

Prentice Hall Mathematics, Course 2 © 2008
Correlated to:
Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 7

ARIZONA 2008 MATHEMATICS STANDARD ARTICULATED BY GRADE LEVEL, GRADE 7	Prentice Hall Mathematics, Course 2 © 2008
Strand 1: Number and Operations	
<p>Number sense is the understanding of numbers and how they relate to each other and how they are used in specific context or real-world application. It includes an awareness of the different ways in which numbers are used, such as counting, measuring, labeling, and locating. It includes an awareness of the different types of numbers such as, whole numbers, integers, fractions, and decimals and the relationships between them and when each is most useful. Number sense includes an understanding of the size of numbers, so that students should be able to recognize that the volume of their room is closer to 1,000 than 10,000 cubic feet.</p> <p>Students develop a sense of what numbers are, i.e., to use numbers and number relationships to acquire basic facts, to solve a wide variety of real-world problems, and to estimate to determine the reasonableness of results.</p>	
Concept 1: Number Sense	
<p>Understand and apply numbers, ways of representing numbers, and the relationships among numbers and different number systems.</p> <p>In Grade 7, students extend their work with equivalency among fractions, decimals and percents to order and compare them. They work with common factors and multiples as they deal with prime and composite numbers. Students are introduced to absolute value and build fluency with all rational numbers.</p>	
<u>Performance Objectives</u>	
<i>Students are expected to:</i>	
PO 1. Recognize and convert between expressions for positive and negative rational numbers, including fractions, decimals, percents, and ratios. Connections: M07-S1C1-03, M07-S1C2-02, M07-S1C2-03, M07-S1C3-01, M07-S1C3-02, M07-S2C2-01, M07-S3C3-02	SE/TE: 95-100, 113, 116, 274-277, 279-283, 284-287, 290-293, 298-301, 302-303, 316, 580, 659
PO 2. Find or use factors, multiples, or prime factorization within a set of numbers. Connections: M07-S1C3-01, M07-S1C3-03	SE/TE: 73, 74-78, 80-81, 83, 84, 112, 118
PO 3. Compare and order rational numbers using various models and representations. Connections: M07-S1C1-01, M07-S1C2-02, M07-S1C3-01	SE/TE: 87, 91, 98, 101, 102-105, 113, 281, 282, 283
PO 4. Model and solve simple problems involving absolute value. Connections: M07-S1C2-02	SE/TE: 31-32, 33, 61
<u>Process Integration</u>	
M07-S5C2-04. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.	SE/TE: 75-76, 78, 95, 274-276, 279, 282, 289, 295, 297
M07-S5C2-06. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.	SE/TE: 31-32, 75-76, 78, 95, 102-105, 274-276, 279, 282, 289, 295, 297, 274-277, 279-283, 284-287, 290-293, 298-301, 302-303

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Concept 2: Numerical Operations	
Understand and apply numerical operations and their relationship to one another. In Grade 7, students' understanding of equality is essential to number operations and algebraic reasoning as they further develop these important ideas. Students build on their previous work in adding, subtracting, multiplying, and dividing fractions and they use rational numbers in solving problems. They develop fluency and flexibility with efficient procedures including the standard algorithm for all operations with integers. Students understand why the procedures work and use them to solve problems. They continue to build on applying order of operations to numerical expressions.	
<u>Performance Objectives</u>	
<i>Students are expected to:</i>	
PO 1. Add, subtract, multiply, and divide integers. Connections: M07-S1C2-02, M07-S1C2-05, M07-S3C1-01, M07-S3C3-02, M07-S3C3-03, M07-S3C3-05, M07-S3C3-06	SE/TE: 36-37, 38-42, 43-47, 51, 61, 66, 118, 166, 177
PO 2. Solve problems with rational numbers and appropriate operations using exact answers or estimates. Connections: M07-S1C1-01, M07-S1C1-03, M07-S1C1-04, M07-S1C2-01 M07-S1C3-02	SE/TE: 4-5, 8-11, 13, 14-17, 19, 20-23, 26, 30, 31, 36-37, 40-42, 44-47, 62, 66, 118, 125, 126-129, 130-136, 160, 162, 166, 177, 226, 372, 661-663, 665-666
PO 3. Solve problems involving percentages, ratio and proportion, including tax, discount, tips, and part/whole relationships. Connections: M07-S1C1-01, M07-S1C3-02	SE/TE: 228-231, 232-235, 236, 238-241, 242, 243, 244-248, 249-250, 252-255, 257, 258, 259-263, 264, 266-267, 270-271, 274-277, 278, 279-283, 284-287, 289, 290-293, 294-297, 298-301, 302-303, 304-307, 310-314, 316-317
PO 4. Represent and interpret numbers using scientific notation (positive exponents only).	SE/TE: 106-109, 113
PO 5. Simplify numerical expressions using the order of operations and appropriate mathematical properties. Connections: M07-S1C2-01, M07-S3C3-02	SE/TE: 48-51, 53, 61, 66, 69-70, 72, 112, 166, 169, 172, 372, 434
<u>Process Integration</u>	
M07-S5C2-05. Apply a previously used problem-solving strategy in a new context.	SE/TE: xxxii-xli, 28, 29, 55, 57, 76, 78, 92, 107, 110, 143, 144, 202, 246, 248, 290, 314, 332, 390, 391, 473, 474, 505, 507, 534, 536, 600, 602
M07-S5C2-01. Analyze a problem situation to determine the question(s) to be answered.	SE/TE: xxxii-xli, 24, 80, 146, 192, 302, 359, 398, 466, 496, 558, 604
M07-S5C2-07. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.	SE/TE: 5, 8, 9, 14, 15, 21, 52, 127, 130, 131, 137, 142, 149, 152, 178, 194-195, 200-201, 233, 242, 260, 280, 285, 289, 299, 302, 309, 329, 359, 360, 384, 423, 438, 446, 462, 496, 504, 544, 558, 566, 587, 596, 604, 610, 611

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<p>Concept 3: Estimation Use estimation strategies reasonably and fluently while integrating content from each of the other strands. In Grade 7, students use estimation skills to verify their work. They continue to make reasonable estimates using integers, fractions, decimals, and percents in problems involving all operations. Students connect their work with estimation to their work with measurement when estimating measured quantities and converting between measures.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
<p>PO 1. Estimate and apply benchmarks for rational numbers and common irrational numbers. Connections: M07-S1C1-01, M07-S1C1-02, M07-S1C1-03, M07-S1C3-03, M07-S2C2-04, M07-S4C4-01, M07-S5C2-11</p>	<p>SE/TE: 120, 122-123, 160, 308</p>
<p>PO 2. Make estimates appropriate to a given situation. Connections: M07-S1C1-01, M07-S1C2-02, M07-S1C2-03, M07-S1C3-04, M07-S2C1-02, M07-S3C3-03, M07-S3C3-05, M07-S3C4-01, M07-S4C4-01, M07-S4C4-03, M07-S4C4-04, M07-S4C4-05, M07-S4C4-06</p>	<p>SE/TE: 4-7, 8, 14, 26, 29, 92, 120-123, 126-127, 130-131, 137, 142, 146, 175, 176, 178, 180, 192-193, 201, 233, 243, 264, 272, 277, 280, 287, 289, 291, 292, 293, 302, 305, 306, 329, 331, 369, 374-376, 377, 389, 401, 402, 423, 428, 438-440, 477, 478, 539, 554-556, 557</p>
<p>PO 3. Estimate square roots of numbers less than 1000 by locating them between two consecutive whole numbers. Connections: M07-S1C1-02, M07-S1C3-01</p>	<p>SE/TE: 401, 402</p>
<p>PO 4. Estimate the measure of an object in one system of units given the measure of that object in another system and the approximate conversion factor. Connections: M07-S1C3-02</p>	<p>SE/TE: 158</p>
<p><u>Process Integration</u></p>	
<p>M07-S5C2-02. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.</p>	<p>SE/TE: 29, 122, 146, 176, 192, 302</p>
<p>M07-S5C2-01. Analyze a problem situation to determine the question(s) to be answered.</p>	<p>SE/TE: 6, 122, 146, 176, 192, 302, 306, 377</p>
<p>M07-S5C2-03. Identify relevant, missing, and extraneous information related to the solution to a problem.</p>	<p>SE/TE: 6, 29, 146, 176, 192, 302, 555</p>

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Strand 2: Data Analysis, Probability, and Discrete Mathematics	
This strand requires students to use data collection, data analysis, statistics, probability, systematic listing and counting, and the study of graphs. This prepares students for the study of discrete functions as well as to make valid inferences, decisions, and arguments. Discrete mathematics is a branch of mathematics that is widely used in business and industry. Combinatorics is the mathematics of systematic counting. Vertex-edge graphs are used to model and solve problems involving paths, networks, and relationships among a finite number of objects.	
Concept 1: Data Analysis (Statistics)	
Understand and apply data collection, organization, and representation to analyze and sort data. In Grade 7, students apply their understanding of integers, fractions, decimals, and percents as they construct, analyze, and describe data in more complex situations that they may encounter in other school subjects and their lives.	
<u>Performance Objectives</u>	
<i>Students are expected to:</i>	
PO 1. Solve problems by selecting, constructing, and interpreting displays of data including multi-line graphs and scatterplots. Connections: M07-S2C1-02, SC07-S1C3-01, SC07-S1C3-02, SC07-S1C3-03, SC07-S1C3-05, SC07-S1C4-01, SC07-S1C4-02, SS07-S1C1-01, SS07-S1C1-02, SS07-S1C1-03, SS07-S2C1-01, SS07-S2C1-02, SS07-S2C1-03, SS07-S4C1-01, SS07-S4C1-02, SS07-S4C1-03	SE/TE: 57, 58, 243, 532-536, 537-542, 543, 544-547, 548, 558-559, 566, 567-570, 571, 572-573
PO 2. Interpret trends in a data set, estimate values for missing data, and predict values for points beyond the range of the data set. Connections: M07-S1C3-02, M07-S2C1-01, M07-S2C2-03, SC07-S1C3-01, SC07-S1C3-02, SC07-S1C3-03, SC07-S1C3-05	SE/TE: 56, 57, 243, 596
PO 3. Identify outliers and determine their effect on mean, median, mode, and range.	SE/TE: 53
PO 4. Distinguish between a simple random and non-random sample.	SE/TE: 550-553
<u>Process Integration</u>	
M07-S5C2-07. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.	SE/TE: 536, 537, 541, 542, 543, 552, 556, 563
M07-S5C2-08. Make and test conjectures based on information collected from explorations and experiments.	SE/TE: 554, 566
M07-S5C2-03. Identify relevant, missing, and extraneous information related to the solution to a problem.	SE/TE: 541, 546, 552, 555, 558, 563, 569

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Concept 2: Probability	
Understand and apply the basic concepts of probability. In Grade 7, students extend their knowledge of fractions by stating the theoretical probability of an event as a fraction, decimal, or percent based on the possible outcomes. They predict, record, and compare results in actual experiments. Experience with probability at this level will prepare students for deeper exploration of probability in the higher grades.	
<u>Performance Objectives</u>	
<i>Students are expected to:</i>	
PO 1. Determine conditional probabilities (experimental) in compound probability experiments. Connections: M07-S1C1-01, M07-S2C2-02	SE/TE: 597, 598-602
PO 2. Experiment with two different events to determine whether the two events are dependent or independent of each other. Connections: M07-S2C2-01	SE/TE: 597, 598-599, 600, 602
PO 3. Compare the results of multiple repetitions of the same probability experiment to the theoretical probability. Connections: M07-S2C1-02	SE/TE: 580, 616
PO 4. Compare probabilities to determine fairness in experimental situations. Connections: M07-S1C3-01	SE/TE: 581, 585
Concept 3: Systematic Listing and Counting	
Understand and demonstrate the systematic listing and counting of possible outcomes. In Grade 7, students utilize graphic organizers to categorize data that may or may not include algebraic components. Students expand on their experience with counting problems by solving problems with increased rigor. Students continue to make connections to the multiplication principle of counting throughout the process of problem solving.	
<u>Performance Objectives</u>	
<i>Students are expected to:</i>	
PO 1. Analyze relationships among the tree diagrams where items repeat and do not repeat; make numerical connections to the multiplication principle of counting.	SE/TE: 75, 76, 78, 592-593, 594, 600, 606, 607, 611, 617
PO 2. Solve counting problems using Venn diagrams and represent the answer algebraically. Connections: M07-S3C3-01, M07-S5C2-09	SE/TE: 537

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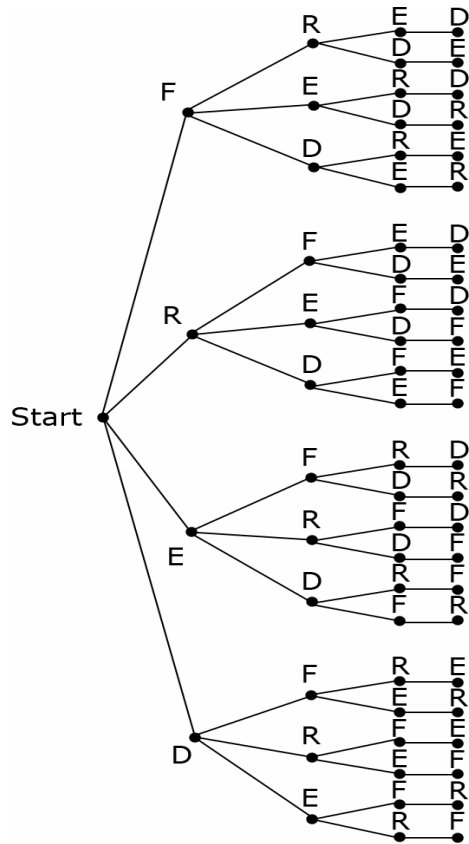
Process Integration

M07-S5C2-06. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.

SE/TE: 75, 76, 78, 537, 592, 594, 600

Example:

- All possible arrangement of the letters in the word FRED.



$4 \times 3 \times 2 \times 1$

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<p>Concept 4: Vertex-Edge Graphs Understand and apply vertex-edge graphs. In Grade 7, students use vertex-edge graphs to solve real-world problems utilizing Hamilton and Euler paths and circuits.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
<p>PO 1. Use vertex-edge graphs and algorithmic thinking to represent and find solutions to practical problems related to Euler/Hamilton paths and circuits. Connections: SS07-S4C1-03, SS07-S4C1-05</p>	<p>SE/TE: Related content: 262, 264, 489</p>
<p><u>Process Integration</u></p>	
<p>M07-S5C2-02. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.</p>	<p>SE/TE: Related content: 262, 264, 489</p>
<p>Strand 3: Patterns, Algebra, and Functions Patterns occur everywhere in nature. Algebraic methods are used to explore, model and describe patterns, relationships, and functions involving numbers, shapes, iteration, recursion, and graphs within a variety of real-world problem solving situations. Iteration and recursion are used to model sequential, step-by-step change. Algebra emphasizes relationships among quantities, including functions, ways of representing mathematical relationships, and the analysis of change.</p>	
<p>Concept 1: Patterns Identify patterns and apply pattern recognition to reason mathematically while integrating content from each of the other strands. In Grade 7, students continue to investigate and analyze patterns and use this information to make conjectures.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
<p>PO 1. Recognize, describe, create, and analyze numerical and geometric sequences using tables or graphs; make conjectures about these sequences. Connections: M07-S1C2-01, M07-S3C2-01, M07-S3C3-01</p>	<p>SE/TE: 441, 442-445, 478</p>
<p><u>Process Integration</u></p>	
<p>M07-S5C2-06. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.</p>	<p>SE/TE: 444-445</p>
<p>M07-S5C2-08. Make and test conjectures based on information collected from explorations and experiments.</p>	<p>SE/TE: 444-445</p>

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<p>Concept 2: Functions and Relationships Describe and model functions and their relationships. In Grade 7, students use graphs, tables, and other algebraic techniques to model applied problems with mathematical functions.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
<p>PO 1. Use a table of values to graph an equation or proportional relationship; describe the graph's characteristics. Connections: M07-S3C1-01, M07-S3C3-04, M07-S3C4-01</p>	<p>SE/TE: 491-494, 495, 496-497, 498-501, 502, 524-525</p>
<p>Concept 3: Algebraic Representations Represent and analyze mathematical situations and structures using algebraic representations. In Grade 7, students refine and expand their knowledge of algebraic thinking by solving equations that require more than one step. They translate fluently between graphs, tables, and equations. Students exhibit their understanding of algebra by creating expressions, equations, and inequalities to model a contextual situation.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
<p>PO 1. Write a single variable algebraic expression or one-step equation given a contextual situation. Connections: M07-S2C3-02, M07-S3C1-01, M07-S3C3-03, M07-S3C3-05</p>	<p>SE/TE: xli, 168-172, 174, 176, 182, 183, 192-193, 194-197, 201- 204, 220, 249-250, 332-333, 457, 458</p>
<p>PO 2. Evaluate an expression containing one or two variables by substituting numbers for the variables. Connections: M07-S1C1-01, M07-S1C2-01, M07-S1C2-05</p>	<p>SE/TE: 170-172, 191, 220, 434, 484</p>
<p>PO 3. Solve multi-step equations using inverse properties with rational numbers. Connections: M07-S1C2-01, M07-S1C3-02, M07-S3C3-01, M07-S3C3-05, M07-S5C2-10</p>	<p>SE/TE: 199-204, 221, 434</p>
<p>PO 4. Translate between graphs and tables that represent a linear equation. Connections: M07-S3C2-01</p>	<p>SE/TE: 491-494, 524</p>
<p>PO 5. Create and solve two-step equations that can be solved using inverse operations with rational numbers. Connections: M07-S1C2-01, M07-S1C3-02, M07-S3C3-01, M07-S3C3-03, M07-S5C2-10</p>	<p>SE/TE: 199-204, 221, 434</p>
<p>PO 6. Create and solve one-step inequalities with whole numbers. Connections: M07-S1C2-01</p>	<p>SE/TE: 205-208, 210-213, 214-218, 221</p>

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<u>Process Integration</u>	
M07-S5C2-01. Analyze a problem situation to determine the question(s) to be answered.	SE/TE: 171, 176, 183, 192-193,197, 203, 207, 212, 217, 249-250, 333, 458, 493
M07-S5C2-04. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.	SE/TE: 171, 183, 192-193, 197, 203, 207, 212, 217,249-250, 332, 493
M07-S5C2-02. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.	SE/TE: 171, 176, 182, 192, 202, 203, 249, 332, 493
<p>Concept 4: Analysis of Change</p> <p>Analyze how changing the values of one quantity corresponds to change in the values of another quantity.</p> <p>In Grade 7, students work to recognize how altering a particular quantity will impact a corresponding value. Using graphs and tables allows students to model and visualize change with greater depth of understanding.</p>	
<u>Performance Objectives</u>	
<i>Students are expected to:</i>	
PO 1. Use graphs and tables to model and analyze change. Connections: M07-S1C3-02, M07-S3C2-01, SS07-S4C2-04	SE/TE: 436, 437-439, 478
<p>Strand 4: Geometry and Measurement</p> <p>Geometry is a natural place for the development of students' reasoning, higher thinking, and justification skills culminating in work with proofs. Geometric modeling and spatial reasoning offer ways to interpret and describe physical environments and can be important tools in problem solving. Students use geometric methods, properties and relationships, transformations, and coordinate geometry as a means to recognize, draw, describe, connect, analyze, and measure shapes and representations in the physical world. Measurement is the assignment of a numerical value to an attribute of an object, such as the length of a pencil. At more sophisticated levels, measurement involves assigning a number to a characteristic of a situation, as is done by the consumer price index. A major emphasis in this strand is becoming familiar with the units and processes that are used in measuring attributes.</p>	
<p>Concept 1: Geometric Properties</p> <p>Analyze the attributes and properties of 2- and 3- dimensional figures and develop mathematical arguments about their relationships.</p> <p>In Grade 7, students expand their investigation of geometric properties to include circles, polygons and three-dimensional shapes and their attributes. Students examine the relationships between and among varying figures.</p>	
<u>Performance Objectives</u>	
<i>Students are expected to:</i>	
PO 1. Recognize the relationship between central angles and intercepted arcs; identify arcs and chords of a circle.	SE/TE: 350-353, 367
PO 2. Analyze and determine relationships between angles created by parallel lines cut by a transversal.	SE/TE: Grade 6 (Course 1): 378

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<p>PO 3. Draw and classify 3-dimensional figures with appropriate labels showing specified attributes of parallelism, congruence, perpendicularity, and symmetry. Connections: M07-S4C4-04, M07-S4C4-05, M07-S4C4-07</p>	<p>SE/TE: 410-413, 429</p>
<p>PO 4. Describe the relationship between the number of sides in a regular polygon and the sum of its interior angles.</p>	<p>SE/TE: 335, 337, 339</p>
<p>PO 5. Identify corresponding parts of congruent figures.</p>	<p>SE/TE: 346-349, 367</p>
<p><u>Process Integration</u></p>	
<p>M07-S5C2-08. Make and test conjectures based on information collected from explorations and experiments.</p>	<p>SE/TE: 348, 352, 412</p>
<p>M07-S5C2-01. Analyze a problem situation to determine the question(s) to be answered.</p>	<p>SE/TE: 348, 352, 412</p>
<p>M07-S5C2-04. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.</p>	<p>SE/TE: 348-349, 352, 412</p>
<p>M07-S5C2-06. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.</p>	<p>SE/TE: 348-349, 352, 412</p>
<p>Concept 2: Transformation of Shapes Apply spatial reasoning to create transformations and use symmetry to analyze mathematical situations. In Grade 7, students build on their knowledge of translations, reflections, and rotations to construct a combination of two transformations using the coordinate plane.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
<p>PO 1. Model the result of a double transformation (translations or reflections) of a 2-dimensional figure on a coordinate plane using all four quadrants.</p>	<p>SE/TE: 509, 510-513, 514-517, 520, 525</p>

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<p>Concept 3: Coordinate Geometry Specify and describe spatial relationships using rectangular and other coordinate systems while integrating content from each of the other strands.</p>	
<p>In Grade 7, there are no performance objectives in this concept.</p>	
<p>Concept 4: Measurement Understand and apply appropriate units of measure, measurement techniques, and formulas to determine measurements. In Grade 7, students broaden their understanding of area and perimeter to include determining the surface area of solids, recognizing different polygons with the same area or perimeter, and calculating the area and circumference of circles. They select and consider significant information to determine the appropriate degree of accuracy for measurements. The skills and understandings developed at this level prepare students for the next grade level where they are asked to apply their knowledge of area to find the area of composite figures and determine the surface area of common solids.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
<p>PO 1. Solve problems involving the circumference and area of a circle by calculating and estimating. Connections: M07-S1C3-01, M07-S1C3-02, M07-S5C2-11</p>	<p>SE/TE: 394-397, 429</p>
<p>PO 2. Identify polygons having the same perimeter or area.</p>	<p>SE/TE: 376, 378, 381, 383</p>
<p>PO 3. Calculate the area and perimeter of composite 2-dimensional figures. Connections: M07-S1C3-02, M07-S5C1-01</p>	<p>SE/TE: 390-392, 428</p>
<p>PO 4. Determine actual lengths based on scale drawings or maps. Connections: M07-S1C3-02, M07-S1C3-04, M07-S4C1-03, SS07-S4C1-03</p>	<p>SE/TE: 258, 259-263, 264, 267</p>
<p>PO 5. Create a net to calculate the surface area of a given solid. Connections: M07-S1C3-02, M07-S4C1-03, M07-S4C4-07, M07-S5C1-01</p>	<p>SE/TE: 414-418, 429</p>
<p>PO 6. Identify the appropriate unit of measure to compute the volume of an object and justify reasoning. Connections: M07-S1C3-02</p>	<p>SE/TE: 419, 421-425, 429</p>
<p>PO 7. Measure to the appropriate degree of accuracy and justify reasoning. Connections: M07-S4C1-03, M07-S4C4-05, SC07-S1C2-04</p>	<p>SE/TE: 154-157, 161</p>
<p><u>Process Integration</u></p>	
<p>M07-S5C2-11. Use manipulatives and other modeling techniques to defend π as a ratio of circumference to diameter.</p>	<p>SE/TE: 372C, 394</p>

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M07-S5C2-02. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.	SE/TE: 258, 390, 395-397, 415, 421-422
M07-S5C2-03. Identify relevant, missing, and extraneous information related to the solution to a problem.	SE/TE: 156, 258, 261, 262, 391, 396, 417, 424
<p>Strand 5: Structure and Logic</p> <p>This strand emphasizes the core processes of problem solving. Students draw from the content of the other four strands to devise algorithms and analyze algorithmic thinking. Strand One and Strand Three provide the conceptual and computational basis for these algorithms. Logical reasoning and proof draws its substance from the study of geometry, patterns, and analysis to connect remaining strands. Students use algorithms, algorithmic thinking, and logical reasoning (both inductive and deductive) as they make conjectures and test the validity of arguments and proofs. Concept two develops the core processes as students evaluate situations, select problem solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.</p>	
<p>Concept 1: Algorithms and Algorithmic Thinking</p> <p>Use reasoning to solve mathematical problems.</p> <p>In Grade 7, students build on their knowledge of how formulas function to develop their own formulas for determining the area of a composite figure. Experience with algorithms will be critical in future math endeavors as students use formulas to solve problems of increased complexity.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
<p>PO 1. Create an algorithm to determine the area of a given composite figure.</p> <p>Connections: M07-S4C4-03, M07-S4C4-05</p>	SE/TE: 390-392, 398-399, 428
<p><u>Process Integration</u></p>	
M07-S5C2-08. Make and test conjectures based on information collected from explorations and experiments.	SE/TE: 390, 392, 398
<p>Concept 2: Logic, Reasoning, Problem Solving, and Proof</p> <p>Evaluate situations, select problem-solving strategies, draw logical conclusions, develop and describe solutions, and recognize their applications.</p> <p>In Grade 7, students analyze problem situations and choose and apply strategies to solve problems. Students are given multiple opportunities to refine their reasoning skills through explaining and defending their solutions.</p>	
<p><u>Performance Objectives</u></p>	
<p><i>Students are expected to:</i></p>	
PO 1. Analyze a problem situation to determine the question(s) to be answered.	SE/TE: xxxii-xli, 24, 80, 146, 192, 302, 359, 398, 466, 496, 558, 604
PO 2. Analyze and compare mathematical strategies for efficient problem solving; select and use one or more strategies to solve a problem.	SE/TE: 28, 29, 55, 57, 76, 78, 92, 107, 110, 143, 144, 202, 246, 248, 290, 314, 332, 390, 391, 473, 474, 505, 507, 534, 536, 600, 602
PO 3. Identify relevant, missing, and extraneous information related to the solution to a problem.	SE/TE: xxxii, 24, 80, 146, 192, 302, 359, 398, 466, 496, 558, 604

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Correlated to:

Arizona 2008 Mathematics Standard Articulated by Grade Level, Grade 7

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PO 4. Represent a problem situation using multiple representations, describe the process used to solve the problem, and verify the reasonableness of the solution.	SE/TE: 28, 29, 55, 57, 76, 78, 92, 107, 110, 143, 144, 202, 246, 248, 290, 314, 332, 390, 391, 473, 474, 505, 507, 534, 536, 600, 602
PO 5. Apply a previously used problem-solving strategy in a new context.	SE/TE: xxxii-xli, 28, 29, 55, 57, 76, 78, 92, 107, 110, 143, 144, 202, 246, 248, 290, 314, 332, 390, 391, 473, 474, 505, 507, 534, 536, 600, 602
PO 6. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language. Connections: SC07-S1C4-03, SC07-S1C4-05	SE/TE: Representative pages: 75, 76, 78, 274-277, 279-283, 284-287, 290-293, 298-301, 302-303, 494
PO 7. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning. Connections: SC07-S1C3-05	SE/TE: 5, 8, 9, 14, 15, 21, 52, 127, 130, 131, 137, 142, 149, 152, 178, 194-195, 200-201, 233, 242, 260, 280, 285, 289, 299, 302, 309, 329, 359, 360, 384, 423, 438, 446, 462, 496, 504, 544, 558, 566, 587, 596, 604, 610, 611
PO 8. Make and test conjectures based on information collected from explorations and experiments. Connections: SC07-S1C1-01, SC07-S1C2-03, SC07-S1C3-04, SC07-S1C3-06, SC07-S1C3-07	SE/TE: 58, 135, 168, 251, 335, 353, 443
PO 9. Solve logic problems using multiple variables and multiple conditional statements using words, pictures, and charts. Connections: M07-S2C3-02	SE/TE: 9, 15, 24, 36, 49, 63, 80, 115, 146, 152, 163, 168, 175, 192, 223, 249, 269, 302, 319, 369, 398, 431, 443, 446-447, 466, 481, 496, 527, 537, 558, 575, 604
PO 10. Demonstrate and explain that the process of solving equations is a deductive proof. Connections: M07-S3C3-03, M07-S3C3-05	SE/TE: 9, 15, 24, 49, 146, 175, 192, 249, 302, 398, 496
PO 11. Use manipulatives and other modeling techniques to defend $n(\pi)$ as a ratio of circumference to diameter. Connections: M07-S1C3-01, M07-S4C4-01	SE/TE: 372C, 394
<u>Process Integration</u>	
Some of the Strand 5 Concept 2 performance objectives are listed throughout the grade level document in the Process Integration Column (2nd column). Since these performance objectives are connected to the other content strands, the process integration column is not used in this section next to those performance objectives.	
M07-S5C2-06. Communicate the answer(s) to the question(s) in a problem using appropriate representations, including symbols and informal and formal mathematical language.	SE/TE: Representative pages: 75, 76, 78, 274-277, 279-283, 284-287, 290-293, 298-301, 302-303, 494
M07-S5C2-07. Isolate and organize mathematical information taken from symbols, diagrams, and graphs to make inferences, draw conclusions, and justify reasoning.	SE/TE: 5, 8, 9, 14, 15, 21, 52, 127, 130, 131, 137, 142, 149, 152, 178, 194-195, 200-201, 233, 242, 260, 280, 285, 289, 299, 302, 309, 329, 359, 360, 384, 423, 438, 446, 462, 496, 504, 544, 558, 566, 587, 596, 604, 610, 611