

2010 ACOS MATHEMATICS/ARMT+ SPECIFICATIONS CORRELATION

GRADE 7

2010 ACOS		ARMT+ Specifications					
CURRENT GRADE 7 CONTENT		2003 CONTENT STANDARD		ITEM TYPE	POINTS POSS.	ADDITIONAL INFORMATION	PAGES IN ITEM SPECS
7.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. [7-RP1]	7.11	Solve problems involving ratios or rates, using proportional reasoning.	Multiple-choice Open-ended	6	• Word problems/real-life situations will be used. • Any representation of a rational number may be used. • Verbal descriptions of proportions may be used.	pp. 76-86
7.2 7.2a 7.2b 7.2c 7.2d	Recognize and represent proportional relationships between quantities. [7-RP2] a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.[7-RP2a] b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. [7-RP2b] c. Represent proportional relationships by equations. [7-RP2c] d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. [7-RP2d]	7.4	Express a pattern shown in a table, graph, or chart as an algebraic equation.	Multiple-choice	4	• Determining an algebraic equation for a pattern shown in a table, graph, or chart will be required. • Any representation of a rational number may be used as values in tables or charts. • Any representation of a rational number may be included in the algebraic equation as a coefficient of a variable or a constant. • Word problems/real-life situations may be used.	pp. 18-24
		7.11	Solve problems involving ratios or rates, using proportional reasoning.	Multiple-choice Open-ended	6	• Word problems/real-life situations will be used. • Any representation of a rational number may be used. • Verbal descriptions of proportions may be used.	pp. 76-86
7.3	Use proportional relationships to solve multistep ratio and percent problems. [7-RP3]	7.11	Solve problems involving ratios or rates, using proportional reasoning.	Multiple-choice Open-ended	6	• Word problems/real-life situations will be used. • Any representation of a rational number may be used. • Verbal descriptions of proportions may be used.	pp. 76-86

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7.4 7.4a 7.4b 7.4c	Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. [7-NS1] a. Describe situations in which opposite quantities combine to make 0.[7-NS1a] b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. [7-NS1b] c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. [7-NS1c] d. Apply properties of operations as strategies to add and subtract rational numbers. [7-NS1d]	7.1	Demonstrate computational fluency with addition, subtraction, and multiplication of integers.	Multiple-choice Gridded	5	- Only one operation will be required for each item. - Parentheses or the multiplication symbol ($\cdot$) will be used for multiplication. - The multiplication symbol ($\times$) will not be used. - Negative integers may be in parentheses. - Integers will not exceed four digits in the stem. - Only two integers will be used in the stem. - No word problems/real-life situations will be used.	pp. 6-9
		7.2	Use order of operations to evaluate numerical expressions.	Multiple-choice Gridded	4	- More than one set of parentheses may be used. - The four basic operations (addition, subtraction, multiplication, and division) will be required. - Only integers may be used. - Either the division symbol ($\div$) or the fractional form may be used for division. - Parentheses or the multiplication symbol ($\cdot$) will be used for multiplication. - The multiplication symbol ($\times$) will not be used. - No word problems/real-life situations will be used. - Exponents may be used.	pp. 10-13
		7.3	Solve problems requiring the use of operations on rational numbers.	Multiple-choice	8	- The four basic operations (addition, subtraction, multiplication, and division) will be required. - Word problems/real-life situations may be required. - Money values may be used. - Mixed numbers may be used. - Solving problems involving addition and subtraction of fractions with common and uncommon denominators may be required. - Changing mixed numbers to improper fractions may be required. - Solving problems involving decimals and percents may be required.	pp. 14-17

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7.5 7.5a 7.5b 7.5c 7.5d	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. [7-NS2] a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. [7-NS2a] b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts. [7-NS2b] c. Apply properties of operations as strategies to multiply and divide rational numbers. [7-NS2c] d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. [7-NS2d]	7.1	a. Demonstrate computational fluency with addition, subtraction, and multiplication of integers.	Multiple-choice Gridded	5	- Only one operation will be required for each item. - Parentheses or the multiplication symbol ($\cdot$) will be used for multiplication. - The multiplication symbol ($\times$) will not be used. - Negative integers may be in parentheses. - Integers will not exceed four digits in the stem. - Only two integers will be used in the stem. - No word problems/real-life situations will be used.	pp. 6-9
7.6	Solve real-world and mathematical problems involving the four operations with rational numbers. (Computations with rational numbers extend the rules for manipulating fractions to complex fractions.) [7-NS3]	7.3	Solve problems requiring the use of operations on rational numbers.	Multiple-choice	8	- The four basic operations (addition, subtraction, multiplication, and division) will be required. - Word problems/real-life situations may be required. - Money values may be used. - Mixed numbers may be used. - Solving problems involving addition and subtraction of fractions with common and uncommon denominators may be required. - Changing mixed numbers to improper fractions may be required. - Solving problems involving decimals and percents may be required.	pp. 14-17

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7.7	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. [7-EE1]						
7.8	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. [7-EE2]	7.4	Express a pattern shown in a table, graph, or chart as an algebraic equation.	Multiple-choice	4	- Determining an algebraic equation for a pattern shown in a table, graph, or chart will be required. - Any representation of a rational number may be used as values in tables or charts. - Any representation of a rational number may be included in the algebraic equation as a coefficient of a variable or a constant. - Word problems/real-life situations may be used.	pp. 18-24
7.9	Solve multistep real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. [7-EE3]						
7.10 7.10a 7.10b	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. [7-EE4] a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. [7-EE4a] b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. [7-EE4b]	7.6	Solve one- and two-step equations.	Multiple-choice	4	- Any representation of a rational number may be used as the coefficient of the variable. - The solution of an equation may be any representation of a rational number.	pp. 30-34

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7.11	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. [7-G1]						
7.12	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. [7-G2]						
7.13	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. [7-G3]	7.8	Recognize geometric relationships among two-dimensional and three-dimensional objects.	Multiple-choice Open-ended	6	- The drawings of two-dimensional and three-dimensional figures may be included. - The drawings of two-dimensional figures may be on a grid. - A two-dimensional figure may be compared to the same two-dimensional figure, a different two-dimensional figure, or a three-dimensional figure. - A three-dimensional figure may be compared to the same three-dimensional figure, a different three-dimensional figure, or a two-dimensional figure.	pp. 48-62
7.14	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. [7-G4]	7.9	Solve problems involving circumference and area of circles.	Multiple-choice Gridded	4	- Word problems/real-life situations may be used. - The drawings of a circle may be included. - The value of "pi" (π) will be 3.14. - Any representation of a rational number may be used for the dimension of the circle. - The formulas will be given on the reference page. - Finding the radius or diameter when given the area or circumference may be required. - In rounding numbers, <i>closest</i> may be used.	pp. 63-68
7.15	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. [7-G5]						

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7.16	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.[7-G6]	7.9	Solve problems involving circumference and area of circles.	Multiple-choice Gridded	4	- Word problems/real-life situations may be used. - The drawings of a circle may be included. - The value of “pi” (π) will be 3.14. - Any representation of a rational number may be used for the dimension of the circle. - The formulas will be given on the reference page. - Finding the radius or diameter when given the area or circumference may be required. - In rounding numbers, <i>closest</i> may be used.	pp. 63-68
		7.10	Find the perimeter of polygons and the area of triangles and trapezoids.	Multiple-choice Gridded	4	- Drawings may be used. - Word problems/real-life situations may be used. - Determining the perimeter of a regular polygon may be required. - Unnecessary dimensions may be included. - The properties of all types of triangles may be required to determine the area of a triangle.	pp. 69-75
7.17	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. [7-SP1]						
7.18.	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. [7-SP2]						
7.19	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. [7-SP3]						
7.20	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. [7-SP4]	7.12	Determine measures of central tendency (mean, median, and mode) and the range using a given set of data or graphs, including histograms, frequency tables, and stem-and-leaf plots.	Multiple-choice Gridded Open-ended	7	- Word problems/real-life situations may be used. - An explanation of how mean, median, and mode are found may be required. - A description of the effects of adding data to a set may be required. - Tables and charts may be used.	pp. 87-109

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7.21	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. [7-SP5]	7.13	Determine the probability of a compound event.	Multiple-choice Gridded Open-ended	6	- Word problems/real-life situations may be used. - An explanation of how mean, median, and mode are found may be required. - A description of the effects of adding data to a set may be required. - Tables and charts may be used.	pp. 110-126
7.22	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. [7-SP6]						
7.23 7.23a 7.23b	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. [7-SP7] - Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. [7-SP7a] - Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. [7-SP7b]	7.13	Determine the probability of a compound event.	Multiple-choice Gridded Open-ended	6	- Word problems/real-life situations may be used. - An explanation of how mean, median, and mode are found may be required. - A description of the effects of adding data to a set may be required. - Tables and charts may be used.	pp. 110-126
7.24 7.24a 7.24b 7.24c	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. [7-SP8] - Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. [7-SP8a] - Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event. [7-SP8b] - Design and use a simulation to generate frequencies for compound events. [7-SP8c]	7.13	Determine the probability of a compound event.	Multiple-choice Gridded Open-ended	6	- Word problems/real-life situations may be used. - An explanation of how mean, median, and mode are found may be required. - A description of the effects of adding data to a set may be required. - Tables and charts may be used.	pp. 110-126

Additional Standards that Must Be Addressed for ARMT+

	2003 CONTENT STANDARD		ITEM TYPE	POINTS POSS.	ADDITIONAL INFORMATION	PAGES IN ITEM SPECS
	7.5	Translate verbal phrases into algebraic expressions and algebraic expressions into verbal phrases.	Multiple-choice	4	- Any representation of a rational number may be included in the algebraic equation as a coefficient of a variable or a constant. - Word problems/real-life situations will be used. - Exponents may be used.	pp. 25-29
	7.7	Determine the transformation(s), including translations, reflections, or rotations, used to alter the position of a polygon on the coordinate plane.	Multiple-choice	4	- The four options may be four graphs. - The stem of the item may include a graph. - Changing the position of a polygon on the coordinate plane may require two transformations. - The identification of a transformation may be required.	pp. 35-47