

NAEP Alignment with The Quantile Framework® for Mathematics*



QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
150	5	Use decades and centuries to describe time.		N8.1a	
39	1	Recognize the context in which addition and subtraction is appropriate and write number sentences.	A4.3b		
52	2	Recognize the 2-dimensional elements of 3-dimensional figures.	G4.1f, G4.3c	G8.1e	
55	3	Identify a pattern and translate into another form (e.g., actions, words, objects)	A4,1d		
59	4	Answer comparative and quantitative questions about charts and graphs.	P4.1c		
60	4	Organize, display, and interpret information in line plots and tally charts.	P4.1a		
64	5	Tell time to nearest quarter-hour using digital and analog clocks.	M4.2a	M8.1c, M8.1h, M8.2a	
71	1	Use place value with hundreds.	N4.1b,N4.1c		
73	1	Indicate the value of each digit in any 2- or 3-digit number.	N4.1a, N4.1b,N4.1c		
79	1	Add 2- and 3-digit numbers without regrouping.	N4.3a, N4.3f		
85	2	Identify and make figures with line symmetry.	G4.2a		
86	2	Identify and make congruent figures.	G4.2e		
89	3	Identify, continue, and describe rules for repeating patterns.	A4.1a, A4.1b, A4.1c		

The field of mathematics education reflects the ongoing work of many outstanding organizations and advisory groups, including the National Council of Teachers of Mathematics (NCTM); the National Assessment Governing Board (NAGB), which oversees NAEP; and the National Mathematics Advisory Panel. An important aspect of these efforts has been the identification of key mathematical topics and concepts within a grade, as well as the progression of topics and concepts across grades. The resulting publications and summaries of these efforts have been aligned with The Quantile Framework for Mathematics, where appropriate.

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QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
90	3	Use patterns to continue numerical sequences; identify the rule.	A4.1a, A4.1b, A4.1c, A4.1e	A8.1a	
97	4	Locate points on a number line.	N4.1b	N8.1b, N8.1i	
105	5	Determine the value of sets of coins.	M4.1b, M4.1g, M4.2a	M4.2a	
109	1	Read and write word names for numbers from 1,000 to 9,999.	N4.1d		
110	1	Relate standard and expanded notation to 3- and 4-digit numbers.	N4.1c, N4.1e		
111	1	Compare and order numbers less than 10,000.	N4.1j		
113	1	Identify odd and even numbers.	N4.5a		
114	1	Represent fractions concretely and symbolically.	N4.1e, N4.2a	N8.2a	N12.2a
115	1	Use benchmark numbers (zero, one-half, one) and models to compare and order fractions.	N4.1j	N8.1j	
117	1	Subtract 2- and 3-digit numbers with regrouping	N4.3a, N4.3f		
118	1	Model multiplication in a variety of ways including repeated addition, rectangular arrays, and skip counting.	N4.3f		
119	1	Use the identity properties for addition and multiplication.	N4.5e, A4.2e	N8.3d, N8.5e, A8.2e	N12.3d, N12.5e, A12.2e
120	1	Model division in a variety of ways including sharing equally, repeated subtraction, rectangular arrays, and the relationship with multiplication.	N4.3f		
123	1	Identify and use the rules for divisibility (2, 3, 4, 5, 6, 9, and 10).		N8.5d	N12.5d
129	3	Describe and demonstrate patterns in skip counting and multiplication; continue sequences beyond memorized or modeled numbers.	A4.1e		
134	4	Organize, display, and interpret information in bar graphs.	P4.1a, P4.1b, P4.1c	P8.1a, P8.1b, P8.1c, P8.1d	P12.1a, P12.1b, P12.1c, P12.1d
135	4	Describe data using the mode.	P4.2b, P4.2d	P8.1c, P8.2a, P8.2d	P12.1c, P12.2a, P8.2d

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136	4	Organize, display, and interpret information in graphs containing scales that represent multiple units.			
137	4	Organize, display, and interpret information in tables and graphs (frequency tables, pictographs, and line plots).	P4.1a, P4.1b, P4.1c	P8.1a, P8.1b, P8.1c, P8.1d	P12.1a, P12.1b, P12.1c, P12.1d
138	4	Locate a point in Quadrant I of a coordinate grid given an ordered pair; name the ordered pair for a point in Quadrant I of a coordinate grid.	G4.4d		
140	4	Describe the probability of chance events as certain, impossible, more likely, less likely or equally likely to occur.	P4.4a		
146	5	Determine perimeter using concrete models, nonstandard units, and standard units.	M4.1a, M4.1b, M4.1c, M4.1h	M8.1c, M8.1h, M8.2d, A8.4e	M12.1c, M12.1h
150	5	Use decades and centuries to describe time.		N8.1a	
152	1	Read, write, and compare whole numbers from 10,000 to less than one million using standard and expanded notation.	N4.1c, N4.1d, N4.1e, N4.1j		
153	1	Apply appropriate type of estimation for sums and differences.	N4.2b	N8.2b	N12.2b
155	1	Compare and order fractions using renaming strategies.		N8.1j	
156	1	Compare rational numbers in decimal form (tenths and hundredths) with and without models.	N4.1j, N4.2a	N8.1j	
157	1	Compare decimals to fractions (tenths and hundredths) with and without models and pictures.	N4.1j	N8.1d, N8.1e, N8.1j	
161	1	Know and use the commutative and associative properties to simplify numerical expressions.	N4.5e, A4.2e	N8.5e, A4.1e	N12.5e, A12.1e
162	1	Know and use division facts related to multiplication facts through 144.	N4.3f		
163	1	Understand that many whole numbers factor in different ways.		N8.5b, N8.5c	N12.5b, N12.5c
164	1	Round rational numbers to a whole number or a given fractional place value.	N4.2b	N8.2b	N12.2b
165	1	Multiply 2- and 3-digit whole numbers by a 1-digit whole number or a 2-digit multiple of 10.	N4.3b		
166	1	Divide using single-digit divisors, with and without remainders.	N4.3c		

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168	1	Describe the effect of operations on size and order of numbers.	N4.3d	N8.2b, N8.3d, N8.3f, N8.5a	N12.2b, N12.3d
170	1	Estimate and compute products of whole numbers with 2- or 3-digit factors.	N4.2b	N8.2b	N12.2b
171	1	Estimate and solve division problems with 2- and 3-digit divisors; explain solution.	N4.2b, N4.3c	N8.2b	N12.2b
173	2	Identify and name: points, rays, line segments, lines, and planes.	G4.1b, G4.1f		G12.4b
174	2	Use manipulatives, pictorial representations, and appropriate vocabulary (e.g., polygon, side, angle, vertex, diameter) to identify and compare properties of plane figures.	G4.1b, G4.1c, G4.1f, G4.3a, G4.5a	G8.1b, G8.1c, G8.1f	
175	2	Use manipulatives, pictorial representations, and appropriate vocabulary (e.g., face, edge, vertex, and base) to identify and compare properties of solid figures.	G4.1b, G4.1f, G4.3c, G4.5a	G8.1b, G8.1c, G8.1f	
176	2	Identify intersecting, parallel, skew, and perpendicular lines and line segments. Identify midpoints of line segments.	G4.1c, G4.4a	G8.4a	G12.4b
179	2	Predict results of tessellating, subdividing, and changing shapes by paper folding or dissecting and rearranging pieces of plane figures and solids.	G4.2d, G4.3b	G8.1f, G8.2d	
182	4	Select the appropriate graph that best displays the given data.		P8.1a, P8.1b, P8.1c, P8.1d, P8.1e	P12.1a, P12.1b, P12.1c, P12.1d, P12.1e
183	4	Describe data using the median.		P8.1c, P8.2a	P12.1c, P12.2a
185	4	Describe the probability of an event using a fraction or ratio.	P4.4b, P4.4g	P8.4a, P8.4j	P12.4a, P12.4j
186	4	Organize, display, and interpret information in line graphs.	P4.1a	P8.1a, P8.1b, P8.1c, P8.1d	P12.1a, P12.1b, P12.1c, P12.1d
191	5	Use grids to develop the relationship between the total numbers of square units in a rectangle and the length and width of the figure ($l \times w$).			
192	5	Determine the area of rectangles, squares, and composite figures using nonstandard units, grids, and standard units.	M4.1a, M4.1b, M4.1c, M4.1i	M8.1c, M8.1g, M4.1j, M8.2d, A8.4e	M12.1c, M12.1h, M12.2a
195	1	Read, write, and compare numbers with decimal place values to the thousandths place or numbers greater than one million.	N4.1j	N8.1a, N8.1j	N12.1j
199	1	Add and subtract fractions with like denominators.	N4.3a		
201	1	Estimate and compute sums and differences with decimal numbers.	N4.3a	N8.2b	N12.2b

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202	2	Identify angles (acute, right, obtuse, and straight).	G4.1c	M8.1b	
204	2	Use a variety of triangles, quadrilaterals, and other polygons to draw conclusions about the sum of the measures of the interior angles.		G8.2a	M12.1f, G12.2a
208	3	Solve one-step linear equations and inequalities and graph solutions of the inequalities on a number line.		G8.4a	
210	3	Describe the algebraic relationship between two defined variables in a verbal expression.		A8.4b	A8.3b
211	4	Organize, display, and interpret information in stem-and-leaf plots.		P8.1a, P8.1b, P8.1c, P8.1d	P12.1a, P12.1b, P12.1c, P12.1d
213	4	Organize, display, and interpret multiple sets of information in the same graph including multiple bar, multiple stem-and-leaf, and multiple line graphs.	P4.2d		P12.2d
214	4	Describe data using the mean.		P8.1c, P8.2a	P12.1c, P12.2a
216	4	Create, compare, and evaluate different graphic representations of the same data.			P12.1a, P12.1b, P12.1c, P12.1d, P12.1e
217	5	Draw and measure angles using a protractor. Understand that a circle measures 360 degrees.		M8.1c, M8.1g	P12.2d
218	3	Translate between models or verbal phrases and algebraic expressions.	A4.2a	A8.3b, A8.4b	A12.2g, A12.3b
219	5	Estimate the measure of an object in one system given the measure of that object in another system.		M8.2c	
222	1	Find factors, common factors, and the greatest common factor of numbers; explain.	N4.5b	N8.5b, N8.5c	N12.5b
226	1	Read, write, or model numbers in expanded form using exponents.		N8.1a, N8.1d	
227	1	Relate a percent to its equivalent fraction or decimal.	N4.1e	N8.1d, N8.1e, N8.1i	
232	1	Write numbers using prime factorization.		N8.5b, N8.5c	N12.5b
233	1	Calculate unit rates to make comparisons.		N8.4c	N12.4c
235	1	Compare and order integers.		N8.1j	

QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
236	1	Simplify numerical expressions that may contain exponents.		A8.3c	A12.3c
237	2	Draw circles: identify and determine the relationships between the radius, diameter, chord, center, and circumference.		G8.4b	
241	2	Identify corresponding parts of similar and congruent figures.		G8.2f	
243	3	Generate a set of ordered pairs using a rule which is stated in verbal, algebraic, or table form.	A4.2a	A8.1a, A8.1b, A8.1c, A8.2c	A12.1b, A12.2c
244	3	Given a list of ordered pairs, identify either verbally or algebraically the rule used to generate the list and record results.	A4.2a	A8.1a, A8.1b, A8.1c, A8.2c	A12.1b, A12.2c
247	4	Locate points in all quadrants of the coordinate plane using ordered pairs.		A8.22c	A12.2c
249	4	Determine the probability from experimental results or compare theoretical probabilities and experimental results.		P8.4c, P8.4d	P12.4c, P12.4d
251	4	Determine the sample space for an event using counting strategies (include tree diagrams, permutations, combinations, and the Fundamental Counting Principle).		P8.4f	P12.4d, P12.4e
254	5	Investigate and determine the relationship between the diameter and the circumference of a circle and the value of pi; calculate the circumference of a circle.		A8.4e	
257	5	Calculate the areas of triangles, parallelograms, trapezoids, circles and composite figures.		M8.1h	M12.1h
258	5	Convert measures of length, area, capacity, weight, and time expressed in a given unit to other units in the same measurement system.	M4.2b	M8.2b	M12.2b
259	1	Write whole numbers in scientific notation; convert scientific notation to standard form; investigate the uses of scientific notation.		N8.1f, N8.2b	N12.1f, N12.1h, N8.2b
260	1	Compare and order rational numbers.		N8.1b, N8.1i, N8.1j	
263	1	Write a proportion to model a word problem; solve proportions.		N8.4b, M8.1l, A8.2g	N12.4b, M12.2g
264	1	Calculate or estimate the percent of a number including discounts, taxes, commissions, and simple interest.		N8.4d	N12.4d
265	1	Use geometric models to investigate the meaning of the square of a number and its positive square root. Know perfect squares to 625.		A8.3c	N12.1d
266	1	Use remainders in problem-solving situations and interpret the remainder with respect to the original problem.		N8.5d	N12.5d

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267	2	Identify proportional parts of similar figures using rulers and protractors.		G8.2e, G8.2f	
269	2	Identify the congruent and supplementary relationships of the angles formed by cutting parallel lines by a transversal.		G8.4b	
270	2	Locate, given the coordinates of, and graph plane figures which are the results of translations or reflections in all quadrants of the coordinate plane.		G8.2c	
272	2	Identify or draw the association between 3-D figures and their front, side, and top views.		G8.1e	
274	3	Evaluate algebraic expressions.		A8.3c	A12.3c
275	3	Solve two-step linear equations and inequalities and graph solutions of the inequalities on a number line.		A8.4a, A8.4b	A12.4a, A12.4b
276	3	Write or model a linear equation or inequality to solve a given problem.		A8.4a, A8.4d	A12.3b, A12.3d
277	3	Write a problem given a simple linear equation or inequality.		A8.3b	A12.3b
278	4	Organize, display, and interpret information in histograms.		P8.1a, P8.1b, P8.1c, P8.1d	P12.1a, P12.1b, P12.1c, P12.1d
279	4	Organize and compare one set of information in histograms and bar graphs.			
280	4	Organize, display, and interpret information in circle graphs using ratios and percents.		P8.1a, P8.1b, P8.1c, P8.1d	P12.1a, P12.1b, P12.1c, P12.1d
281	4	Describe data using or selecting the appropriate measure of central tendency.		P8.2d	P12.2d
284	4	Determine the number of possible outcomes of a given situation and list the possibilities	P4.4e	P8.4e	
285	4	Determine the probability of compound events (with and without replacement).		P8.4a, P8.4b, P8.4h, P8.4j	P12.4a, P12.4b, P12.4h, P12.4i, P12.4j
287	5	Use scale factors to reduce and enlarge drawings on grids.		N8.4c, M8.2f	N12.4c, M12.2f
289	5	Model the concept of volume for prisms and cylinders as the product of the area of the base and the height. Calculate the volume of prisms and cylinders.		M8.1c, M8.1g, M8.1j, M8.2d	M12.1d, M12.1j, A12.4e
291	5	Recognize the effect on the area and perimeter when one or two dimensions of a plane figure are changed.		M8.1b	M12.1c, M12.1h, M12.2g

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292	5	Use proportions to express relationships between corresponding parts of similar figures.		G8.2e, G8.2f	
295	1	Solve problems involving percent increase and percent decrease.		N8.4d	N12.4d
296	1	Use rules of exponents to simplify numeric and algebraic expressions.		A8.3c	A12.3c
297	1	Estimate the square root of a number between two consecutive integers. Use a calculator to estimate the square root of a number.		N8.2b, N8.2d, A8.3c	N12.2b, N12.2d, N12.3g
300	1	Use the commutative, associative, and distributive properties, and inverses and identities to simplify algebraic expressions.		A8.1e, A8.3c	N12.5e, A12.1e, A12.3c
302	2	Use the Pythagorean Theorem and its converse to solve problems.		M8.1k, G8.3d	M12.1k, M12.1m, G12.3d
306	3	Determine algebraically or graphically the solutions of a linear inequality.		G8.4c	A12.4c
307	3	Find and identify the intercepts of a linear relation.			A12.1e
308	3	Describe, extend, and analyze a wide variety of geometric and numerical patterns, such as Pascal's triangle or the Fibonacci sequence.			A12.1a
309	3	Graphically solve systems of linear equations.			A12.4d
310	4	Organize, display, and interpret information in box-and-whisker plots.		P8.1a, P8.1b, P8.1c, P8.1d, P8.2d	P12.1a, P12.1b, P12.1c, P12.1d
311	4	Organize, display, and interpret information in scatter plots. Approximate a trend line and identify the relationship as positive, negative, or no correlation.		P8.1a, P8.1b, P8.1c, P8.1d	P12.1a, P12.1b, P12.1c, P12.1d, P12.2h
314	4	Distinguish between a population and a sample and draw conclusions about the sample (random or biased).		P8.3a, P8.3b	P12.3a, P12.3b
316	4	Make predictions based on theoretical probabilities or experimental results.		P8.4b, P8.4d, P8.4d	P12.4b, P12.4d, P12.4e
317	5	Calculate distances from scale drawings and maps.		N8.4c, M8.2f	N12.4c, M8.2f
318	5	Use nets or formulas to find the surface area of prisms and cylinders.			G12.1b
319	5	Use models to investigate the relationship of the volume of a cone to a cylinder and a pyramid to a prism with the same base and height.			A12.4e

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320	5	Calculate the volume of pyramids and cones.		M8.1c, M8.1g, M8.1j, M8.2d	M12.1d, M12.1j, A12.4e
321	5	Determine the effect on the volume of solid figures when one or more dimension is changed.	M4.1b	M8.1b	M12.2g
322	5	Determine precision units, accuracy, and greatest possible error of a measuring tool. Apply significant digits in meaningful contexts.		N8.2b, M8.2e	N12.2b, M8.2e
323	1	Evaluate absolute value expressions.		N8.1g	N12.1g, N12.3a
324	1	Simplify radical expressions.		A8.3c	N12.2b, N112.3g, A12.3c
327	1	Factor polynomials.			N12.5b
328	1	Find the greatest common factor of a polynomial.			N12.5b
330	3	Define and distinguish between relations and functions, dependent and independent variables, domain and range.			A12.1g
332	3	Solve linear equations using the commutative, distributive and equality properties and be able to justify the steps used.		A8.4c	N12.5e, A12.3d, A12.4a
333	3	Use systems of linear equations in two or more variables to solve problems.			A12.4d, A12.4g
335	3	Graph quadratic equations. Identify the intercepts, the vertex, and the axis of symmetry.			A12.1h, A12.2b
336	3	Solve quadratic equations by factoring.			N12.5b
339	3	Evaluate expressions and use formulas to solve problems involving exponential functions (e.g., growth and decay).		A8.2g	A12.2h
342	4	Derive a linear equation that models a set of data (line of best fit). Using calculators. Use the model to make predictions.			N12.3a
343	5	Find the slope of a line given the graph of the line, an equation of the line, or two points on the line.		A8.2b, A8.4d	A12.1e, A12.1h
344	3	Describe the slope of a line given in the context of a problem situation.		M8.1i, A8.1b, A8.1f, A8.4d	
345	3	Write the equation of and graph linear relationships given the slope and y-intercept.		A8.2b, A8.4d	A12.1h, A12.1i

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346	3	Write the equation of and graph linear relationships given the slope and one point on the line.		A8.2b, A8.4d	A12.1h, A12.1i
347	3	Write the equation of and graph linear relationships given two points on the line.		A8.2b, A8.4d	A12.1h, A12.1i
362	3	Use direct variation to solve problems.		M8.1l, A8.2g, A8.4e	M12.1l
363	2	Determine the vertex, orientation, and axis of symmetry of a parabola using the vertex form of the quadratic relation.			G12.4c, G12.4d, A12.1e, A12.1h, A12.2b
364	3	Use the definition of an ellipse to identify characteristics, write an equation, and graph the relation.			G12.4c, G12.4d, A12.2b
366	3	Convert between different representation of relations and functions using tables, the coordinate plane, and algebraic or verbal statements.			A12.1b, A12.2a, A12.2b,
368	3	Determine compositions of functions.			
370	3	Solve quadratic equations by graphing.			A12.2g
373	3	Solve quadratic equations using the quadratic formula.			A12.2g
375	3	Find and interpret the maximum, the minimum, and the intercepts of a quadratic function.			A12.2b
383	3	Identify asymptotes, intercepts, holes, domain, and range of a rational function and sketch the graph.			A12.1g, A12.2b
384	3	Solve rational equations.			A12.2b, A12.4d
386	3	Solve rational inequalities.			A12.4a
388	3	Graph a radical relation, function, or inequality. State the domain and range.			A12.1g
394	3	Use matrices to solve systems of equations with 2 or more variables.			A12.4g
397	3	Solve absolute value equations or inequalities. Graph absolute value inequalities on the number line.			N12.1g
400	3	Graph exponential functions of the form $f(x) = ab^x$.			A12.1e, A12.1h, A12.2b

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408	4	Derive a quadratic or exponential function that models a set of data (curve of best fit) using calculators. Use the model to make predictions.			A12.2b
409	3	Solve exponential equations of the form $y = ab^x$ or $y = (1 + r)^x$.		A8.2g	A12.1h
428	2	Describe the transformations of solid figures in space.			G12.2b, G12.2c
429	2	Use matrix operations (addition, subtraction, multiplication, scalar multiplication) to describe the transformation of plane figures in the coordinate plane.			G12.2b, G12.2c, A12.2d
430	4	Identify appropriate mathematical models to represent real data sets (constant, linear, quadratic, cubic, square root, absolute value, reciprocal, trigonometric, exponential, logarithmic, piecewise, and greatest integer).			A12.2b, A12.2g
436	3	Use the definition of a hyperbola to identify characteristics, write an equation, and graph the relation.			G12.4c, G12.4d, A12.2b
440	3	Find the inverse of a function or relation. Verify that two functions are inverses using their graphs or composition of functions.			A12.3d
453	3	Graph tangent, cotangent, secant, and cosecant functions. Identify the domain, range, period, and asymptotes of the function.			A12.2b
464	3	Find indicated terms, common ratio, or common difference using sequence formulas.			A12.1b, A112.1e
477	4	Determine measures of spread (standard deviation).			P12.2a, P12.2c, P12.2d, P12.2f
479	4	Define and use the normal distribution curve to model a set of data.			P12.2f
482	2	Identify the coordinates of a point in space.			G12.1c
483	2	Use the distance formula to find the distance between two points. Use the midpoint formula to find the coordinates of the midpoint of a segment.		G8.1a, G8.4a, A8.2d	M12.1e, G12.1c, G12.1d, A12.2d
490	2	Use properties, definitions, and theorems of angles and lines to solve problems related to the segment addition postulate and the angle addition postulate.		G8.4a	
491	2	Use properties, definitions, and theorems of angles and lines to solve problems related to angle bisectors, segment bisectors, and perpendicular bisectors.			G12.3g
492	2	Recognize and apply definitions and theorems of angles formed when a transversal intersects parallel lines.			M12.1f, G12.4b, G12.4b
496	2	Use properties, definitions, and theorems of polygons to solve problems related to the interior and exterior angles of a convex polygon.			G12.3f

QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
497	2	Use properties, definitions, and theorems of polygons to solve problems related to congruent and similar polygons.			G12.2e, G12.3f
499	2	Use coordinate geometry to confirm properties of plane figures.		G8.1a, G8.4d, A8.2d	M12.1e, G12.1c, G12.1d, G12.4d, A12.2d
500	2	Use properties of quadrilaterals (parallelograms, rectangle, rhombi, squares, trapezoids, kites) to solve problems.		G8.1d	
503	2	Use properties of triangles to solve problems related to similar triangles and the relationships of their corresponding parts.		G8.2e	
504	2	Use properties of triangles to solve problems related to congruent triangles and their corresponding parts.		G8.2e	
506	2	Investigate and use properties of triangles to solve problems related to altitudes, perpendicular bisectors, angle bisectors, and medians.			G12.3g
514	2	Use properties of right triangles to solve problems using the relationships in special right triangles.			G12.3g
515	2	Use trigonometric ratios to represent relationships in right triangles to solve problems.		M8.1k	M12.1k, M12.1m
518	3	Use properties of circles to solve problems related to the equation of a circle, its center, and radius length.			G12.1c, G12.1d, G12.3e, G12.4c, A12.2b
519	2	Use pictorial representations and appropriate vocabulary to identify relationships with circles (e.g., tangent, secant, concentric circles, inscribe, circumscribe, semicircles, and minor and major arcs).			G12.3e
523	2	Use properties of circles to solve problems involving arcs formed by central angles or inscribed angles.			G12.3e
524	2	Use theorems related to the segments formed by chords, secants, and tangents to solve problems.			G12.4b
525	3	Use the definition of a sphere to identify characteristics, write an equation, and graph the relation.			G12.1d, G12.1e
528	5	Find the area of rhombi and of regular polygons to solve problems.			M12.1h
529	5	Use measures of arcs or central angles to find arc length or sector area of a circle.			M12.1h, G12.3e
530	5	Find the ratio of perimeters, areas, and volumes of similar geometric figures using formulas to solve problems.			G12.2e

QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
531	5	Find the lateral area and surface area of a right prism, pyramid, right circular cylinder, and cone using formulas. Find the surface area and volume of a sphere using formulas.			M12.1d, M12.1j, G12.1e, A12.4e
532	2	Use slopes to examine if two lines are parallel or perpendicular.		G8.3g, G8.4a	M12.1e, G12.1c, G12.1d, G12.3g
533	3	Write the equation of a line parallel or perpendicular to a given line through a given point.		G8.3g	G12.3g
534	2	Transform (translate, reflect, rotate, dilate) polygons in the coordinate plane; describe the transformation in simple algebraic terms.			G12.2b, G12.2c, G12.2d, A12.2d
535	4	Determine a simple probability using geometric figures.		P8.4j	P12.4j
541	5	Tell time at the five-minute intervals.	M4.1g		
542	2	Combine simple figures to create a given shape.	G4.3b, G4.3f		
544	3	Write addition and subtraction sentences to represent a word problem.	N4.3g		
547	2	Use a coordinate grid to solve problems. Describe the path between given points on the plane.	G4.1a, A4.2c		
548	3	Describe the meaning of an unknown in the context of a word problem.	A4.3a		
549	3	Find the value of an unknown in a number sentence.	A4.3a, A4.4a		
551	1	Use proportional reasoning to solve problems.		N8.4c	N12.4c
556	2	Describe cross-sectional views of three-dimensional figures.		G8.1e, G8.4c	
558	2	Use proportional reasoning to solve problems related to similar and congruent polygons.		N8.4cG8.2e	N12.4c
559	4	Determine the quartiles or interquartile range for a set of data.		P8.1c, P8.2b	P12.1c, P12.2a, P12.2d
560	4	Describe how the mean, frequency distribution, and interquartile range of a set of data affect its graph.			P12.2a
561	4	Identify outliers and determine their effect on the mean, median, and range of a set of data.		P8.2c	P12.2c

QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
562	3	Use ordered pairs derived from tables, algebraic rules, or verbal descriptions to graph linear functions.		A8.1b, A8.1c, A8.1e, A8.2a, A8.2b	A12.1b, A12.4a
564	1	Develop number sense for the real numbers. Define and use rational numbers; compare and order; and use estimates of irrational numbers in appropriate situations.		N8.2a	N12.1d, N12.1j, N12.2a
565	4	Approximate a trend line or calculate a line of best fit for a given set of data. Use the trend line or line of best fit to make predictions.		P8.1a, P8.1b, P8.1c, P8.1d, P8.2e	P12.1a, P12.1b, P12.1c, P12.1d, P12.2e, P12.2g, A12.2f, A12.2g
567	3	Identify relations as linear or nonlinear.		A8.1e, A8.2g	
568	3	Interpret and compare properties of linear functions, graphs, and equations.		A8.1c, A8.2b	A12.1e, A12.1h
569	3	Solve equations involving powers and roots by using inverse relationships.			
571	3	Use inverse, combined and joint variation to solve problems.			M12.1l, A12.1e, A12.1h, A12.2g
574	3	Apply algebra techniques to solve rate problems including distance, work, and mixture problems.		A8.4e	
578	1	Use the distributive property to simplify numerical expressions.	N4.5e, A4.2e	N8.5e, A8.1e	N12.5e, A12.1e
585	5	Estimate and calculate areas with scale drawings and maps.		M8.2f	M12.2f
587	4	Use the fundamental counting principle to develop and use formulas for combinations and permutations.			P12.4d, P12.4e
589	3	Solve quadratic inequalities graphically or algebraically.			A12.4a, A12.4c
592	3	Distinguish the equations of conic sections (parabolas, circles, ellipses, hyperbolas).			G12.4c, G12.4d, A12.2b
593	3	Use function notation and determine a value of the function given an element of the domain.			A12.3c
597	2	Use a variety of regular polygons to draw conclusions about the sum of the measures of the interior angles.		G8.3f	G12.3f
598	1	Add 2- and 3-digit numbers with regrouping.	N4.3a, N4.3f		
599	1	Subtract 2- and 3digit numbers without regrouping.	N4.3a, N4.3f		

QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
600	1	Use place value with thousands.	N4.1a		
607	3	Write multiplication and division sentences to represent a problem.	N4.3g, A4.3b		
613	4	Use a tree diagram to determine probabilities of events.			P12.4f
614	1	Determine the factorial of a number.			
615	2	Identify the number of lines of symmetry in a figure.	G4.2a	G8.2a	
616	2	Locate, given the coordinates of, and graph points which are the results of translations or reflections in all quadrants of the coordinate plane.		G8.2c	
618	5	Use relationships between minutes, hours, days, weeks, months, and years to describe time.	M4.1a, M4.1b		
620	2	Name polygons by the number of sides. Distinguish quadrilaterals based on properties of their sides or angles.	G4.3a, G4.3f, G4.5a	G8.1c, G8.1d, G8.1f, G8.3f	G12.1c, G12.1d, G12.3f
622	1	Solve problems with percent equations, percent proportions, or ratios.		N8.4d	N12.4c, G8.1d
624	2	Identify and classify triangles according to the measures of the interior angles and the lengths of the sides.	G4.3a, G4.5a		
626	1	Model the concept of percent and relate to the value in decimal or fractional form.		N8.1d, N8.1i	
628	2	Recognize geometric transformation of plane figures such as turns (rotations), flips (reflections), and slides (translations).	G4.2c		
630	5	Model the concept of the volume of a solid figure using cubic units.	M4.1c	M8.1g, M8.2d, G8.1b	M12.2a
633	1	Use powers of ten to multiply and divide whole numbers and decimals.	N4.3b, N4.3c		
634	4	Describe data using the range.	P4.2b, P4.2d	P8.1c, P8.2a, P8.2d	P12.1c, P12.2b, P12.2d
635	2	Use base plans to model three-dimensional figures.		G8.1e	
636	1	Determine the absolute value of a number.		N8.1g	N12.1g

QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
637	3	Identify transformations on nonlinear parent functions using function notation, algebraic equations, or graphs.			A12.1h
640	5	Determine the magnitude and direction of a vector and solve problems.			G12.4e
641	1	Identify and use special types of matrices (identity matrix, zero matrix, and square matrix).			
642	1	Compute with rational numbers (positive and negative).		N8.3a, N8.3f, N8.3g, A8.3c, A8.4c	N12.3a, N12.3g, A12.3c
643	2	Identify diagonals of a polygon. Determine when a diagonal is a line of symmetry.			G12.2a
644	3	Solve linear inequalities using the properties of inequality.			A12.3d, A12.4a
648	1	Read and write word names for rational numbers in decimal form to the hundredths place.		N8.1e	
649	5	Estimate, measure, and compare length using appropriate tools and units.	M4.1a, M4.1b, M4.1c, M4.1g, M4.2a, M4.2d	M8.1b, M8.1c, M8.1g, M8.2a, M8.2d	
650	5	Estimate, measure, and compare capacity using appropriate tools and units.	M4.1a, M4.1b, M4.1c, M4.1g, M4.2a, M4.2d	M8.1b, M8.1c, M8.1g, M4.2a, M4.2d	
651	5	Estimate, measure, and compare weight using appropriate tools and units.	M4.1a, M4.1b, M4.1c, M4.2a, M4.2d	M8.1b, M8.1c, M8.1g, M8.2a, M8.2d	
652	5	Use theorems about arc measures determined by rays of angles formed by two lines intersecting a circle when the vertex is inside the circle (two chords), on the circle (tangent and chord), or outside the circle (two secants).			G12.3e, G12.4b
653	2	Use theorems about congruent chords and arcs and the relationships of a radius of a circle to a tangent to solve problems.		G12.3e	G12.4b
654	1	Write a ratio to compare two quantities.	N4.4a	N8.4a	
655	3	Graph and solve compound inequalities.			A12.4a
656	3	Recognize and extend arithmetic and geometric sequences. Identify the common difference or common ratio.			A12.1a
659	3	Solve a literal equation for an indicated variable.			A12.1f

QTaxon Number**	QF Strand	QTaxon Description	Grade 4 NAEP	Grade 8 NAEP	Grade 12 NAEP
660	1	Round whole numbers to a given place value.		N8.2b	N12.2b
663	1	Represent a number in a variety of numerical ways.	N4.1b, N4.1d, N4.1e		
667	5	Determine angular speed to solve problems.			M12.1l
668	1	Write and simplify equivalent fractions			
669	1	Estimate products and quotients of decimals or of mixed numbers.		N8.2b, N8.3g	N12.2b
672	5	Determine area and volume using right triangle relationships, including trigonometric relationships.			M12.1k, A12.4e
673	3	Use the definition of a parabola to identify characteristics, write an equation, and graph.			G12.4c
674	3	Solve systems of linear inequalities.			A12.1g
675	1	Estimate sums and differences with fractions and mixed numbers.		N8.2b	N12.2b
676	1	Read and write word names for numbers from 13 to less than 100.	N4.1d, N4.1e		

Legend: This alignment was based upon the Benchmarks for the Critical Foundations (Table 2, p. 20). The first number refers to the Broader Category (1= Fluency with Whole Numbers; 2= Fluency with Fractions; 3= Geometry and Measurement). The second number refers to the Benchmark under the Category. The last number refers to specific skills listed within the Benchmarks.

* Based on The Final Report of the National Mathematics Advisory Panel (2008).

** QTaxon Number refers to a unique identification number in The Quantile Framework for Mathematics. It is for reference only and is not the Quantile® measure.