

*Kansas*  
**Curricular Standards**  
**Mathematics - Grade 7**  
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 1.800.900.2290

<i>Benchmark Number</i>	<i>Benchmark</i> • <i>Instructional Targets</i>	<i>Gourmet Resource</i>	<i>Taught</i>	<i>Tested</i>
<b>1</b>	<b>Number and Computation (Standard)</b> The student uses numerical and computational concepts and procedures in a variety of situations.			
<b>1.1</b>	<b>Number Sense</b> The student demonstrates number sense for rational numbers, pi, and simple algebraic expressions in one variable in a variety of situations.			
	<b>Knowledge Base Indicators</b>			
<b>1.1.1</b>	<ul style="list-style-type: none"> <li>Compares and orders rational numbers and pi, and explains the relative magnitude among them. Special Note: Remember, rational numbers include large numbers such as one million and small numbers such as one thousandth.</li> </ul>			
<b>1.1.2</b>	<ul style="list-style-type: none"> <li>Knows, explains, and uses equivalent representations for rational numbers: integers, decimals, fractions, percents, ratios, numbers with whole number exponents, and scientific notation.</li> </ul>			
<b>1.1.3</b>	<ul style="list-style-type: none"> <li>Explains and determines the absolute value of rational numbers.</li> </ul>			
<b>1.1.4</b>	<ul style="list-style-type: none"> <li>Knows, explains, and uses equivalent representations for the same simple algebraic expressions such as <math>2x + 5x</math> could be written as <math>7x</math>.</li> </ul>			
<b>1.1.5</b>	<ul style="list-style-type: none"> <li>Knows and explains what happens to the product or quotient when a number is multiplied or divided by a number between zero and one or a number greater than one.</li> </ul>			

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<b>1.2</b>	<b>Number Systems and their Properties</b> The student demonstrates an understanding of the rational number system and pi, recognizes, applies, and explains its properties, and extends these properties to algebraic expressions in one variable.			
	<b>Knowledge Base Indicators</b>			
<b>1.2.1</b>	<ul style="list-style-type: none"> <li>Recognizes the need for rational numbers and pi.</li> </ul>			
<b>1.2.2</b>	<ul style="list-style-type: none"> <li>Classifies rational numbers as members of various number systems.</li> </ul>			
<b>1.2.3</b>	<ul style="list-style-type: none"> <li>Knows or explains the relationships among natural (counting) numbers, whole numbers, integers, and rational numbers (models include number lines, Venn diagrams).</li> </ul>			
<b>1.2.4</b>	<ul style="list-style-type: none"> <li>Knows the correct terminology for, explains, and uses: addition and multiplication properties of equality; commutative, associative, distributive, and substitution properties; additive and multiplicative identity properties; additive and multiplicative inverse properties; multiplicative property of zero; transitive, reflexive and symmetric properties; transitive property of inequality; and the addition property of inequality.</li> </ul>			
<b>1.3</b>	<b>Estimation</b> The student uses numerical estimation with rational numbers and pi in a variety of situations.			
	<b>Knowledge Base Indicators</b>			
<b>1.3.1</b>	<ul style="list-style-type: none"> <li>Uses a variety of computational methods including mental mathematics, paper and pencil, concrete materials, or technological tools such as calculators and computers to estimate quantities involving rational numbers and pi.</li> </ul>			

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1.3.2	<ul style="list-style-type: none"> <li>Estimates quantities involving rational numbers and pi using various estimation techniques such as rounding, special numbers, clustering, truncation, and compatible numbers.</li> </ul>			
1.3.3	<ul style="list-style-type: none"> <li>Recognizes and explains the difference between exact and approximate values of rational numbers and pi.</li> </ul>			
1.3.4	<ul style="list-style-type: none"> <li>Discusses the appropriateness of the estimation strategy used and its impact on the result.</li> </ul>			
1.4	<p><b>Computation</b> The student explains and performs computations with rational numbers, pi and first degree algebraic expressions in one variable in a variety of situations.</p>			
	<p><b>Knowledge Base Indicators</b></p>			
1.4.1	<ul style="list-style-type: none"> <li>Uses a variety of computational methods including mental arithmetic (doubles and neighbors), paper and pencil, concrete materials, or technological tools such as calculators and computer.</li> </ul>			
1.4.2	<ul style="list-style-type: none"> <li>Explains and performs computations with rational numbers, pi, and first degree algebraic expressions in one variable.</li> </ul>			
1.4.3	<ul style="list-style-type: none"> <li>Recognizes, explains, and uses different ways to express arithmetic operations.</li> </ul>			
1.4.4	<ul style="list-style-type: none"> <li>Analyzes and explains computational procedures including the use of more than one arithmetic approach to perform a computation such as <math>49 \times 23 = (40 \times 23) + (9 \times 23)</math> or <math>49 \times 23 = (49 \times 20) + (49 \times 3)</math> or <math>49 \times 23 = (50 \times 23) - 23</math>.</li> </ul>			

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<b>2</b>	<b>Algebra (Standard)</b> The student uses algebraic concepts and procedures in a variety of situations.			
<b>2.1</b>	<b>Patterns</b> The student recognizes, describes, extends, develops, and explains the general rule of patterns from a variety of situations.			
<b>Knowledge Base Indicators</b>				
<b>2.1.1</b>	<ul style="list-style-type: none"> <li>Identifies and continues patterns presented in a variety of formats: numeric, algebraic, visual, oral, written, kinesthetic, pictorial, tabular, graphical, or listing.</li> </ul>			
<b>2.1.2</b>	<ul style="list-style-type: none"> <li>Recognizes patterns with two simultaneous changes.</li> </ul>			
<b>2.1.3</b>	<ul style="list-style-type: none"> <li>Creates a pattern.</li> </ul>			
<b>2.2</b>	<b>Variables, Equations, and Inequalities</b> The student uses symbols and whole numbers to solve simple equations and inequalities in a variety of situations.			
<b>Knowledge Base Indicators</b>				
<b>2.2.1</b>	<ul style="list-style-type: none"> <li>Knows and explains that a variable can represent a single quantity that changes such as daily temperature.</li> </ul>			
<b>2.2.2</b>	<ul style="list-style-type: none"> <li>Shows and explains how changes in one variable affects other variables such as changes in diameter affects circumference.</li> </ul>			
<b>2.2.3</b>	<ul style="list-style-type: none"> <li>Explains the difference between an equation and an expression.</li> </ul>			
<b>2.2.4</b>	<ul style="list-style-type: none"> <li>Explains and uses the following words and symbols to represent relationships such as <math>&lt;</math>, <math>\leq</math>, <math>&gt;</math>, <math>\geq</math>, <math>=</math>, <math>\neq</math> and greater than or equal to.</li> </ul>			
<b>2.2.5</b>	<ul style="list-style-type: none"> <li>Solves two-step linear equations in one variable with whole number coefficients and constants, and positive rational solutions.</li> </ul>			

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2.2.6	<ul style="list-style-type: none"> <li>Solves two-step linear inequalities in one variable with whole number coefficients and constants, and positive rational solutions intuitively, analytically, and graphically such as <math>2x + 1 &gt; 9</math>.</li> </ul>			
2.2.7	<ul style="list-style-type: none"> <li>Solves one-step linear equations in one variable.</li> </ul>			
2.2.8	<ul style="list-style-type: none"> <li>* Evaluates formulas using substitution.</li> </ul>			
2.2.9	<ul style="list-style-type: none"> <li>N * Knows and explains the relationship between ratios, proportions and percents including solving for a missing term in a proportion.</li> </ul>			
2.2.10	<ul style="list-style-type: none"> <li>Represents solution sets of linear equations in two variables on the coordinate plane.</li> </ul>			
2.3	<p><b>Functions</b></p> <p>The student recognizes, describes, and examines constant and linear relationships in a variety situations.</p>			
	<p><b>Knowledge Base Indicators</b></p>			
2.3.1	<ul style="list-style-type: none"> <li>Uses a variety of methods including mental mathematics, paper and pencil, concrete materials, and graphing utilities or other technological tools to recognize and examine constant and linear relationships.</li> </ul>			
2.3.2	<ul style="list-style-type: none"> <li>Explains or gives examples of relationships which remain constant.</li> </ul>			
2.3.3	<ul style="list-style-type: none"> <li>Uses ordered pairs to demonstrate relationships.</li> </ul>			

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2.4	<b>Models</b> The student develops and uses models to represent and justify mathematical relationships found in a variety of situations.			
	<b>Knowledge Base Indicators</b>			
2.4.1	<ul style="list-style-type: none"> <li>• <i>Uses mathematical models to represent and explain mathematical concepts and procedures.</i></li> </ul>			
2.4.2	<ul style="list-style-type: none"> <li>• <i>* Identifies mathematical models to show the relationship between two or more things.</i></li> </ul>			
3	<b>Geometry (Standard)</b> The student uses geometric concepts and procedures in a variety of situations.			
3.1	<b>Geometric Figures and their Properties</b> The student recognizes, applies, and compares properties of geometric figures in a variety of situations.			
	<b>Knowledge Base Indicators</b>			
3.1.1	<ul style="list-style-type: none"> <li>• <i>Recognizes and uses properties of all geometric figures listed previously, plus the following figures: trapezoid and parallelogram.</i></li> </ul>			
3.1.2	<ul style="list-style-type: none"> <li>• <i>Classifies triangles as scalene, isosceles, equilateral, acute, right, obtuse, and equiangular, and polygons as regular, irregular, and/or by the number of sides.</i></li> </ul>			
3.1.3	<ul style="list-style-type: none"> <li>• <i>Recognizes or applies properties of corresponding parts of similar and congruent triangles and quadrilaterals.</i></li> </ul>			
3.1.4	<ul style="list-style-type: none"> <li>• <i>Uses symbols for perpendicular, parallel, triangle, and right angle.</i></li> </ul>			
3.1.5	<ul style="list-style-type: none"> <li>• <i>Uses appropriate technology, manipulatives, constructions or drawings to recognize or compare geometric figures.</i></li> </ul>			
3.1.6	<ul style="list-style-type: none"> <li>• <i>Determines if a triangle can be constructed from three different lengths.</i></li> </ul>			

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<b>3.2</b>	<b>Measurement and Estimation</b> The student estimates and measures using standard and nonstandard units in a variety of situations.			
<b>Knowledge Base Indicators</b>				
<b>3.2.1</b>	<ul style="list-style-type: none"> <li>Uses various estimation techniques to determine rational number approximations of length, volume, surface area, area, perimeter, weight, capacity, temperature or time.</li> </ul>			
<b>3.2.2</b>	<ul style="list-style-type: none"> <li>Recognizes, states and uses measurement formulas for perimeter and area of parallelograms, triangles, squares, rectangles, and circles plus the volume of a cube.</li> </ul>			
<b>3.2.3</b>	<ul style="list-style-type: none"> <li><i>N</i> * Applies measurement formulas which are given to three-dimensional figures including surface area of cubes and volume and surface area of rectangular prisms.</li> </ul>			
<b>3.2.4</b>	<ul style="list-style-type: none"> <li>Finds area and perimeter of two-dimensional figures composed of squares, rectangles, triangles, and circles.</li> </ul>			
<b>3.2.5</b>	<ul style="list-style-type: none"> <li>Applies various measurement techniques and uses appropriate tools, units of measure and degree of accuracy to find accurate rational number representations for length, volume, surface area, area, perimeter, weight, temperature and time.</li> </ul>			
<b>3.2.6</b>	<ul style="list-style-type: none"> <li>Uses appropriate units to describe rate as a unit of measure such as miles per hour.</li> </ul>			
<b>3.2.7</b>	<ul style="list-style-type: none"> <li>Finds missing angle measurements in triangles and quadrilaterals.</li> </ul>			
<b>3.2.8</b>	<ul style="list-style-type: none"> <li>Performs conversions within the standard measurement system.</li> </ul>			
<b>3.2.9</b>	<ul style="list-style-type: none"> <li>Performs conversions within the metric measurement system.</li> </ul>			

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<b>3.3</b>	<b>Transformational Geometry</b> The student recognizes and describes a single geometric transformation of simple shapes or objects in a variety of situations.			
<b>Knowledge Base Indicators</b>				
<b>3.3.1</b>	• <i>N * Recognizes, describes, and performs single and multiple transformations [rotation, reflection, translation, shrink or magnify (dilate)] on two-dimensional figures.</i>			
<b>3.3.2</b>	• <i>Creates a tessellation.</i>			
<b>3.3.3</b>	• <i>N * Recognizes and draws three-dimensional shapes as they would appear from a variety of visual perspectives (top, bottom, side, and corners).</i>			
<b>3.4</b>	<b>Geometry from an Algebraic Perspective</b> The student will analyze two-dimensional geometry using a coordinate system in a variety of situations.			
<b>Knowledge Base Indicators</b>				
<b>3.4.1</b>	• <i>Uses a variety of methods including mental mathematics, paper and pencil, concrete materials, graphing utilities and other technological tools to analyze two-dimensional geometry on the coordinate system.</i>			
<b>3.4.2</b>	• <i>N * Uses the coordinate plane to:</i>			
<b>3.4.2.a</b>	• <i>identify in which quadrant or on which axis a point lies when given the coordinates of the point.</i>			
<b>3.4.2.b</b>	• <i>graph or identify points on the coordinate plane in all four quadrants.</i>			
<b>3.4.2.c</b>	• <i>Determine if a given point is on the line given the graph of the line.</i>			
<b>3.4.2.d</b>	• <i>List up to five coordinate pairs on the graph of a line and then state the pattern that exists.</i>			

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3.4.3	<ul style="list-style-type: none"> <li>Finds the distance between the points on a number line by computing the absolute value of their difference.</li> </ul>			
4	<b>Data (Standard)</b> The student uses concepts and procedures of data analysis in a variety of situations.			
4.1	<b>Probability</b> The student uses probability to generate convincing arguments, draw conclusions, and make decisions in a variety of situations.			
<b>Knowledge Base Indicators</b>				
4.1.1	<ul style="list-style-type: none"> <li>Determines the probability of a compound event composed of two independent events.</li> </ul>			
4.1.2	<ul style="list-style-type: none"> <li>Explains and gives examples of events having probability of one or zero.</li> </ul>			
4.1.3	<ul style="list-style-type: none"> <li>* Describes probability of events using fractions, decimals and percents.</li> </ul>			
4.2	<b>Statistics</b> The student generates, organizes, and interprets rational number and other data in a variety of situations. The student applies measures of central tendency when drawing conclusions from the data.			
<b>Knowledge Base Indicators</b>				
4.2.1	<ul style="list-style-type: none"> <li>Organizes, displays and reads quantitative (numerical) and qualitative (non-numerical) data in a clear, organized and accurate manner including the use of correct titles, labels, and intervals or categories. Specific formats for the display of rational number data and other types of data include:            frequency distributions.            box-and-whiskers plots.            stem-and-leaf plots.            scatterplots.            bar, line, and circle graphs.            Venn diagrams or other pictorial displays.            charts and tables.</li> </ul>			

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4.2.2	<ul style="list-style-type: none"> <li>Explains and conducts appropriate sampling techniques for gathering data for a given situation (observation, survey, census of total population, random sampling, etc.)</li> </ul>			
4.2.3	<ul style="list-style-type: none"> <li>* Determines the measures of central tendency (mean, median, and mode), and the range for a rational number data set containing an even or odd number of data points.</li> </ul>			
4.2.4	<ul style="list-style-type: none"> <li>Identifies or determines the quartiles of a data set.</li> </ul>			
4.2.5	<ul style="list-style-type: none"> <li>Determines and explains the advantages and disadvantages of using each measure of central tendency and the range to describe a data set.</li> </ul>			

\* This indicator will be assessed at the state level.

N The use of calculators, abacuses or computers will not be allowed during the assessment of this indicator at the state level.