



COMMON CORE STATE STANDARDS FOR

Mathematics

Appendix A:

Designing High School
Mathematics Courses
Based on the Common
Core State Standards

Overview of the Traditional Pathway for the Common Core State Mathematics Standards

This table shows the domains and clusters in each course in the Traditional Pathway. The standards from each cluster included in that course are listed below each cluster. For each course, limits and focus for the clusters are shown in italics.

	Domains	High School Algebra I	Geometry	Algebra II	Fourth Courses*
Number and Quantity	The Real Number System	<ul style="list-style-type: none"> Extend the properties of exponents to rational exponents. N.RN.1, 2 Use properties of rational and irrational numbers. N.RN.3 			
	Quantities	<ul style="list-style-type: none"> Reason quantitatively and use units to solve problems. <i>Foundation for work with expressions, equations and functions</i> N.Q.1, 2, 3 			
	The Complex Number System			<ul style="list-style-type: none"> Perform arithmetic operations with complex numbers. N.CN.1, 2 Use complex numbers in polynomial identities and equations. <i>Polynomials with real coefficients</i> N.CN.7, (+) 8, (+) 9 	<ul style="list-style-type: none"> Perform arithmetic operations with complex numbers. (+) N.CN.3 Represent complex numbers and their operations on the complex plane. (+) N.CN.4, 5, 6
	Vector Quantities and Matrices				<ul style="list-style-type: none"> Represent and model with vector quantities. (+) N.VM.1, 2, 3 Perform operations on vectors. (+) N.VM.4a, 4b, 4c, 5a, 5b Perform operations on matrices and use matrices in applications. (+) N.VM.6, 7, 8, 9, 10, 11, 12

*The (+) standards in this column are those in the Common Core State Standards that are not included in any of the Traditional Pathway courses. They would be used in additional courses developed to follow Algebra II.

	Domains	High School Algebra I	Geometry	Algebra II	Fourth Courses
Algebra	Seeing Structure in Expressions	<ul style="list-style-type: none"> Interpret the structure of expressions. <i>Linear, exponential, quadratic</i> A.SSE.1a, 1b, 2 Write expressions in equivalent forms to solve problems. <i>Quadratic and exponential</i> A.SSE.3a, 3b, 3c 		<ul style="list-style-type: none"> Interpret the structure of expressions. <i>Polynomial and rational</i> A.SSE.1a, 1b, 2 Write expressions in equivalent forms to solve problems. A.SSE.4 	
	Arithmetic with Polynomials and Rational Expressions	<ul style="list-style-type: none"> Perform arithmetic operations on polynomials. <i>Linear and quadratic</i> A.APR.1 		<ul style="list-style-type: none"> Perform arithmetic operations on polynomials. <i>Beyond quadratic</i> A.APR.1 Understand the relationship between zeros and factors of polynomials. A.APR.2, 3 Use polynomial identities to solve problems. A.APR.4, (+) 5 Rewrite rational expressions. <i>Linear and quadratic denominators</i> A.APR.6, (+) 7 	
	Creating Equations	<ul style="list-style-type: none"> Create equations that describe numbers or relationships. <i>Linear, quadratic, and exponential (integer inputs only); for A.CED.3 linear only</i> A.CED.1, 2, 3, 4 		<ul style="list-style-type: none"> Create equations that describe numbers or relationships. <i>Equations using all available types of expressions, including simple root functions</i> A.CED.1, 2, 3, 4 	

	Domains	High School Algebra I	Geometry	Algebra II	Fourth Courses
Algebra	Reasoning with Equations and Inequalities	<ul style="list-style-type: none"> Understand solving equations as a process of reasoning and explain the reasoning. <i>Master linear; learn as general principle</i> A.REI.1 Solve equations and inequalities in one variable. <i>Linear inequalities; literal that are linear in the variables being solved for; quadratics with real solutions</i> A.REI.3, 4a, 4b Solve systems of equations. <i>Linear-linear and linear-quadratic</i> A.REI.5, 6, 7 Represent and solve equations and inequalities graphically. <i>Linear and exponential; learn as general principle</i> A.REI.10, 11, 12 		<ul style="list-style-type: none"> Understand solving equations as a process of reasoning and explain the reasoning. <i>Simple radical and rational</i> A.REI.2 Represent and solve equations and inequalities graphically. <i>Combine polynomial, rational, radical, absolute value, and exponential functions</i> A.REI.11 	<ul style="list-style-type: none"> Solve systems of equations. (+) A.REI.8, 9
		<ul style="list-style-type: none"> Understand the concept of a function and use function notation. <i>Learn as general principle; focus on linear and exponential and on arithmetic and geometric sequences</i> F.IF.1, 2, 3 Interpret functions that arise in applications in terms of a context. <i>Linear, exponential, and quadratic</i> F.IF.4, 5, 6 Analyze functions using different representations. <i>Linear, exponential, quadratic, absolute value, step, piecewise-defined</i> F.IF.7a, 7b, 7e, 8a, 8b, 9 		<ul style="list-style-type: none"> Interpret functions that arise in applications in terms of a context. <i>Emphasize selection of appropriate models</i> F.IF.4, 5, 6 Analyze functions using different representations. <i>Focus on using key features to guide selection of appropriate type of model function</i> F.IF.7b, 7c, 7e, 8, 9 	<ul style="list-style-type: none"> Analyze functions using different representations. <i>Logarithmic and trigonometric functions</i> (+) F.IF.7d
Functions	Interpreting Functions				

	Domains	High School Algebra I	Geometry	Algebra II	Fourth Courses
Functions	Building Functions	<ul style="list-style-type: none"> Build a function that models a relationship between two quantities. <i>For F.BF.1, 2, linear, exponential, and quadratic</i> F.BF.1a, 1b, 2 Build new functions from existing functions. <i>Linear, exponential, quadratic, and absolute value; for F.BF.4a, linear only</i> F.BF.3, 4a 		<ul style="list-style-type: none"> Build a function that models a relationship between two quantities. <i>Include all types of functions studied</i> F.BF.1b Build new functions from existing functions. <i>Include simple radical, rational, and exponential functions; emphasize common effect of each transformation across function types</i> F.BF.3, 4a 	<ul style="list-style-type: none"> Build a function that models a relationship between two quantities. (+) F.BF.1c Build new functions from existing functions. (+) F.BF.4b, 4c, 4d, 5
	Linear, Quadratic, and Exponential Models	<ul style="list-style-type: none"> Construct and compare linear, quadratic, and exponential models and solve problems. F.LE.1a, 1b, 1c, 2, 3 Interpret expressions for functions in terms of the situation they model. <i>Linear and exponential of form $f(x)=b^x+k$</i> F.LE.5 		<ul style="list-style-type: none"> Construct and compare linear, quadratic, and exponential models and solve problems. <i>Logarithms as solutions for exponentials</i> F.LE.4 	
	Trigonometric Functions			<ul style="list-style-type: none"> Extend the domain of trigonometric functions using the unit circle. F.TF.1, 2 Model periodic phenomena with trigonometric functions. F.TF.5 Prove and apply trigonometric identities. F.TF.8 	<ul style="list-style-type: none"> Extend the domain of trigonometric functions using the unit circle. (+) F.TF.3, 4 Model periodic phenomena with trigonometric functions. (+) F.TF. 6, 7 Prove and apply trigonometric identities. (+) F.TF. 9

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Geometry	Congruence		<ul style="list-style-type: none"> Experiment with transformations in the plane. G.CO.1, 2, 3, 4, 5 Understand congruence in terms of rigid motions. <i>Build on rigid motions as a familiar starting point for development of concept of geometric proof</i> G.CO.6, 7, 8 Prove geometric theorems. <i>Focus on validity of underlying reasoning while using variety of ways of writing proofs</i> G.CO.9, 10, 11 Make geometric constructions. <i>Formalize and explain processes</i> G.CO.12, 13 		
	Similarity, Right Triangles, and Trigonometry		<ul style="list-style-type: none"> Understand similarity in terms of similarity transformations. G.SRT.1a, 1b, 2, 3 Prove theorems involving similarity. G.SRT.4, 5 Define trigonometric ratios and solve problems involving right triangles. G.SRT.6, 7, 8 Apply trigonometry to general triangles. G.SRT.9, 10, 11 		

	Domains	High School Algebra I	Geometry	Algebra II	Fourth Courses
Geometry	Circles		<ul style="list-style-type: none"> Understand and apply theorems about circles. G.C.1, 2, 3, (+) 4 Find arc lengths and areas of sectors of circles. <i>Radian introduced only as unit of measure</i> G.C.5 		
	Expressing Geometric Properties with Equations		<ul style="list-style-type: none"> Translate between the geometric description and the equation for a conic section. G.GPE.1, 2 Use coordinates to prove simple geometric theorems algebraically. <i>Include distance formula; relate to Pythagorean theorem</i> G.GPE. 4, 5, 6, 7 		<ul style="list-style-type: none"> Translate between the geometric description and the equation for a conic section. (+) G.GPE.3
	Geometric Measurement and Dimension		<ul style="list-style-type: none"> Explain volume formulas and use them to solve problems. G.GMD.1, 3 Visualize the relation between two-dimensional and three-dimensional objects. G.GMD.4 		<ul style="list-style-type: none"> Explain volume formulas and use them to solve problems. (+) G.GMD.2
	Modeling with Geometry		<ul style="list-style-type: none"> Apply geometric concepts in modeling situations. G.MG.1, 2, 3 		
Statistics and Probability	Interpreting Categorical and Quantitative Data	<ul style="list-style-type: none"> Summarize, represent, and interpret data on a single count or measurement variable. S.ID.1, 2, 3 Summarize, represent, and interpret data on two categorical and quantitative variables. <i>Linear focus, discuss general principle</i> S.ID.5, 6a, 6b, 6c Interpret linear models S.ID.7, 8, 9 		<ul style="list-style-type: none"> Summarize, represent, and interpret data on a single count or measurement variable. S.ID.4 	

	Domains	High School Algebra I	Geometry	Algebra II	Fourth Courses
Statistics and Probability	Making Inferences and Justifying Conclusions			<ul style="list-style-type: none"> Understand and evaluate random processes underlying statistical experiments. S.IC.1, 2 Make inferences and justify conclusions from sample surveys, experiments and observational studies. S.IC.3, 4, 5, 6 	
	Conditional Probability and the Rules of Probability		<ul style="list-style-type: none"> Understand independence and conditional probability and use them to interpret data. <i>Link to data from simulations or experiments</i> S.CP.1, 2, 3, 4, 5 Use the rules of probability to compute probabilities of compound events in a uniform probability model. S.CP.6, 7, (+) 8, (+) 9 		
	Using Probability to Make Decisions		<ul style="list-style-type: none"> Use probability to evaluate outcomes of decisions. <i>Introductory; apply counting rules</i> (+) S.MD.6, 7 	<ul style="list-style-type: none"> Use probability to evaluate outcomes of decisions. <i>Include more complex situations</i> (+) S.MD.6, 7 	<ul style="list-style-type: none"> Calculate expected values and use them to solve problems. (+) S.MD.1, 2, 3, 4 Use probability to evaluate outcomes of decisions.. (+) S.MD. 5a, 5b