

K–12 Mathematics Benchmarks Correlations

KEY:

- Middle School Course 1 = MS 1; Course 2 = MS 2; One-Year Advanced Course = MS A
- High School Integrated Course 1 = Int 1; Course 2 = Int 2; Course 3 = Int 3
- High School Traditional Algebra I = Alg I; Geometry = Geo; Algebra II = Alg II
- Achieve's Algebra II End-of-Course Exam Core = EOC A2 Core; Module = EOC A2 Mod
- ADP = American Diploma Project
- Tasks = Tasks
- part = partial; opt = optional

K–12 Mathematics Benchmarks Correlations

NUMBER

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
N.A.1 Rational numbers.													
a. Identify rational numbers, represent them in various ways, and translate among these representations.	A.1		PK.A.1									I1, MR2	
b. Understand and use inequalities to compare rational numbers; apply basic rules of inequalities to transform expressions involving rational numbers.	A.1		PK.A.1									I2.2	
c. Locate rational numbers on the number line and explain the significance of these locations.	A.1		PK.A.1									I2.1, I2.2	
d. Know and apply effective methods of calculation with rational numbers.	A.2		PK.A.2									I1, I1.1	2, 16, 28
e. Recognize, describe, extend, and create well-defined numerical patterns.	A.3		PK.A.3										
f. Solve practical problems involving rational numbers.	A.2		PK.A.2									I1.2	2, 16, 28
N.A.2 Absolute values.													
a. Know and apply the definition of absolute value.		A.1	PK.A.7									I2.1	
b. Interpret absolute value as distance from zero.		A.1	PK.A.7									I2.1	
c. Interpret absolute value of a difference as "distance between."		A.1	PK.A.7									I2.1	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
N.A.3 Prime decomposition, factors, and multiples.													
a. Know and apply the Fundamental Theorem of Arithmetic, that every positive integer is either prime itself or can be written as a unique product of primes (ignoring order).	A.4		PK.A.4									I1.4	
b. Explain the meaning of the greatest common divisor (greatest common factor) and the least common multiple and use them in operations with fractions.	A.4		PK.A.4									I1.4	
c. Write equivalent fractions by multiplying both numerator and denominator by the same non-zero whole number or dividing by common factors in the numerator and denominator.	A.4		PK.A.4										
N.A.4 Ratios, rates, and derived quantities.													
a. Interpret and apply measures of change such as percent change and rates of growth.	B.1		G.1				A.1					I1.2	
b. Calculate with quantities that are derived as ratios and products.	B.1		G.1				A.1					I1.2	
c. Solve data problems using ratios, rates, and product quantities.	B.1		G.1				A.1					I1.2	2, 25
d. Create and interpret scale drawings as a tool for solving problems.	B.1		G.1	A1			A.1					K7	
e. Use unit analysis to clarify appropriate units in calculations.				A.1			A.1					K8.1	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
f. Identify and apply derived measures.				A.1			A.1					K8.2	16
g. Use and identify potential misuses of weighted averages.				A.1			A.1			S.1.b		L2.2	2
N.B.1 Estimation and approximation.													
a. Use simple estimates to predict results and verify the reasonableness of calculated answers.	A.5		PK.A.5									MR5, MR8	
b. Develop, apply, and explain different estimation strategies for a variety of common arithmetic problems.	A.5		PK.A.5									MR5	2, 16
c. Explain the phenomenon of rounding error, identify examples, and, where possible, compensate for inaccuracies it introduces.	A.5		PK.A.5									MR5	24
d. Determine a reasonable degree of precision in a given situation.					A.4		A.2					MR5	7, 24
e. Interpret and compare extreme numbers (e.g., lottery odds, national debt, astronomical distances).					A.4		A.2					I2.2	
f. Apply significant figures, orders of magnitude, and scientific notation when making calculations or estimations.					A.4		A.2					I1.5, MR5	
g. In a problem situation, use judgment to determine when an estimate is appropriate and when an exact answer is needed.	A.5		PK.A.5									MR5	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
N.B.2 Exponents and roots.													
a. Use the definition of a <i>root</i> of a number to explain the relationship of powers and roots.		A.2	A.1							O3.b		J1.1	
b. Estimate square and cube roots and use calculators to find good approximations.		A.2	A.1									I2.2, I4.1, M5	
c. Evaluate expressions involving positive integer exponents and interpret such exponents in terms of repeated multiplication.	A.6		PK.A.6									J1.1	
d. Convert between forms of numerical expressions involving roots and perform operations on numbers expressed in radical form.					B.1, B.5		C.1			O1.a, O1.b		J1.1, J1.2	19
e. Interpret rational and negative exponents and use them to rewrite expressions in alternative forms.					B.1		C.1			O1.b, O1.c			
N.B.3 Real numbers.													
a. Categorize real numbers as either rational or irrational and know that, by definition, these are the only two possibilities.		A.3	A.2										
b. Establish simple facts about rational and irrational numbers using logical arguments and examples.						A.3	C.2						
c. Show that a given interval on the real number line, no matter how small, contains both rational and irrational numbers.						A.3 part, A.4 part	C.2 part, C.3 part						

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
d. Extend the properties of computation with rational numbers to real number computation.		A.3	A.2										
N.C.1 Number bases.													
a. Identify key characteristics of the base-10 number system and adapt them to other common number bases (binary, octal, and hexadecimal).		B.1 opt	J.1 opt										
b. Convert binary to decimal and vice versa.		B.1 opt	J.1 opt										
c. Encode data and record measurements of information capacity using various number base systems.		B.1 opt	J.1 opt										
N.D.1 Complex numbers.													
a. Know that if a and b are real numbers, expressions of the form $a + bi$ are called complex numbers, and explain why every real number is a complex number.					D.1				B.1	O2.a		I3	
b. Identify complex conjugates.					D.1				B.1	O2.b			
c. Determine complex number solutions of the form $a + bi$ for certain quadratic equations.					D.2				C.1	E2.a, E2.b		J3, J3.5	
N.E.1 Computation with complex numbers.													
a. Compute with complex numbers.									B.2 opt	O2.b			

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
N.E.2 Argand diagrams.													
a. Interpret complex numbers graphically using an Argand diagram.													
b. Represent the complex number $z = x + iy$ in the polar form $z = r(\cos\theta + i\sin\theta)$ and interpret this form graphically, identifying r and θ .													
c. Explain the effect of multiplication and division of complex numbers using an Argand diagram and its relationship to the polar form of a complex number.													

K–12 Mathematics Benchmarks Correlations

DISCRETE MATHEMATICS

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
D.A.1 Sets and Boolean algebra.													
a. Know the concepts of sets, elements, empty set, relations (e.g., belong to), and subsets, and use them to represent relationships among objects and sets of objects.				E.1			B.1						
b. Perform operations on sets: union, intersection, complement.				E.1			B.1						
c. Create and interpret Venn diagrams to solve problems.				E.1			B.1						
d. Identify whether a given set is finite or infinite; give examples of both finite and infinite sets.				E.1			B.1						
D.B.1 Permutations and combinations.													
a. Determine the number of ways events can occur using permutations, combinations, and other systematic counting methods.				F.3			A.3				R1.a	L4.1	
b. Interpret and simplify expressions involving factorial notation.				F.3			A.4				R1.a	L4.1	
D.B.2 Discrete graphs.													
a. Construct and interpret decision trees.				F.2				A.3			R1.c	L4.5	
b. Create and interpret network graphs.				F.2				A.3					22
c. Construct and interpret flow charts.				F.2				A.3					

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
D.B.3 Iteration and recursion.													
a. Analyze and interpret relationships represented iteratively and recursively.						C.1	D.1 part, D2 part				I2.a		
b. Generate and describe sequences having specific characteristics.						C.2	D.2				I2.af	J1.7*	
c. Demonstrate the effect of compound interest, decay, or growth using iteration.						D.3	D.3				I2.b, II.f	J5.6	
D.C.1 Algorithms.													
a. Identify and give examples of simple algorithms.	A.7		PK.A.8								I2.a		
b. Analyze and apply algorithms for searching, for sorting, and for solving optimization problems.				C..3			B4						27
D.C.2 Mathematical reasoning.													
a. Use correct mathematical notation, terminology, syntax, and logic.				C.1			B.2					K1, MR3, MR4	
b. Distinguish between inductive and deductive reasoning.				C.2			B.3					MR1	
c. Explain and illustrate the role of definitions, conjectures, theorems, proofs, and counterexamples in mathematical reasoning.				C.1 part, C.2 part				B.1 part, B.2 part				K1, K1.1, MR3	1, 6
d. Make, test, and confirm or refute conjectures using a variety of methods.				C.2			B.3 part	B.2 part				MR1, MR3	21

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
D.C.3 Propositional logic.													
a. Use and interpret relational conjunctions (“and,” “or,” “not”), terms of causation (“if... then”) and equivalence (“if and only if”).				E.2			B.2						
b. Describe logical statements using terms such as <i>assumption</i> , <i>hypothesis</i> , <i>conclusion</i> , <i>converse</i> , and <i>contrapositive</i> .				C.1				B.2					
c. Recognize and avoid flawed reasoning such as “Since $A \Rightarrow B$, therefore $B \Rightarrow A$.”				C.2				B.3					
d. Recognize syllogisms, tautologies, and circular reasoning and use them to assess the validity of an argument.				C.2				B.3					
D.E.1 Quantitative applications.													
a. Identify and apply the quantitative issues underlying voting, elections, and apportionment.													
b. Know and use methods of fair division and negotiation strategies.				C.3									
D.E.2 Sequences and series.													
a. Know and use subscript notation to represent the general term of a sequence and summation notation to represent partial sums of a sequence.						C.3 opt					I1.a, I1.b	J1.7*, MR4	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
b. Derive and apply the formulas for the general term of arithmetic and geometric series.						C.3 opt					I1.a	J1.7*, MR4	
c. Derive and apply formulas to calculate sums of finite arithmetic and geometric series.						C.3 opt					I1.b	J1.7*	
d. Derive and apply formulas to calculate sums of infinite geometric series whose common ratio r is in the interval $(-1, 1)$.						C.3 opt					I1.c	J1.7*	
e. Model, analyze, and solve problems using sequences and series.						C.3 opt					I1.f, I2.b	J5.6	
D.E.3 Recursive equations.													
a. Convert the recursive model for discrete linear growth (A_1 is given and $A_{n+1} = A_n + d$ for $n > 1$, d a constant difference) to a closed linear form ($A_n = a + d(n - 1)$).											I1.d	J1.7*	
b. Convert the recursive model of discrete population growth (P_1 is given and $P_{n+1} = rP_n$, for $n > 1$, r a constant growth rate) to a closed exponential form ($P_n = ar^{n-1}$).											I1.e	J1.7*	
c. Analyze, define, and calculate sequences that are neither arithmetic nor geometric using recursive methods.											I2.a		

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
D.E.4 Digital codes.													
a. Interpret common digital codes (e.g., zip codes, universal product codes (UPCs), and ISBNs on books) and identify their special characteristics.													
b. Understand, evaluate, and compare how error detection and error correction are accomplished in different common codes.													
c. Identify characteristics of common forms of data compression (e.g., mp3, jpeg, and gif).													
d. Analyze the concepts underlying public-key encryption and digital signatures that enable messages to be transmitted securely.													
D.E.5 Mathematical induction.													
a. Analyze and describe how mathematical induction rests on the definition of whole numbers and explain how proof by mathematical induction establishes a proposition.												MR1	
b. Identify common theorems that can be proved by mathematical induction and explain why this method of proof works for these theorems.													
c. Use mathematical induction to prove simple propositions.													

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
D.E.6 Proof by contradiction.													
a. Analyze and explain how proof by contradiction can be used to establish a proposition.												MR3	
b. Identify examples of theorems for which an indirect argument is useful and assess whether an indirect argument is useful to prove a particular theorem.													
c. Use an indirect argument to prove a result.													

K–12 Mathematics Benchmarks Correlations

ALGEBRA

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
A.A.1 Variables and expressions.													
a. Interpret and compare the different uses of variables and describe patterns, properties of numbers, formulas, and equations using variables.		C.1	B.1										
b. Analyze and identify characteristics of algebraic expressions.		C.2	B.2							O3.f		J1, J3	
c. Evaluate, interpret, and construct simple algebraic expressions.		C.2	B.2									J1.6, J2.3	
d. Identify and transform expressions into equivalent expressions.		C.2	B.2							O3.f		J1.1, J1.2* J1.4	6, 9, 20
e. Determine whether two algebraic expressions are equivalent.		C.2	B.2							O3.f			20
f. Apply the properties of exponents to transform variable expressions involving integral exponents.					B.2		G.1			O3.c		J1.1	
g. Interpret rational exponents; translate between rational exponents and notation involving integral powers and roots.					B.1 part, B.2 part		C.1 part, G.1 part			O3.a, O3.b		J1.1, J1.2*	
A.A.2 Functions.													
a. Determine whether a relationship is or is not a function.		D.1	C.1									J2.1	
b. Represent and interpret functions using graphs, tables, words, and symbols.		D.1	C.1									MR2	9, 12, 20, 28, 30

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
A.A.3 Linear functions.													
a. Analyze and identify linear functions of one variable.		D.2	C.2										18, 28
b. Know the definitions of x - and y -intercepts, know how to find them, and use them to solve problems.		D.2	C.2									J4.1, J4.2, J4.5	
c. Know the definition of slope, calculate it, and use slope to solve problems.		D.2	C.2									J4.1, K10.1	
d. Express a linear function in several different forms for different purposes.		D.3	C.3									MR2, K10.2	
e. Recognize contexts in which linear models are appropriate; determine and interpret linear models that describe linear phenomena.		D.4	C.4									J5.1, L3.4	28
A.A.4 Proportional functions.													
a. Recognize, graph, and use direct proportional relationships.		D.5 part	C.5 part	B.1			E.1						
b. Recognize, graph, and use reciprocal relationships.				B.2			E.2						
c. Distinguish among and apply linear, direct proportional, and reciprocal relationships.				B.3			E.3						
d. Explain and illustrate the effect of varying the parameters m and b in the family of linear functions and varying the parameter k in the families of directly proportional and reciprocal functions.				B.5			E.4					J4.2	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
A.A.5 Equations and identities.													
a. Distinguish among an equation, an expression, and a function.		E.1	D.1										
b. Solve linear and simple nonlinear equations involving several variables for one variable in terms of the others.					B.6		F.1			E2.e		J3.2	
c. Interpret identities as a special type of equation and identify their key characteristics.		E.1	D.1										
d. Make regular fluent use of basic algebraic identities such as $(a + b)^2 = a^2 + 2ab + b^2$; $(a - b)^2 = a^2 - 2ab + b^2$; and $(a + b)(a - b) = a^2 - b^2$.					B.3		H.7					J1.4	
e. Create, interpret, and apply mathematical models to solve problems arising from contextual situations.				B.4 part	D.3 part		F.5 Part, H4 part					J5, J5.1, J5.2, J5.3, J5.4, J5.5, J5.6	
A.A.6 Linear equations and inequalities.													
a. Solve linear equations in one variable algebraically.		E.2	D.2									J3.1	
b. Solve and graph the solution of linear inequalities in one variable.		E.2	D.2									J3.1, J4.4	
c. Identify the relationship between linear functions of one variable and linear equations in two variables.		E.3	D.3										

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
d. Use graphs to help solve linear equations in one variable.		E.2	D.3									J4, J4.1, J4.2	10
e. Represent any straight line in the coordinate plane by a linear equation in two variables.		E.2	D.3									K10.2	
f. Solve and graph the solution of a linear inequality in two variables.				E.4			F.3					J4.4	
g. Recognize and solve problems that can be modeled using linear equations or inequalities in one or two variables; interpret the solution(s) in terms of the context of the problem.		E.3 part	D.3 part	E.7 part			F.5 part			E1.d		J5.1	10
h. Solve equations and inequalities involving the absolute value of a linear expression in one variable.				E.3			F.2			E1.a		J3.1	
A.B.1 Quadratic functions.													
a. Identify quadratic functions expressed in multiple forms; identify the specific information each form clarifies.					C.1		H.1			P1.a, P1.b		MR2	18
b. Graph quadratic functions and use the graph to help locate zeros.					C.3		H.2 part		C.1 part	P1.b		J4.5,	
c. Recognize contexts in which quadratic models are appropriate; determine and interpret quadratic models that describe quadratic phenomena.					D.3		H.3			P1.d		J.5.3	18, 26

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
A.B.2 Simple quadratic functions.													
a. Solve quadratic equations that can be easily transformed into the form $(x - a)(x - b) = 0$ or $(x + a)^2 = b$, for a and b integers.					C.3		H.4			E2.a		J3.5	
b. Estimate the roots of a quadratic equation from the graph of the corresponding function.					C.3		H.4			P1.b		J4.5	
c. Solve simple quadratic equations that arise in the context of practical problems and interpret their solutions in terms of the context.					D3		H.4			P1.d		J5.3	
A.B.3 Systems of linear equations and inequalities.													
a. Solve systems of simultaneous linear equations in two variables using algebraic procedures.		E.4 part	D.4 part	E.6 part			F.4 part					J3.3	10, 26
b. Use graphs to help solve systems of simultaneous linear equations in two variables.		E.4	D.4									J4.3	10
c. Solve systems of two or more linear inequalities in two variables and graph the solution set.				E.5					A.1	E1.c			27
d. Solve systems of simultaneous linear equations in three variables using algebraic procedures.				E.6					A.2	E1.b, E1.d		J3.4*	
e. Describe the possible arrangements of the graphs of three linear equations in three variables and relate these to the number of solutions of the corresponding system of equations.				E.6					A.2			J3.4*	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
f. Recognize and solve problems that can be modeled using a system of linear equations or inequalities; interpret the solution(s) in terms of the context of the problem.		E.4 part	D.4 part	E.7 part			F.5 part		A.3 part	E1.d		J5.2	27
A.C.1 Elementary functions.													
a. Identify key characteristics of absolute value, step, and other piecewise-linear functions and graph them.						D.1	E.5			F3.al F3.b		J4, J5	11, 12
b. Graph and analyze exponential functions and identify their key characteristics.						D.2	G.2 part		F.1 part, F.4 part	X1.a, X1.b, X1.c		J4.7	18
c. Analyze power functions and identify their key characteristics.					E.1				D.1	P2.a			18
d. Transform the algebraic expression of power functions using properties of exponents and roots.					E.2				D.1	O3.a		J1.1, J1.2	
e. Differentiate the graphs of simple exponential and power functions by their key characteristics.						E.1			F.2	P2.a, P2.c, P2.d X1.b		J4.7	18
f. Recognize and solve problems that can be modeled using exponential and power functions; interpret the solution(s) in terms of the context of the problem.						E.4	G.3 part		D.4 part	E2.a, P2.e, X1.d		J5.4	3, 18
g. Explain, illustrate, and identify the effect of simple coordinate transformations on the graph of a function.						E.5			F.4	X1.c		J4.2, J4.5, J4.6, J4.8	12

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
A.C.2 Polynomial functions.													
a. Transform quadratic functions and interpret their graphical forms.					C.2		H.5 part		C.2 part	P1.a, P1.c		K6	
b. Analyze polynomial functions and identify their key characteristics.					E.3				D.2	P2.b		J4.5	
c. Use key characteristics to identify the graphs of simple polynomial functions.					E.4				D.3	P2.b, P2.c			
d. Recognize and solve problems that can be modeled using simple polynomial functions; interpret the solution(s) in terms of the context of the problem.					E.5				D.4	P1.d, P2.f			26
A.C.3 Polynomial and rational expressions and equations.													
a. Solve and graph quadratic equations having real solutions using a variety of methods.					C.3 part, D.3 part		H.6			E2.a		J4.5	
b. Relate the coefficients a , b , and c of the quadratic equation $ax^2 + bx + c = 0$ to its roots.					D.2				C.1	E2.a, E2.c		J4.5	
c. Distinguish among linear, exponential, polynomial, rational, and power expressions, equations, and functions by their symbolic form.						E.2			F.3			MR2	
d. Perform operations on polynomial expressions.					E.6				D.5	O3.d		J1.3, J1.4	
e. Know and use the binomial expansion theorem.					B.4				D.5			J6*	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
f. Use factoring to reduce rational expressions that consist of the quotient of two simple polynomials.					E.7				E.1	O3.e		J1.3, J1.4	
g. Perform operations on simple rational expressions.					E.8				E.2	O3.e, O3.f		J1.5	
A.D.1 General quadratic equations and inequalities.													
a. Solve and graph quadratic equations having complex solutions.					D.2				C.1	E2.a, E2.b		J3.5	
b. Solve and graph quadratic inequalities in one or two variables.					D.4				C.3	E2.b, E2.d			17
c. Manipulate simple quadratic equations to extract information.					D.5				C.2	E2.c E2.e	C1.b		
A.D.2 Rational and radical equations and functions.													
a. Solve simple rational and radical equations in one variable.						E.3			E.3	E2.a			30
b. Graph simple rational and radical functions in two variables.						E.1 part, E.2 part, E.5 part			E.4	P2.d, P2.e			30
A.E.1 Trigonometric functions.													
a. Relate sine and cosine functions to a central angle of the unit circle.											T1.b	K12.1*	
b. Define and graph trigonometric functions over the real numbers.											T1.c, T1.d, T1.e, T1.f	K12.3*	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
c. Analyze periodic functions and identify their key characteristics.											T1.a, T1.g	K12.3*	
d. Recognize and solve problems that can be modeled using equations and inequalities involving trigonometric functions.											T1.g		
e. Derive and use basic trigonometric identities.				D.3								K12.2*	
f. Solve geometric problems using the sine and cosine functions.											T1.g	K11, K11.2, K11.3, K12*, K12.4*	
A.E.2 Matrices and linear equations.													
a. Know and use matrix notation for rows, columns, and entries of cells.											M1.a		
b. Compute the determinant of a 2x2 or 3x3 matrix.											M2.b		
c. Know and perform addition, subtraction, and scalar multiplication of matrices.											M1.a		
d. Know and perform matrix multiplication.											M1.b		
e. Relate vector and matrix operations to transformations in the coordinate plane.											M3.a		
f. Apply the concept of inverse to matrix multiplication.											M2.b, M2.d		
g. Write and solve systems of 2x2 and 3x3 linear equations in matrix form.											M2.c		

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
A.E.3 Operations on functions.													
a. Compare and contrast properties of different types (families) of functions.									H.3 opt	P2.a	L2.a, L2.b, L2.d		
b. Analyze the transformations of a function from its graph, formula, or verbal description.									F.3 part / opt, G1 part / opt		L2.b, L2.c		
c. Compute the sum, difference, product, and quotient of two functions.									G.1 opt	F1.a		J2.4*	
d. Determine the composition of simple functions, including any necessary restrictions on the domain.						D.4 opt			G.1 opt	F1.b		J2.4*	
A.E.4 Inverse functions.													
a. Analyze characteristics of inverse functions.						D.5 opt			G.2 opt	F2.a		J2.5*	
b. Determine the inverse of linear and simple non-linear functions, including any necessary restrictions on the domain.						D.5 part / opt, D.6 part / opt			G.3 opt	F2.b		J2.5*	
c. Apply properties of logarithms to solve problems and prove theorems.						D.6 opt			G.4 opt		L1.a, L1.b, L2.d	J2.6*	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
A.E.5 Relations.													
a. Know the definition of a relation and distinguish non-function relations from functions.												J2.1	
b. Determine whether a function has the characteristics of reflexivity, symmetry, and transitivity; know that relations exhibiting these characteristics are members of a special class of relations called <i>equivalence relations</i> .													
c. Explain how some geometric concepts, such as equality, parallelism, and similarity, can be defined as equivalence relations.													

K–12 Mathematics Benchmarks Correlations

GEOMETRY

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
G.A.1 Angles and triangles.													
a. Know the definitions and basic properties of angles and triangles in the plane and use them to solve problems.	D.1		PK.C.1									K2, K2.3, K3, K5	8, 21
b. Know and prove basic theorems about angles and triangles.		F.1	PK.C.2									K2, K2.3, K3	
G.A.2 Rigid motions and congruence.													
a. Represent and explain the effect of translations, rotations, and reflections of objects in the coordinate plane.		F.2	E.1									K6	
b. Identify corresponding sides and angles between objects and their images after a rigid transformation.		F.2	E.1										
c. Show how any rigid motion of a figure in the plane can be created by some combination of translations, rotations, and reflections.		F.2	E.1									K6	
G.A.3 Measurement.													
a. Make, record, and interpret measurements.	C.1		PK.B.1									K8.2	
b. Apply units of measure in expressions, equations, and problem situations.	C.1		PK.B.1									K8.1	
c. Use measures of weight, money, time, information, and temperature.	C.1		PK.B.1										

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
d. Record measurements to reasonable degrees of precision, using fractions and decimals as appropriate.	C.1		PK.B.1									K8	24
G.A.4 Length, area, and volume.													
a. Identify and distinguish among measures of length, area, surface area, and volume.	C.2		PK.B.2									K8.2	
b. Calculate the perimeter and area of triangles, quadrilaterals, and shapes that can be decomposed into triangles and quadrilaterals that do not overlap.	C.2		PK.B.2									K8.2	17, 19
c. Determine the surface area of right prisms and pyramids whose base(s) and sides are composed of rectangles and triangles.	C.2 part		PK.B.2 part	D1				E.1 part				K8.2	19
d. Know, and apply formulas for the surface area of right circular cylinders, right circular cones, and spheres.	C.2 part		PK.B.2 part	D.1 part				E.1 part				K8.2	7
e. Know, and apply formulas for the volume of right prisms, right pyramids, right circular cylinders, right circular cones, and spheres.	C.2 part		PK.B.2 part	D.1 part				E.1 part				K8.2	7
f. Estimate lengths, areas, surface areas, and volumes of irregular figures and objects.	C.2		PK.B.2					E1				K9	
G.B.1 Angles in the plane.													
a. Know and distinguish among the definitions and properties of vertical, adjacent, corresponding, and alternate interior angles.	D.1		PK.C.1									K2.1, K2.3	8

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
b. Identify pairs of vertical angles and explain why they are congruent.	D.1		PK.C.1									K2.3	8
c. Identify pairs of corresponding, alternate interior, and alternate external angles in a diagram where two parallel lines are cut by a transversal and show that they are congruent.	D.1		PK.C.1									K2.3	8
d. Explain why, if two lines are intersected by a third line in such a way as to make the corresponding angles, alternate interior angles, or alternate exterior angles congruent, then the two original lines must be parallel.				D.1				B.2				K2.3	8
e. Apply properties of lines and angles to perform basic geometric constructions.				D.2				B.3				K2, K2.1, K2.3	
G.B.2 Coordinates and slope.													
a. Represent and interpret points, lines, and two-dimensional geometric objects on a coordinate plane.		G.3	E.2									K10	19
b. Determine the area of polygons in the coordinate plane.		G.3	E.2									K10	
c. Know how the word <i>slope</i> is used in common non-mathematical contexts, give physical examples of slope, and calculate slope for given examples.		G.3	E.2									K10.1	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
d. Calculate the slope of a line in a coordinate plane.		G.3	E.2									K10.1	
e. Interpret and apply slope of parallel and perpendicular lines in a coordinate plane.		G.3	E.2										
G.B.3 Pythagorean theorem.													
a. Interpret and prove the Pythagorean theorem and its converse.		A.4	A.3									K1.2, K5	
b. Determine distances between points in the Cartesian coordinate plane.		A.4	A.3									K10.3	
c. Apply the Pythagorean theorem and its converse to solve problems.		A.4	A.3									K5	1
G.B.4 Circles.													
a. Identify and explain the relationships among the radius, diameter, circumference, and area of a circle.	D.2		F.1									K4	25
b. Show that for any circle, the ratio of the circumference to the diameter is the same as the ratio of the area to the square of the radius and that these ratios are the same for different circles.	D.2		F.1										
c. Know and apply formulas for the circumference and area of a circle.	D.2		F.1									K4, K8.2	7, 25

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
G.B.5 Scaling, dilation, and dimension.													
a. Analyze and represent the effects of multiplying the linear dimensions of an object in the plane by a constant scale factor, r .	B.2		G.2									K8.3	19
b. Describe the effect of a scale factor r on length, area, and volume.	B.2		G.2	A.2 part								K8.3	19
c. Recognize and use relationships among volumes of common solids.				A.3				E.1				K8.2	
d. Interpret and represent origin-centered dilations of objects in the coordinate plane.				A.4				C.4					19
G.B.6 Similarity and congruence.													
a. Interpret the definition and characteristics of similarity for triangles in the plane.	B.3		G.3									K3, K7	1
b. Apply similarity in practical situations.	B.3		G.3									K3, K7	1
c. Identify and apply conditions that are sufficient to guarantee similarity of triangles.				A.5				C.1				K3	1
d. Explain why congruence is a special case of similarity; determine and apply conditions that guarantee congruence of triangles.				A.6				C.2				K3	8
e. Apply the definition and characteristics of congruence to make constructions, solve problems, and verify basic properties of angles and triangles				A.6				C.2				K3, K7	8

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
f. Extend the concepts of similarity and congruence to other polygons in the plane.				A.7				C.3				K7	
G.B.7 Visual representations.													
a. Relate a net, top-view, or side-view to a three-dimensional object that it might represent.	E.1		PK.D.1									K9	7
b. Draw two-dimensional representations of three-dimensional objects by hand and using software.	E.1		PK.D.1									K9	
c. Visualize, describe, or sketch the cross-section of a solid cut by a plane that is parallel or perpendicular to a side or axis of symmetry of the solid.	E.1		PK.D.1									K9	
G.B.8 Geometric constructions.													
a. Carry out and explain simple straightedge and compass constructions.				D.2				B.3				K2, K2.1, K2.2, K2.3	4
b. Use geometric computer or calculator packages to create and test conjectures about geometric properties or relationships.				D.2				B.3					4
G.C.1 Geometry of a circle.													
a. Know and apply the definitions and properties of a circle and the radius, diameter, chord, tangent, secant, and circumference of a circle.						B.1		D.1				K4	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
b. Recognize and apply the fact that a tangent to a circle is perpendicular to the radius at the point of tangency.						B.2		D.1				K4	25
c. Recognize, verify, and apply statements about the relationships between central angles, inscribed angles, and the circumference arcs they define.						B.2		D.1				K4	7, 21
d. Recognize, verify, and apply statements about the relationships between interior and exterior angles of a circle and the arcs and segments they define.						B.2		D.1				K4	25
e. Determine the length of line segments and arcs, the size of angles, and the area of shapes that they define in complex geometric drawings.						B.3		D.2				K2, K8	21, 25
G.C.2 Axioms, theorems, and proofs in geometry.													
a. Use geometric examples to illustrate the relationships among undefined terms, axioms/postulates, definitions, theorems, and various methods of reasoning.						A.1		B.1				K1, K1.1, MR3	8
b. Present and analyze direct and indirect geometric proofs using paragraphs or two-column, or flow-chart formats.				D.1		A.2		B.2				K1.2, MR1, MR3	21

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
c. Use coordinates and algebraic techniques to interpret, represent, and verify geometric relationships.				D.1				A.2 part, D.3 part				K10, K2, K2.1, K2.2, K2.3, K3, K4	
d. Interpret and use locus definitions to generate two- and three-dimensional geometric objects.						B.4		A.2					
e. Recognize that there are geometries other than Euclidean geometry in which the parallel postulate is not true.						B.8		E.5				K2.1	
G.D.1 Triangle trigonometry.													
a. Know the definitions of sine, cosine, and tangent as ratios of sides in a right triangle and use trigonometry to calculate the length of sides, measure of angles, and area of a triangle.				D.3				C.5				K11, K11.2, K11.2	25
b. Show how similarity of right triangles allows the trigonometric functions sine, cosine, and tangent to be properly defined as ratios of sides.				D.3				C.5				K11.1	25
c. Derive, interpret, and use the identity $\sin^2\theta + \cos^2\theta = 1$ for angles θ between 0° and 90° .				D.3				C.5				K12.2*	
G.D.2 Three-dimensional geometry.													
a. Analyze cross-sections of basic three-dimensional objects and identify the resulting shapes.						B.5		E.2				K9	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
b. Describe the characteristics of the three-dimensional object traced out when a one- or two-dimensional figure is rotated about an axis.						B.6		E.3					
c. Analyze all possible relationships among two or three planes in space and identify their intersections.						B.7		E.4					
G.E.1 Spherical geometry.													
a. Know and apply the definition of a great circle.						B.9 opt		E.6 opt				K1.3	
b. Use latitude, longitude, and great circles to solve problems relating to position, distance, and displacement on the earth's surface.						B.9 opt		E.6 opt					
c. Interpret various two-dimensional representations for the surface of a sphere (e.g., two-dimensional maps of the Earth), called projections, and explain their characteristics.						B.9 opt		E.6 opt					
d. Describe geometry on a sphere as an example of a non-Euclidean geometry.						B.9 opt		E.6 opt				K1.3	
G.E.2 Vectors.													
a. Use vectors to represent quantities that have both magnitude and direction.											M4.a		
b. Add and subtract vectors, find their dot product, and multiply a vector by a scalar; interpret the results.											M4.b		

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
c. Use vectors to describe lines in two- and three-dimensional Euclidean space.													
d. Use vectors and their operations to represent situations and solve problems.													
e. Use vectors to represent motions of objects in two and three dimensions.											M4.a		
f. Apply parametric methods to represent motion of objects.													
G.E.3 Conic sections.													
a. Develop and represent conic sections from basic properties.											C1.a, C1.b, C1.c	J4.6*	
b. Describe how the intersection of a plane with a cone can form a circle, an ellipse, a parabola, or a hyperbola depending on the orientation of the plane with respect to the axis of the cone.													
c. Apply conic sections in modeling real-world phenomena.											C1.d		

K–12 Mathematics Benchmarks Correlations

PROBABILITY AND STATISTICS

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
PS.A.1 Simple probability.													
a. Represent probabilities using ratios and percents.	G.1		PK.F.1									L4.1	14
b. Compare probabilities of two or more events and recognize when certain events are equally likely.	G.1		PK.F.1									L4	22
c. Use sample spaces to determine the (theoretical) probabilities of events.	G.1		PK.F.1									L4.4	23
d. Know and use the relationship between probability and odds.	G.1		PK.F.1										14
PS.A.2 Relative frequency and probability.													
a. Describe the relationship between probability and relative frequency.	G.2		H.1								R1.d	L4.2	
b. Identify, create, and describe the key characteristics of frequency distributions of both discrete and continuous data.	G.2		H.1								R1.d		
c. Analyze and interpret actual data to estimate probabilities and predict outcomes.	G.2		H.1								R1.e	L4.5	
d. Compare theoretical probabilities with the results of simple experiments (e.g., tossing dice, flipping coins, spinning spinners).	G.2		H.1								R1.f	L4.5	22
e. Compute and graph cumulative frequencies.	G.2		H.1									L4.2	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
PS.A.3 Question formulation and data collection.													
a. Formulate questions about a phenomenon of interest that can be answered with data.	F.1		I.1									L3.2	5
b. Design a plan to collect appropriate data.		G.1	I.1									L3.2	5
c. Collect and record data.	F.1		I.1									L1.1	5
PS.A.4 Linear trends.													
a. Determine whether a scatter plot suggests a linear trend.		G.5	I.5									L3.4	11, 29
b. Visually determine a line of good fit to estimate the relationship in bivariate data that suggests a linear trend.		G.5	I.5									L3.4	11, 13
PS.B.1 Compound probability.													
a. Calculate probabilities of compound events.				F.1				F.1			R1.c	L4.5	13, 23
b. Use probability to interpret odds and risks and recognize common misconceptions.				F.1				F.1				L4.5	14
c. Show how a two-way frequency table can be used effectively to calculate and study relationships among probabilities for two events.				F.1				F.1			R1.c	L4.2, L4.5	13
d. Recognize probability problems that can be represented by geometric diagrams, the number line, or in the coordinate plane; represent such situations geometrically and apply geometric properties of length or area to calculate the probabilities.				F.1				A.1					

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
PS.B.2 Analysis and interpretation of categorical and quantitative data.													
a. Represent both univariate and bivariate categorical data accurately and effectively.	F.2		PK.E.1								S1.a		11
b. Represent both univariate and bivariate quantitative (measurement) data accurately and effectively.		G.2	I.2								S1.a		
c. Summarize and compare data sets by using a variety of statistics.		G.3	I.3								S1.a	L1.3	11
d. Read, interpret, interpolate, and judiciously extrapolate from graphs and tables.		G.4	I.4									L1.2	29
e. Judge accuracy, reasonableness, and potential for misrepresentation.	F.2		I.2								S2.c	L2, L2.1, L2.2, L2.3	
f. Interpret data and communicate conclusions.		G.4	I.4								S2.b	L1.2	
PS.C.1 Probability distributions.													
a. Identify and distinguish between discrete and continuous probability distributions.					A.1			F.2			R2.a	L4	
b. Know and use the chief characteristics of the normal distribution.					A.2			F.2			R2.b	L1.6	15
c. Calculate and use the mean and standard deviation to describe the characteristics of a distribution.					A.1			F.2				L1.3	15

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
d. Understand how to calculate and interpret the expected value of a random variable having a discrete probability distribution.					A.3			F.2					
PS.C.2 Correlation and regression.													
a. Determine a line of good fit for a scatter plot.						F.3	F.6		H.3		S1.c, S2.a	L1.5, L3.4	11, 29
b. Determine and interpret correlation coefficients.						F.3	F.6 part		H.3 part / opt		S1.c, S2.a	L1.5, L3.4	
PS.D.1 Sample surveys, experiments, and observational studies.													
a. Describe the nature and purpose of sample surveys, experiments, and observational studies, relating each to the types of research questions they are best suited to address.						F.1			H.1		S2.c	L3, L3.1	5
b. Recognize and explain the rationale for using randomness in research designs.						F.2			H.2		S2.c	L3, L3.1	5
c. Use simulations to analyze and interpret key concepts of statistical inference.						F.2			H.2				
d. Plan and conduct sample surveys to estimate population characteristics and experiments to compare treatments.						F.2			H.2			L3.2	5
e. Explain why observational studies generally do not lead to good estimates of population characteristics or cause and effect statements on treatments.						F.1			H.1			L3.3	

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
PS.D.2 Risks and decisions.													
a. Apply probability to practical situations to make informed decisions.					A.3			F.3				L4.5	
PS.E.1 Transformations of data.													
a. Explore transformations of data of the purpose of “linearizing” a scatter plot that shows curvature.						F.4 opt			H.3 opt				
b. Estimate the rate of exponential growth or decay by fitting a regression model to appropriate data transformed by logarithms.						F.4 opt			H.3 opt				
c. Estimate the power term in a power model by fitting a regression model to appropriate data transformed by logarithms.						F.4 opt			H.3 opt				
d. Analyze how linear transformations of data affect measures of center and spread, the slope of a regression line, and the correlation coefficient.						F.4 opt			H.3 opt			L1.3, L.1.4	
PS.E.2 Advanced probability.													
a. Interpret and use the Central Limit Theorem: The distribution of the average of independent samples approaches a normal distribution.												L1.6	
b. Know and use equations for the binomial and normal distributions.													
c. Use and interpret the normal approximation to the binomial distribution.													
d. Calculate and apply expected value.													

K–12 Mathematics Benchmarks Correlations

Expectation	MS1	MS2	MSA	Int 1	Int 2	Int 3	Alg I	Geo	Alg II	EOC A2 Core	EOC A2 Mod	ADP	Tasks
PS.E.3 Cross-classified data.													
a. Recognize problems that call for the use of conditional probability and calculate conditional probability in such cases.													
b. Use contingency tables to analyze categorical data.													
c. Use χ^2 tests to evaluate significance of conditional probabilities.													
PS.E.4 Statistical reasoning.													
a. Explain the protocol for hypothesis testing and apply it in problem situations.													
b. Explain statistical estimation and error.													
c. Design, conduct, and interpret a simple comparative experiment.											L3.2		
PS.E.5 Statistical inference.													
a. Estimate population parameters (point estimators and confidence intervals).													
b. Know common tests of significance and use them to test hypotheses.													
c. Know and explain the difference between mathematical and statistical inference.													