hōʻike i nā waiwai o ka *sine, cosine*, a me *tangent* no x, [(pi) + x], a me [2(pi) - x] ma ko lākou mau waiwai no x, ʻoiai he helu maoli ʻo x.	
		F.TF.4	Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.	Hoʻohana i ka pōʻai anakahi e wehewehe i ka ʻālikelike (he paʻewa a he kaulike) a me ka wā pinepine/pā wā o nā hahaina ana huinakolu.	
	Model periodic phenomena with trigonometric functions	F.TF.5	Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.*	Koho i ka hahaina ana huinakolu e kūkohu i ka hanana pā wā/wā pinepine me ka *amplitude*, ke alapine, a me ka laina waena i koho ʻē ʻia.	
		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.	Maopopo ka hoʻohaiki ʻana i ka hahaina ana huinakolu i ka poʻāi āna e hoʻonui mau ai a i ʻole e hoʻemi mau ai a me kona hopena, ʻoia hoʻi ke kūkulu ʻia ʻana o kona huli hope.	
		F.TF.7	Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology,	Hoʻohana i ka hahaina huli hope e hoʻomākalakala i nā haʻihelu ana honua e kupu ana ma ka pōʻaiapili kūkohu; loiloi i nā haʻina me ka ʻenehana, a	

			and interpret them in terms of the context.*	unuhi iā lākou mai loko mai o ka pōʻaiapili.	
	Prove and apply trigonometric identities	F.TF.8	Prove the Pythagorean identity (sin A)^2 + (cos A)^2 = 1 and use it to calculate trigonometric ratios.	Hōʻoiaʻiʻo i ka *Pythagorean identity* (sin A)^2 + (cos A)^2 = 1 a hoʻohana iā ia e helu i nā lakio ana honua.	
		F.TF.9	Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.	Hōʻoiaʻiʻo i nā haʻilula hoʻohui a hoʻolawe no ka *sine, cosine,* and *tangent* a hoʻohana iā lākou no ka hoʻomākalakala polopolema/nane haʻi.	
Congruence	Experiment with transformations in the plane	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.	ʻIke i ka wehewehe manaʻo kikoʻī/pilikahi o ka huina, ka pōʻai, ke kaha kūpono, ke kaha moe like/pilipā, a me ka ʻāpana kaha e pili i nā manaʻo i wehewehe ʻole ʻia no ke kiko, ka laina, ka lōʻihi ma ka laina, a me ka lōʻihi o ke kaʻapuni ʻana i ka piʻo poepoe	
		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).	Hōʻike i ka loli ʻana ma ka papa me ka hoʻohana ʻana, e laʻa, nā māliko a me nā polokalamu ana honua; wehewehe i ka loli ʻana he mau hahaina e hoʻohana i nā kiko o ka papa ma ke ʻano he mau huakomo a e hoʻohana i nā kiko hou ma ke ʻano he mau huapuka. Hoʻohālikelike i nā loli ʻana e mālama i ka mamao a me ka huina a me nā mea e mālama ʻole.	
		G.CO.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Ke hāʻawi ʻia he huinahālōʻihi, he huinahāpilipā/moe like, he huinahāpaʻapilipā, a i ʻole he huinalehulehu maʻamau, wehewehe i hoʻowili ʻana a me ke kinona aka like e hāpai ma luna ona iho.	

		G.CO.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Hoʻomōhala i nā wehewehe manaʻo o ka hoʻowili ʻana, ke kinona aka like, a me ka loli ʻana e pili i ka huina, ka pōʻai, ke kaha kūpono, ke kaha pilipā/moe like, a me ka ʻāpana kaha.	
		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.	Ke hāʻawi ʻia he kinona a me ka hoʻowili ʻana, ke kinona aka like, a i ʻole ka loli ʻana, kahakiʻi i ke kinona i hoʻololi ʻia me ka hoʻohana ʻana i, e laʻa, ka pepa makaʻaha, ka pepa hoʻomēheu, a i ʻole ka polokalamu ana honua. Koho i ke kaʻina hana o ka loli ʻana nāna e hāpai i ke kinona a i kekahi kinona aʻe.	
	Understand congruence in terms of rigid motions	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.	Hoʻohana i ka wehewehe ana honua o ka ʻoni ʻoʻoleʻa e hoʻololi i nā kinona a e wānana/kuhi i ka hopena o kekahi ʻoni ʻoʻoleʻa ma luna o kekahi kinona; ke hāʻawi ʻia he ʻelua kinona, hoʻohana i ka wehewehe manaʻo o ke komolike e pili i ka ʻoni ʻoʻoleʻa e hoʻoholo inā komolike lāua.	
		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.	Hoʻohana i ka wehewehe manaʻo o ke komolike e pili i ka ʻoni ʻoʻoleʻa e hōʻike i ke komolie o ʻelua huinakolu inā naʻe nō hoʻi komolike nā paʻa ʻaoʻao pili a me nā paʻa huina pili.	
		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.	Wehewehe i ka loaʻa ʻana o nā koina no ke komolike o ka huinakolu (ASA, SAS, a me SSS) mai ka wehewehe manaʻo o ke komolike e pili i ka ʻoni ʻoʻoleʻa.	
	Prove geometric	G.CO.9	Prove theorems about lines and angles. Theorems include:	Hōʻoiaʻiʻo i nā manaʻohaʻi no nā kaha laina a me nā huina. Pili nā manaʻohaʻi:	

	theorems		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.	i ke komo like o nā huina kū; i ka peʻa ʻana o ke kaha ʻokiʻoki i nā kaha pilipā/moe like, komo like nā huina loko hou aku a komo like hoʻi nā huina pili; kaulike loa ke kaʻawale o nā kiko ma ke kaha kūpono ʻoki hapalua o ka ʻāpana kaha i nā piko o ia ʻāpana kaha.	
		G.CO.10	Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180 degrees; 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.	Hōʻoiaʻiʻo i nā manaʻohaʻi no nā huinakolu. Pili nā manaʻohaʻi: i ke ana ʻia o nā huina loko o ka huinanui o ka huinakolu a i 180 kekelē; i ke komo like ʻana o nā kumu huina o ka huinakolu ʻelua ʻaoʻao like; i ka pilipā/moe like ʻana o ka ʻāpana kaha e hoʻopili ana i nā kiko kauwaena i nā ʻaoʻao ʻelua o ka huinakolu me ka ʻaoʻao ʻekolu a he hapalua kona lōʻihi; i ka hui ʻana o nā kaha hoʻohapalua o ka huinakolu ma kekahi kiko.	
		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.	Hōʻoiaʻiʻo i nā manaʻohaʻi no nā huinahā pilipā/moe like. Pili nā manaʻohaʻi: i ke komo like ʻana o nā ʻaoʻao ʻēkoʻa; i ke komo like ʻana o nā huina ʻēkoʻa; i ka ʻoki hapalua ʻana o nā kaha lala o ka huinahā pilipā/moe like kekahi i kekahi; a i ka manaʻo kūʻē, ʻo ia hoʻi, he mau huinahā pilipā/moelike no lākou nā kaha lala komo like nā huinahā lōʻihi.	
	Make geometric constructions	G.CO.12	Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective	Kūkulu i nā mea ana honua paʻalula me nā ʻano mea like ʻole a me nā ʻano hana like ʻole (he pānānā a me ka lula, ke kaula, nā mea anianikū, ka pepelu pepa	

			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.	ʻana, ka polokolamu kamepiula ana honua, apwa.). Kope i ka ʻāpana kaha; kope i ka huina; ʻoki hapalua i ka ʻāpana kaha; ʻoki hapalua i ka huina; kūkulu i nā kaha laina kūpono, a me ke kaha ʻoki hapalua kūpono o ka ʻāpana kaha; a ma kekahi kiko, kūkulu i ke kaha laina e pilipā/moe like i kekahi kaha laina i koho ʻia.	
		G.CO.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.	Kūkulu i ka huinakolu like, ka huinahā like, a me ka huinaono maʻamau e hoʻopuni pā ʻia e ka pōʻai.	kahakiʻi ʻia vs hoʻopuni pā for inscribed
Similarity, Right Triangles, and Trigonometry	Understand similarity in terms of similarity transformations	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. -- b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Hōʻoiaʻiʻo ma ka hoʻokolohua ʻana i nā ʻanopili o ka hoʻonaele ʻana e loaʻa i ka helu hoʻonui kikowaena a me ka helu hoʻonui lakio: --a. Hoʻoneʻe ka hoʻonaele ʻana i ke kaha laina e pā ʻole ai ke kikowaena o ka hoʻonaele ʻana, a ʻaʻohe loli ke kaha laina ma ke kiko waena. --e. Lōʻihi aʻe a i ʻole pōkole mai ka hoʻonaele ʻana o ka ʻāpana kaha i ka lakio e loaʻa i ka helu hoʻonui lakio.	
		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	Ke hāʻawi ʻia ʻelua kinona, hoʻohana i ka wehewehe manaʻo o ke ʻano like ʻana e pili i ka loli ʻano like e hoʻoholo i ke ʻano like o lāua; wehewehe me ka hoʻohana ʻana i ka loli ʻano like i ka manaʻo o ke ʻano like ʻana no nā huinakolu, ʻo ia hoʻi, kaulike nā paʻa huina pili a pau a me ka lakio like o nā paʻa ʻaoʻao pili a pau.	

			corresponding pairs of sides.		
		G.SRT.3	Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.	Hoʻohana i nā ʻanopili o ka loli ʻano like e hoʻokumu i ke koina AA no ʻelua huinakolu e ʻano like.	
	Prove theorems involving similarity	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.	Hōʻoiaʻiʻo i nā manaʻohaʻi no nā huinakolu. Pili nā manaʻohaʻi: i ka puʻunaue ʻana o ke kaha pilipā/moe like i kekahi ʻaoʻao o ka huinakolu i nā kaha laina ʻelua aʻe me ka lakio like, a me ka manaʻo kūʻē; i ka hōʻoiaʻiʻo ʻia ʻana o ka Manaʻohaʻi *Pythagorean* e ka hoʻohana ʻana i ke ʻano like huinakolu.	
		G.SRT.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	Hoʻohana i nā koina o ke komo like ʻana a me ke ʻano like ʻana no nā huinakolu e hoʻomākalakala polopolema/nane haʻi a e hōʻoiaʻiʻo i nā pilina o nā kinona ana honua.	
	Define trigonometric ratios and solve problems involving right triangles	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.	Maopopo ka pilina ma o ke ʻano like, he mau ʻanopili o nā huina o ka huinakolu nā lakio ʻaoʻao o nā huinakolu kūpono, e hoʻokuhi ana i nā wehewehe manaʻo ʻana o nā lakio ana huinakolu no nā huina ʻoi.	
		G.SRT.7	Explain and use the relationship between the sine and cosine of complementary angles.	Wehewehe a hoʻohana i ka pilina o ka *sine* a me ke *cosine* o nā huina hoʻopiha kūpono.	
		G.SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	Hoʻohana i nā lakio ana huinakolu a me ka Manaʻohaʻi *Pythagorean* e hoʻomākalakala i nā huinakolu kūpono ma nā polopolema/nane haʻi.	
	Apply trigonometry to general	G.SRT.9	Derive the formula A = (1/2)ab sin(C) for the area of a triangle by drawing an auxiliary line from	Loaʻa ka haʻilula A = (1/2)ab *sin*(C) no ka ʻili o ka huinakolu ma o ke kaha ʻana i ka laina kūpono kākoʻo mai ke kihiʻaki	

	triangles		a vertex perpendicular to the opposite side.	mai i ka ʻaoʻao ʻēkoʻa.	
		G.SRT.10	Prove the Laws of Sines and Cosines and use them to solve problems.	Hōʻoiaʻiʻo i nā Kanawai o ka *Sines* a me ke *Cosines* a e hoʻohana no ka hoʻomākalakala polopolema/nane haʻi.	
		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).	Maopopo a hoʻohana i ke Kanawai o ka *Sines* a me ke Kanawai o ke *Cosines* e huli a loaʻa nā ana i ʻike ʻole ʻia ma nā huinakolu kūpono a me nā huinakolu kūpono ʻole (e laʻa, nā polopelema/nane haʻi anaʻāina, nā manehu hopena.	
Circles	Understand and apply theorems about circles	G.C.1	Prove that all circles are similar.	Hōʻoiaʻiʻo i ke ʻano like ʻana o nā pōʻai a pau.	
		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.	Hoʻomaopopo a wehewehe i nā pilina ma nā huina, nā kahahānai, a me ke kaula hōʻike piko/kīkoʻo i hoʻopuni ʻia. Hoʻokomo hoʻi i ka pilina o nā huina kauwaena e hoʻopuni ʻia a me nā huina e hoʻopuni; he mau huina kūpono nā huina i hoʻopuni ʻia ma ke anawaena; he kaha kūpono ke kahahānai o ka pōʻai i ke kahapili/kaha pā lihi ma kahi e hui ai ke kahahānai i ka pōʻai.	
		G.C.3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	Kūkulu i nā pōʻai hoʻopuni ʻia a hoʻopuni o ka huinakolu, a hōʻoiaʻiʻo i nā anopili o nā huina no kekahi huinahā i hoʻopuni e ka pōʻai.	
		G.C.4	Construct a tangent line from a point outside a given circle to the circle.	Kūkulu i ke kahapili/kaha pā lihi mai ke kiko mai waho mai o kekahi pōʻai i koho ʻē ʻia i ia pōʻai nō.	
	Find arc lengths and areas of	G.C.5	Derive using similarity the fact that the length of the arc intercepted by an angle is	Loaʻa ka manaʻo no ka lōʻihi o ka piʻo e huina pā ʻia e ka huina he lakio like i ke kahahānai ma o ke ʻano like ʻana, a	

	sectors of circles		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.	wehewehe manaʻo i ke ana kahahānai o ka huina ʻo ia ke kūpaʻa o ka lakio like; loaʻa ka haʻilula no ka ʻili o ka ʻāpana.	
Expressing Geometric Properties with Equations	Translate between the geometric description and the equation for a conic section	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.	Loaʻa ka haʻihelu o ka pōʻai o ke kauwaena a me ke kahahānai i koho ʻia ma ka hoʻohana ʻana i ka Manaʻohaʻi *Pythagorean*; hoʻopau i ke kuea e huli a loaʻa ke kauwaena a me ke kahahānai o ka pōʻai e loaʻa i ka haʻihelu.	
		G.GPE.2	Derive the equation of a parabola given a focus and directrix.	Loaʻa ka haʻihelu o ka palapola i ka hāʻawi ʻia he kiko paʻa a he kaha anaʻālike.	
		G.GPE.3	Derive the equations of ellipses and hyperbolas given the foci.	Loaʻa ka haʻihelu o ka pōʻai lōʻihi a me ka *hyperbola* ke hāʻawi ʻia i nā kiko paʻa.	
	Use coordinates to prove simple geometric theorems algebraically	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, sqrt3) lies on the circle centered at the origin and containing the point (0, 2).	Hoʻohana i nā kuhikuhina e hōʻoiaʻiʻo i nā manaʻohaʻi ana honua nōhie/maʻalahi ma ka hōʻailona helu.	
		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).	Hōʻoiaʻiʻo i ke koina ihona no nā kaha pilipā/moe like a me nā kaha kūpono a hoʻohana e hoʻomākalakala i nā polopolema/nane haʻi ana honua (e laʻa, huli a a loaʻa ka haʻihelu o ke kaha moe like/pilipā a i ʻole ke kaha kūpono a i kekahi kaha e pā ai ke kiko e koho ʻē ʻia).	

		G.GPE.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Huli a loaa ke kiko ma kekahi ʻāpana kaha kuhi ʻiʻo ma waena o ʻelua kiko e hāʻawi ʻia a e ʻoki i ka ʻāpana kaha ma nā lakio i hāʻawi ʻia.	
		G.GPE.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.*	Hoʻohana i nā kuhikuhina e helu i ke anapuni o nā huina lehulehu a me ka ʻili o nā huinakolu a me nā huinahā lōʻihi, e laʻa, ma ka hoʻohana ʻana i ka haʻilula mamao.	
Geometric Measurement and Dimension	Explain volume formulas and use them to solve problems	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.	Hāʻawi i ke kahua manaʻo/kumu manaʻo mōhalu no nā haʻilula no ke anapuni o ka pōʻai, ka ʻili o ka pōʻai, ka pihanahaka o ka paukū olokaʻa, o ka pelamika, a o ka ʻōpuʻu. Hoʻohana i ke kahua manaʻo/kumu manaʻo kālailai, ke kulehana/kahua hana a *Cavalieri*, a me nā kahua manaʻo/kumu manaʻo mōhalu kaupalena ʻia.	
		G.GMD.2	Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.	Hōʻike mōhalu i ke kahua manaʻo/kumu manaʻo ma ka hoʻohana ʻana i ke kulehana/kahua hana *Cavalieri* no nā haʻilula no ka pihanahaka o ka paʻapoepoe a ma nā kinona papa ʻē aʻe.	
		G.GMD.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.*	Hoʻohana i nā haʻilula pihanahaka no nā paukū olokaʻa, nā pelamika, nā ʻōpuʻu, a me nā paʻapoepoe e hoʻomākalakala polopolema/nane haʻi.	
	Visualize relationships between two-dimensional and three-dimensional objects	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.	Hoʻomaopopo i nā kinona papa e loaʻa ma ka ʻoki ʻana i ʻāpana o nā kinona paʻa, a hoʻomaopopo i nā kinona paʻa i hoʻokumu ʻia ma ka hoʻowili ʻana i nā kinona papa.	

	Apply geometric concepts in modeling situations	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).*	Hoʻohana i nā kinona ana honua, ko lākou mau ana, a me ko lākou mau ʻanopili e haʻi ʻano i nā mea (e laʻa, kūkohu i ke kumu lāʻau a i ʻole ke kino kānaka me ke ʻano he paukū olokaʻa).	
Modeling with Geometry	Apply geometric concepts in modeling situations	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).*	Hoʻohana i ka manaʻo nui o ka paʻapū e pili i ka ʻili a me ka pihanahaka i ke kūkohu ʻana i nā pōʻaiapili (e laʻa, ka paʻapū pūʻuo kanaka o ka mile, nā BTU o ke kapuaʻi paʻaʻiliono).	
		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). *	Hoʻohana i ke kiʻihana ana honua e hoʻomākalakala i nā pilikia hakulau (e laʻa, ka haku ʻana i mea a i ʻole i hale e hoʻokō i nā kaupalena ʻāina a i ʻole e hōʻemi kālā; ka hoʻohana ʻana i nā ʻōnaehana makaʻaha ʻāina e pili i nā lakio).	
Interpreting Categorical and Quantitative Data	Summarize, represent, and interpret data on a single count or measurement variable	S.ID.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).	Hōʻike i ka ʻikepili/ʻike ke kākuhi ʻana ma ka laina helu maoli (nā kākuhi kiko, nā pakuhi ʻaukā pinepine, a me nā pakuhi pahu).	
		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.	Hoʻohana i ka ʻikepili/ʻike helu e kohu i ke ʻano o ka hoʻoili ʻikepili/ ʻike e hoʻohālikelike i ke kauwaena (ka helu kūwaena, ka ʻawelike), a me ka laulā (*interquartile range, standard deviation*) o ʻelua a ʻoi ʻōpaʻa/hui ʻikepili/ʻike ʻokoʻa.	
		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).	Unuhi i nā mea ʻokoʻa o ke kinona, ke kauwaena, a me ka laulā i ka pōʻaiapili o ka ʻōpaʻa/hui ʻikepili/ʻike, me ka nānā ʻana i nā hopena o nā kiko ʻikepili e moewaho lā.	
		S.ID.4	Use the mean and standard deviation of a data set to fit it to a	Hoʻohana i ka ʻawelike a me ka *standard deviation* o ka ʻōpaʻa/hui	

			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.	ʻikepili/ʻike e hoʻolike i ka hoʻoili maʻamau a e koho/kuhi i ka pākēneka hoʻoulu. Hoʻokūʻike i kekahi ʻōpaʻa/hui ʻikepili/ʻike e kohu ʻole i ia kaʻina hana. Hoʻohana i ka mikini helu, ka pakuhi makaʻaha, a me nā pakuhi papa e koho/kuhi i nā wahi ma lalo o ka uma maʻamau.	
	Summarize, represent, and interpret data on two categorical and quantitative variables	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.	Hōʻuluʻulu i ka ʻikepili/ʻike waeʻano no ʻelua māhele ma ka pakuhi papa *two-way frequency*. Unuhi i ke alapine pili i ka pōʻaiapili o ka ʻikepili/ʻike (me nā alapine pili *joint, marginal,* a *conditional*). Hoʻokūʻike i nā pilina e hiki a me nā lauana e hiki o ka ʻikepili/ʻike.	
		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. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggest a linear association.	Hōʻike i ka ʻikepili/ʻike ma ʻelua kumuloli ana nui ma ka pakuhi kikokiko, a haʻi ʻano i ka pilina o nā kumuloli. a. Hoʻopili i ka hahaina i ka ʻikepili/ʻike kūpono; hoʻohana i ka hahaina kohu i ka ʻikepili/ʻike e hoʻomākalakala i nā polopolema/nane haʻi i ka pōʻaiapili o ka ʻikepili/ʻike. Hoʻohana i ka hahaina i hāʻawi ʻia a i ʻole e koho i ka hahaina o ka pōʻaiapili e kuhi ai. Kālele i nā kūkohu pili laina, pāhoʻonui lua, a pāhoʻonui. e. Loiloi mōhalu i ke kohu ʻana o ka hahaina ma o ke kākuhi ʻana a me ke kālailai ʻia ʻana i nā koena. i. Hoʻolike i ka hahaina pili laina no ka pakuhi kikokiko e kuhi ana i ka pilina me ka laina.	

	Interpret linear models	S.ID.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	Unuhi i ka ihona (ka lakio o ka loli) a me ka huina pā (ka mahele pa‘a) o ke kūkohu laina i ka pō‘aiapili o ka ‘ikepili/‘ike.	
		S.ID.8	Compute (using technology) and interpret the correlation coefficient of a linear fit	Helu (me ka ‘enehana) a unuhi i ke ka‘ilau pili pono o ka ho‘okohu pili laina.	
		S.ID.9	Distinguish between correlation and causation	Hō‘oko‘a/waele‘a/Hō‘oia i ka pili pono a i ka hopena.	
Making Inferences and Justifying Conclusions	Understand and evaluate random processes underlying statistical experiments	S.IC.1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.	Maopopo ka ‘ike/‘ikepili helu ma ke ‘ano he ka‘ina hana no ka mana‘o kuhi ‘ana no ka palena ho‘oulu e pili i ka hāpana koho wale ‘ia mai ia ho‘oulu ‘ana.	
		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?	Ho‘oholo i ke kohu pono o ka hopena o kekahi ka‘ina hana i hā‘awi ‘ia me ke kūkohu kiko‘ī/pilikahi, e la‘a, ka ho‘ohana ‘ana i ka ho‘omeamea.	
	Make inferences and justify conclusions from sample surveys, experiments, and observational studies	S.IC.3	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	Ho‘okū‘ike i nā kumu a me ka ‘oko‘a o nā anaman‘o hāpana, nā ho‘okolohua, a me ka huli kaulona; wehewehe i ka pilina o ke koho wale a me nā pākahi a pau o luna.	
		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	Ho‘ohana i ka ‘ikepili/’ike mai ke anamana‘o hāpana e koho/kuhi i ka ‘awelike ho‘oulu a i ‘ole ka lakio like; ho‘omōhala i ka *margin of error* ma o ka	

			simulation models for random sampling.	hoʻohana ʻana i ke kūkohu hoʻomeamea no ka hāpana koho wale.	
		S.IC.5	Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.	Hoʻohana i ka ʻikepili/ʻike o ka hoʻokolohua koho wale ʻia e hoʻohālikelike i ʻelua ʻano hana; hoʻohana i ka hoʻomeamea e hoʻoholo inā he mea nui ka ʻokoʻa o nā kaupalena.	
		S.IC.6	Evaluate reports based on data.	Loiloi i nā palapala hōʻike e pili i ka ʻike/ʻikepili.	
Conditional Probability and the Rules of Probability	Understand independence and conditional probability and use them to interpret data	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").	Haʻiʻano i nā hanana he mau ʻōpaʻa/hui lalo o ka *sample space* (ka ʻōpaʻa/hui o nā hopena) me ka hoʻohana ʻana i nā hiʻohiʻona (a i ʻole he māhele) o ka hopena, a i ʻole ma ke ʻano he hui, he huina pā a i ʻole he hoʻopiha kūpono o nā hanana hou aku ("a i ʻole," "a me," " ʻaʻole").	
		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.	Maopopo he kūʻokoʻa nā hanana ʻelua ʻo A a me B inā ʻo ka pahiki o ke kupu pū ʻana o A a me B ka hua loaʻa o ko lāua pahiki, a hoʻohana i kēia ʻanopili e hoʻoholo i ko lāua ʻano he kūʻokoʻa.	
		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	Maopopo ka pahiki *conditional* o A ke loaʻa ʻo B ma ke ʻano P(A a me B)/P(B), a unuhi i ke kūʻokoʻa o A a me B ma ka ʻōlelo ʻana ʻo ka pahiki *conditional* o A ke like ʻo B me ka pahiki o A, a ʻo ka pahiki *conditional* o B ke like ʻo A me ka pahiki like ʻo B.	

			probability of B.		
		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.	Kūkulu a unuhi i ka pakuhi papa *two-way frequency* o ka ʻikepili//ike ke pili ʻelua māhele me kēlā mea kēia mea e waeʻano ʻia ana. Hoʻohana i ka pakuhi papa *two-way* ma ke ʻano he *sample space* e hoʻoholo i ke kūʻokoʻa o nā hanana a e kokekau i nā pahiki *conditional*.	
		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.	Hoʻokūʻike a wehewehe i ka manaʻonui o ka pahiki *conditional* a me ke kūʻokoʻa i ka ʻōlelo maʻamu a i nā pōʻaiapili o ka nohona.	
	Use the rules of probability to compute probabilities of compound events in a	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.	Huli a loaʻa ka pahiki *conditional* o A inā ʻo B ka hakina o ko B hopena e like ana me ko A hopena kekahi, a unuhi i ka haʻina e pili i ke kūkohu.	
		S.CP.7	Apply the Addition Rule, P(A or	Hoʻohana ka Lula Hoʻohui P(A a i ʻole B)	

	uniform probability model		B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model.	= P(A) + P(B) - P(A a me B), a unuhi i ka haʻina e pili i ke kūkohu.	
		S.CP.8	Apply the general Multiplication Rule in a uniform probability model, P(A and B) = $[P(A)]*[P(B \mid A)] = [P(B)]*[P(A \mid B)]$, and interpret the answer in terms of the model.	Hoʻohana i ka Lula Hoʻonui laulā ma ke kūkohu pahiki makalike, P(A a me B) = $[P(A)]*[P(B \mid A)] = [P(B)]*[P(A \mid B)]$, a unuhi i ka haʻina e pili i ke kūkohu.	
		S.CP.9	Use permutations and combinations to compute probabilities of compound events and solve problems.	Hoʻohana i ke kake kaʻina a me ke huihuina e helu i nā pahiki o nā hanana pūhui a hoʻomākalakala polopolema/nane haʻi.	
Using Probability to Make Decisions	Calculate expected values and use them to solve problems	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.	Wehewehe i ke kumuloli koho wale no ka nui o ka uku pāneʻe ma o ka hoʻāmana ʻana i ka waiwai helu i nā hanana pakahi ma ka *sample space*; kākuhi i ka hoʻoili pahiki kūpili me ka hoʻohana ʻana i ka hōʻikeʻike kiʻi no ka hoʻoili ʻike/ʻikepili.	
		S.MD.2	Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.	Helu i ka waiwai i mahuʻi ʻia o ke kumuloli koho wale ʻia; unuhi ma ke ʻano he ʻawelike o ka hoʻoili pahiki.	
		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	Hoʻomōhala i ka hoʻoili pahiki no ke kumuloli koho wale ʻia e wehewehe ʻia no ka *sample space* i hiki ke helu ʻia ka manaʻohaʻi pahiki; huli a loaʻa ka waiwai i mahuʻi ʻia.	

			all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.		
		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 T V sets would you expect to find in 100 randomly selected households?	Hoʻomōhala i ka hoʻoilo pahiki no ke kumuloli koho wale ʻia e wehewehe ʻia no ka *sample space* e hoʻāmana ʻia ai ka pahiki ma ka nānā pono ʻana; huli a loaʻa ka waiwai e mahuʻi ʻia.	
	Use probability to evaluate outcomes of decisions	S.MD.5	Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. 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,	Kaupaona i nā hopena e hiki ke hoʻoholo ʻia e ka hoʻāmana ʻia ʻana o ka pahiki i ka waiwai ukupau a me ka huli ʻana a loaʻa ka waiwai e mahuʻi ʻia. a. Huli a loaʻa i ka ukupau e mahuʻi ʻia no ka pāʻani papaha. e. Loiloi a hoʻohālikelike i ke kaʻakālai e pili i ka waiwai e mahuʻi ʻia.	

			chances of having a minor or a major accident.		
		S.MD.6	Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator).	Hoʻohana i ka pahiki e hoʻoholo i ka hopena kaulike (e laʻa, ma ka huki ʻana i ka hailona, ma ka hoʻohana ʻana i ka mea hoʻopuka helu koho wale ʻia).	
		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).	Kālailai i nā koho a me nā kaʻakālai ma ka hoʻohana ʻana i nā manaʻo pahiki (e laʻa, ka hoʻāʻo hualoaʻa, ka hoʻāʻo lāʻau lapaʻau, ka huki ʻana i ka ʻalihikūlele ma ka hopena o ka pāʻani pōpeku ʻana).	