

Middle School Mathematics (5169*) Match to Common Core State Standards

Knowledge and skills assessed are designated by their outline numbering in the test content specifications that appear on page 2.
For example, IIC is II Algebra / C Knows how to solve linear equations and inequalities.

Common Core Mathematics Domain		Grade Level					
		4	5	6	7	8	High School
NUMBER and OPERATIONS	Counting and Cardinality (CC)						
	Operations and Algebraic Thinking (OA)**	IA, IE, IF, IIF	IA, IIF, IVG				
	Numbers and Operations in Base Ten (NBT)	IA	IA, IB				
	Number and Operations — Fractions (NF)	IA, IB	IA, IB, IF				
	Ratios and Proportional Relationships (RP)			IC, ID	IC, ID		
	The Number System (NS)			IA, IB, IE, IVG	IA, IB	IA, IB, IF	
	Number and Quantity (NQ)						IA, IB, IC, ID, IE, IF
ALGEBRA	Algebra (A)						IIA, IIB, IIC, IID, IIE
	Expressions and Equations (EE)			IA, IIA, IIC, IIIC, IID, IIE	IIA, IIB, IIC, IIIC, IID, IIE	IA, IF, IIA, IIB, IIC, IIE, IIIC, IID, IIE	
FUNCTIONS and their graphs	Functions (F)					IIIA, IIIC, IIID, IIIE	IIF, IIIA, IIIB, IIIC, IIID, IIIE
MODELING	Modeling (M)						IF, IIIE, VE
GEOMETRY and MEASUREMENT	Measurement and Data (MD)***	IVA, IVE, IVH, VA	IVA, IVH, VA				
	Geometry (G)	IVC, IVD, IVE, IVG	IVD, IVE, IVG	IVA, IVD, IVE, IVG	IC, IVA, IVB, IVC, IVD, IVE, IVF	IVA, IVB, IVC, IVD, IVF, IVG	IVA, IVB, IVC, IVD, IVE, IVF, IVG, IVI, IVJ
STATISTICS and PROBABILITY	Statistics and Probability (SP)			VA, VB, VD	VA, VB, VC, VD	VA, VB, VD	VA, VB, VC, VD, VE

* Middle School Mathematics (5169) is a newly revised and regenerated test and replaces Middle School Mathematics (0069), Fall 2013.

** The Operations and Algebraic Thinking domain also links to the conceptual category of Algebra.

*** The Measurement and Data domain also links to the conceptual category of Statistics and Probability.

Key

- A vacant cell indicates that there are no CCSS Standards at that grade level in that Domain.
- A dash (—) indicates that the test does not have content specifications matching the Domain.

I. Numbers and Operations

- A. Understands operations and properties of the real number system.**
 1. Solve problems using addition, subtraction, multiplication, and division of rational numbers.
 2. Apply the order of operations.
 3. Given operations on a number system, determine whether the properties hold (e.g., commutative, associative, distributive).
 4. Compare, classify, and order real numbers.
 5. Perform operations involving exponents, including negative exponents.
 6. Simplify and approximate radicals.
 7. Represent and compare very large and very small numbers (e.g., scientific notation).
- B. Understands the relationships among fractions, decimals, and percents.**
 1. Convert among fractions, decimals, and percents.
 2. Represent fractions, decimals, and percents using various models.
- C. Knows how to use ratio reasoning to solve problems.**
 1. Apply the concept of a ratio and use ratio language and notation to describe a relationship between two quantities.
 2. Compute unit rates.
 3. Use ratio reasoning to convert rates.
 4. Solve problems involving scale factors.
- D. Knows how to use proportional relationships to solve real-world problems.**
 1. Recognize and represent proportional and inversely proportional relationships between two quantities.
 2. Use proportional relationships to solve multistep ratio and percent problems.
- E. Knows how to use basic concepts of number theory (e.g., divisibility, prime factorization, multiples) to solve problems.**
 1. Recognize relationships involving prime and composite numbers.
 2. Solve problems involving odd or even numbers.
 3. Solve problems involving factors, multiples, and divisibility.
- F. Knows a variety of strategies to determine the reasonableness of results.**
 1. Recognize the reasonableness of results within the context of a given problem.
 2. Test the reasonableness of results using estimation.
 3. Estimate absolute and relative error in the numerical answer to a problem.

II. Algebra

- A. Knows how to evaluate and manipulate algebraic expressions, equations, and formulas.**
 1. Perform arithmetic operations on polynomials.
 2. Manipulate and perform arithmetic operations on problems involving rational expressions.
 3. Evaluate, manipulate, and compare algebraic expressions involving radicals and exponents, including negative exponents.
 4. Use variables to construct and solve equations in real-world contexts.
 5. Translate verbal relationships into algebraic equations or expressions.
- B. Knows how to recognize and represent linear relationships algebraically.**
 1. Determine the equation of a line.
 2. Recognize and use the basic forms of linear equations.
- C. Knows how to solve linear equations and inequalities.**
 1. Solve one-variable linear equations and inequalities algebraically and represent solutions on a number line.
- D. Knows how to represent and solve nonlinear equations and inequalities.**
 1. Solve one-variable nonlinear equations and inequalities (e.g., absolute value, quadratic) algebraically and represent solutions on a number line.

- E. Knows how to represent and solve systems of equations and inequalities.**
 1. Represent and solve systems of linear equations and inequalities with two variables algebraically and graphically.
- F. Knows how to recognize and represent simple sequences or patterns (e.g., arithmetic, geometric).**
 1. Evaluate, extend, or algebraically represent rules that involve number patterns.
 2. Describe or extend patterns involving shapes or figures.
 3. Explore patterns in order to make conjectures, predictions, or generalizations.

III. Functions and Their Graphs

- A. Knows how to identify, define, and evaluate functions.**
 1. Know function notation.
 2. Given a set of conditions, decide whether they represent a function.
 3. Evaluate functions for given values (algebraically, graphically, tabular).
- B. Knows how to determine and interpret the domain and the range of a function numerically, graphically, and algebraically.**
 1. Determine the domain and range of a given table of values.
 2. Determine the domain and range from a given graph of a function.
 3. Determine the domain and range of a given function.
 4. Interpret domain and range in real-world settings.
- C. Understands basic characteristics of linear functions (e.g., slope, intercepts).**
 1. Determine the slope of a given linear function.
 2. Interpret slope as a constant rate of change.
 3. Determine the x- and y-intercepts of a given linear function.
 4. Interpret the x- and y-intercepts of a given linear function.
- D. Understands the relationships among functions, tables and graphs.**
 1. Determine and interpret the x- and y-intercepts of any given function.
 2. Given a graph (e.g., linear, quadratic, absolute value, or simple exponential), select an equation that best represents the graph.
 3. Determine the graphical properties and sketch a graph given an equation of a linear, quadratic, absolute value, or simple exponential function.
- E. Knows how to analyze and represent functions that model given information.**
 1. Develop a model (e.g., graph, equation, table) of a given set of conditions.
 2. Evaluate whether a particular mathematical model (e.g., graph, equation, table) can be used to describe a given set of conditions.

IV. Geometry and Measurement

- A. Knows how to solve problems involving perimeter, area, surface area, and volume.**
 1. Calculate and interpret perimeter and area of geometric shapes.
 2. Calculate and interpret surface area and volume of geometric shapes.
 3. Use two-dimensional representations of three-dimensional objects to visualize and solve problems.
- B. Understands the concepts of similarity and congruence.**
 1. Use similarity and congruence to solve problems with two-dimensional and three-dimensional figures.
- C. Understands properties of lines (e.g., parallel, perpendicular, intersecting) and angles.**
 1. Solve problems involving parallel, perpendicular, and intersecting lines.
 2. Apply angle relationships (e.g., supplementary, vertical, alternate interior) to solve problems.
- D. Understands properties of triangles.**
 1. Solve problems that involve sides (e.g., Pythagorean Theorem) and angles.
 2. Solve problems that involve medians, midpoints, and altitudes.
 3. Solve problems involving special triangles (e.g., isosceles, equilateral, right).

- E. Understands properties of quadrilaterals (e.g., rectangle, rhombus, trapezoid) and other polygons.**
 1. Know geometric properties of various quadrilaterals (e.g., parallelogram, trapezoid)
 2. Know relationships among quadrilaterals.
 3. Solve problems involving angles and diagonals.
 4. Solve problems involving polygons with more than four sides.
- F. Understands properties of circles.**
 1. Solve problems involving circumference and area of a circle.
 2. Solve problems involving diameter or radius of a circle.
 3. Solve basic problems involving central angles, tangents, arcs, and sectors.
- G. Knows how to interpret geometric relationships in the xy-plane (e.g., transformations, distance, midpoint).**
 1. Use coordinate geometry to represent and examine the properties of geometric shapes (e.g., Pythagorean theorem, area of rectangle).
 2. Determine the distance between two points.
 3. Determine the midpoint of two points.
 4. Interpret and solve problems involving transformations.
- H. Understands systems of measurement (e.g., metric, customary).**
 1. Solve measurement and estimation problems involving time, length, temperature, volume, and mass in both U.S. customary and metric systems, where appropriate.
 2. Convert units within each system.
- I. Is familiar with how geometric constructions are made.**
 1. Identify formal geometric constructions made with a variety of tools and methods (e.g., copying a segment, bisecting an angle, constructing parallel and perpendicular lines).

V. Probability, Statistics, and Discrete Math

- A. Knows how to interpret and analyze data presented in various forms.**
 1. Analyze and interpret various displays of data (e.g., box plots, histograms, scatter plots, stem-and-leaf plots).
 2. Draw conclusions based on graphical displays (e.g., misleading representation of data, line of best fit, interpolation).
- B. Knows how to represent data in various forms.**
 1. Construct circle graphs, bar graphs, line graphs, histograms, scatter plots, double bar graphs, double line graphs, stem-and-leaf plots, box plots, and line plots/dot plots.
 2. Choose an appropriate graph based on data.
- C. Knows how to develop, use, and evaluate probability models.**
 1. Use counting techniques, including the counting principle, to answer questions involving a finite sample space.
 2. Solve probability problems involving independent and dependent events.
 3. Solve problems using geometric probability.
- D. Understands concepts associated with measures of central tendency and dispersion (spread).**
 1. Solve for the mean and weighted average of a given set of data.
 2. Determine and interpret mean, median, and mode in a variety of problems.
 3. Determine and interpret common features of a data set (e.g., range and outliers).
 4. Choose an appropriate measure of central tendency to represent a given data set.
- E. Knows how to model and solve problems using simple diagrams, flowcharts, or algorithms.**
 1. Construct, use, and interpret simple diagrams (e.g., Venn diagrams, flowcharts) to solve problems.
 2. Apply a given algorithm to solve a problem.

