

**USD 203 Piper Curriculum
Mathematics**

**Math Extension 7
Grade 7**

Standard	Benchmark	KSMS Knowledge Base Indicator	KSMS Application Indicator
1--NUMBERS & COMPUTATION			
	1--Number Sense		
		<p>1.1.1K. Knows, explains, and uses equivalent representations for rational numbers and simple algebraic expressions including integers, fractions, decimals, percents and ratios; integer bases with whole number exponents; positive rational numbers written in scientific notation with positive integer exponents; time; and money (2.4.K1a-c) \$.</p>	<p>1.1.1A Generates and/or solves real world problems using (2.4.A1a) \$:</p>
			<p>b. fractions and decimal approximations of the irrational number pi.</p>
		<p>1.1.2K.</p>	<p>1.1.2A. Determines whether or not solutions to real-world problems using rational numbers, the irrational number pi, and simple algebraic expressions are reasonable (2.4.A1a) \$</p>
		<p>1.1.3K.</p>	
		<p>1.1.4K. Knows and explains what happens to the product or quotient when (2.4.K1a):</p>	
		<p>a. a whole number is multiplied or divided by a rational number greater than zero and less than one,</p>	
		<p>b. a whole number is multiplied or divided by a rational number greater than one,</p>	
		<p>c. a rational number (excluding zero) is multiplied or divided by zero.</p>	
		<p>1.1.5K. Explains and determines the absolute value of rational numbers (2.4.K1a)</p>	
	2--Number Systems and their Properties		

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		1.2.1K.	1.2.1A.	
		1.2.2K.	1.2.2A.	
		1.2.3K.		
		1.2.4K.		
		a. identity properties for addition and multiplication (additive identity -zero added to any number is equal to that number; multiplicative identity- one multiplied by any number is equal to that number)		
		1.2.5K.		
	3--Estimation			
			1.3.1K.	1.3.1A.
			1.3.2K. Uses various estimation strategies and explains how they were used to estimate rational number quantities or the irrational number pi (2.4.K1a) \$. N	1.3.2A. Estimates to check whether or not the result of a real-world problem using rational numbers, the irrational number pi , and /or simple algebraic expressions is reasonable and makes predictions based on the information (2.4.A1a)
			1.3.3K. Recognizes and explains the difference between an exact and an approximate answer (2.4.K1a).	1.3.3A. Determines a reasonable range for the estimation of a quantity given a real-world problem and explains the reasonableness of the range (2.4.A1a)
			1.3.4K. Determines the appropriateness of an estimation strategy used and whether the estimate is greater than (overestimate), or less than (underestimate) the exact answer and its potential impact on the result (2.4.K1a).	1.3.4A. Determines if a real-world problem calls for an exact or an approximate answer and performs the appropriate computation using various computational methods including mental math, paper and pencil, concrete objects and/or appropriate technology (2.4.A1a)\$.
			1.3.5K. Knows and explains why the fraction (22/7) or decimal (3.14) representation of the irrational number pi is an approximate value (2.4.K1c).	
	4--Computation			

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		1.4.1K. Computes with efficiency and accuracy using various computational methods including mental math, paper and pencil, concrete materials, and appropriate technology (2.4.K1a-c) \$.	1.4.1A. Generates and/or solves one- and two-step real-world problems using these computational procedures and mathematical concepts (2.4.A1a) \$:
			a addition, subtraction, multiplication, and division of rational numbers with a special emphasis on fractions and expressing answers in simplest form .
			b. addition, subtraction, multiplication, and division of rational numbers with a special emphasis on integers.
			c. first degree algebraic expressions in one variable .
		1.4.2K.	d. percentages of rational number .
		d. adds, subtracts, multiplies and divides fractions and expresses answers in simplest form ;	N
		e. adds, subtracts, multiplies, and divides integers;	
		f. uses basic order of operations (evaluates within grouping symbols, evaluates powers to the second or third power, multiplies or divides in order from left to right, then adds or subtracts in order from left to right) using whole numbers;	
		g. simplifies positive rational numbers raised to positive whole number powers;	
		h. combines like terms of a first degree algebraic expression.	
		1.4.3K. Recognizes, describes, and uses different ways to express the same computational procedures.	

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		1.4.5K.	
		1.4.4K. Finds percentages of rational numbers \$	
2--ALGEBRA			
	1--Patterns		
		2.1.1K. Identifies, states, and continues a pattern presented in various formats including numeric (list or table), algebraic (symbolic notation), visual (picture, table, or graph), verbal (oral description), kinesthetic (action), and written using these attributes :	2.1.1A.
		c. geometric figures (2.4.K1f)	
		2.1.2K.	2.1.2A.
		2.1.3K. Extends a pattern when given a rule of one or two simultaneous (addition, subtraction, multiplication, division) between consecutive terms (2.4.K1a)	
		2.1.4K. States the rule to find the nth term of a pattern with one operational change (addition or subtraction) between consecutive terms (2.4.K1a)	
	2--Variables, Equations, and Inequalities		
		2.2.1K.	2.2.1A. Represents real-world problems using variables and symbols to write linear expressions, one- or two-step equations, or one-step inequalities (2.4.A1e) \$
		2.2.2K.	2.2.2A.
		2.2.3K.	2.2.3A.
		2.2.4K.	2.2.4A. Explains the mathematical reasoning that was used to solve a real-world problem using a one- or two-step linear equation (2.4.A1e) \$
		2.2.5K.	

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		a. one-step linear equations in one variable with positive rational coefficients and solutions	
		b. two-step linear equations in one variable with counting number coefficients and constants and positive rational solutions	
		2.2.6K.	
		2.2.7K. Knows the mathematical relationship between ratios, proportions, and percents and how to solve for a missing term in a proportion with positive rational number solutions and monomials (2.4.K1a,c) \$	
		2.2.8K. Evaluates simple algebraic expressions (including formulas) using positive rational numbers (2.4.K1c) \$	
	3--Functions		
		2.3.1K.	2.3.1A.
		2.3.2K.	2.3.2A.
		2.3.3K. Demonstrates mathematical relationships using ordered pairs in all four quadrants of a coordinate plane (2.4.K1g)	
		2.3.4K.	
	4--Models		
		2.4.1K. Knows, explains, and uses mathematical models to represent mathematical concepts, procedures, and relationships. Mathematical models include:	2.4.1A.

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Standard	Benchmark	KSMS Knowledge Base Indicator	KSMS Application Indicator
		<p>a. process models (concrete objects, pictures, diagrams, number lines, hundred charts, measurement tools, multiplication arrays, division sets, or coordinate grids) to model computational procedures, algebraic relationships, and mathematical relationships and to solve equations (1.1.K1-5, 1.2.K1-4, 1.3.K1-4, 1.4.K5, 2.1.K1a-b, 2.1.K1e, 2.1.K2-4, 2.2.K1-3, 2.2.K5-6, 2.3.K1, 3.1.K9, 3.2.K1-3, 3.2.K1-3, 3.2.K9, 3.3.K1-4, 3.4.K1, 4.2.K4-6) \$;</p>	
		<p>c. equations and inequalities to model numerical relationships (2.2.K5-6, 2.2.K6-8, 3.2.K11) \$</p>	
		<p>e. coordinate planes to model relationships between ordered pairs and linear equations (2.3.K1, 2.3.K3-5, 3.3.K1-3, 3.4.K1, 3.4.K3-4)</p>	
		<p>f. two- and three-dimensional geometric models (geoboards, dot paper, nets or solids) to model perimeter, area, volume, and surface area (3.2.K1-2, 3.2.K4-6, 3.2.K8, 3.2.K10, 3.3.K1-3)</p>	
		<p>g. geometric models (spinners, targets or number cubes), process models (pictures, diagrams, or coins) to model probability (4.1.K1, 4.1.K4) ;</p>	
		<p>h. frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single stem-and -leaf plots, scatter plots , and box and whisker plots to organize and display data (1.2.K1, 4.2.K1, 4.2.K4-7);</p>	

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			<p>2.4.2A Selects a mathematical model and justifies why some mathematical models are more accurate than other mathematical models in certain situations.</p> <p>2.4.3A. Uses the mathematical modeling process to make inferences about real-world situations when the mathematical model used to represent the situation is given .</p>
3--GEOMETRY			
	1--Geometric Figures and their Properties		
		3.1.1K. Recognizes and compares properties two- and three-dimensional figures using concrete objects, constructions, drawings, appropriate terminology, and appropriate technology (2.4.K1f).	3.1.1A.
		3.1.2K.	3.1.2A.
		3.1.3K. Identifies angle and side properties of triangles and quadrilaterals:	3.1.3A.
		a. sum of the interior angles of any triangle is 180	
		b. sum of the interior angles of any quadrilateral is 360	
		c. parallelograms have opposite sides that are parallel and congruent	
		d. rectangles have angles of 90, sides may or may not be equal	
		e. rhombi have all sides equal in length, angles may or may not be equal	
		f. squares have angles of 90, all sides congruent	
		g. trapezoids have one pair of opposite sides parallel and the other pair of opposites sides are not parallel	
		3.1.4K. Identifies and describes:	

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		<p>a. the altitude and base of a rectangular prism and triangular prism</p> <p>b. the radius and diameter of a cylinder</p> <p>3.1.5K. Identifies corresponding parts of similar and congruent triangles and quadrilaterals.</p> <p>3.1.6K. Uses symbols for right angle within a figure, parallel, perpendicular, and triangle to describe geometric figures</p> <p>3.1.7K. Classifies triangles as:</p> <p>a. right, obtuse, acute or equiangular</p> <p>b. scalene, isosceles, or equilateral</p> <p>3.1.8K.</p> <p>3.1.9K. Generates a pattern for the sum of angles for 3-,4-,5-, ...n-sides polygons</p> <p>3.1.10K.</p>	
	2--Measurement and Estimation		
		<p>3.2.1K. Determines and uses rational number approximations (estimations) for length, width, weight, volume, temperature, time, perimeter, and area using standard and nonstandard units of measure (2.4.K1a,f) \$.</p>	<p>3.2.1A. Solves real-world problems by :</p> <p>a. converting within the customary and metric systems.</p> <p>b. finding perimeter and area of circles, squares, rectangles, triangles, and parallelograms (2.4.A1e).</p> <p>c. finding perimeter and area of two-dimensional composite figures of circles, squares, rectangles, and triangles (2.4.A1e).</p> <p>e. finding missing angle measurements in triangles and quadrilaterals (2.4.A1e).</p>

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		3.2.2K.	3.2.2A.			
		3.2.3K. Converts within the customary system and within the metric system.				
		3.2.4K. Recognizes and states perimeter and area formulas for circles .				
		3.2.5K. Knows and uses perimeter and area formulas for circles, squares, rectangles, triangles, and parallelograms (2.4.K1f).				
		3.2.6K. Finds perimeter and area of two-dimensional composite figures of circles, squares, rectangles, and triangles (2.4.K1f)				
		3.2.7K. Uses given measurement formulas to find:				
		a. surface area of cubes .				
		b. volume of rectangular prisms.				
		3.2.8K. Finds surface area of rectangular prisms using concrete objects (2.4.K1f).				
		3.2.9K.				
		3.2.10K. Finds missing angle measurements in triangles and quadrilaterals (2.4.K1f).				
		3--Transformational Geometry				
					3.3.1K.	3.3.1A.
					3.3.2K. Identifies three-dimensional figures from various perspectives (top, bottom, sides, corners) (2.4.K1e-f).	3.3.2K.
3.3.3K. Draws three-dimensional figures from various perspectives (top, bottom, sides, corners) (2.4.K1e-f).	3.3.3K. Determines the actual dimensions and/or measurements of a figure represented in a scale drawing.					
3.3.4K. Generates a tessellation (2.4.K1e-f).						
4--Geometry from an Algebraic Perspective						

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		3.4.1K. Finds the distance between the points on a number line by computing the absolute value of their difference.	3.4.1A. Represents and/or generates real-world problems using a coordinate plane to find (2.4.A1e-f): a. perimeter of squares and rectangles . b. circumference (perimeter) of circles . c. area of circles, parallelograms, triangles, squares, and rectangles.
		3.4.2K. Uses all four quadrants of a coordinate plane to (2.4.K1e) :	
		a. identify in which quadrant or on which axis a point lies when given the coordinates of a point.	
		b. plot points .	
		c. identify points.	
		d. list through five ordered pairs of a given line.	
		3.4.3K. Uses a given linear equation with whole number coefficients and constants and a whole number solution to find the ordered pairs, organize the ordered pairs using a T-table, and plot the ordered pairs on the coordinate plane (2.4.K1d-e).	
		3.4.4K.	
4--DATA			
	1--Probability		
		4.1.1K.	4.1.1A.
		4.1.2K.	4.1.2A.
		4.1.3K. Uses a fraction, decimal, and percent to represent the probability of :	4.1.3A.
		a. simple event in an experiment or simulation.	
		b. a compound event composed of two independent events in an experiment or simulation.	
		4.1.4K.	4.1.4A.
	2--Statistics		

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		<p>4.2.1K.. Organizes displays and reads numerical (quantitative) and non-numerical (qualitative) data in a clear, organized and accurate manner including a title, labels, categories, and rational number intervals using these data displays (2.4.K1h) \$:</p>	4.2.1A.
		a. frequency tables.	
		b. bar, line and circle graphs	
		c. Venn diagrams or other pictorial displays.	
		d. charts and tables .	
		e. single stem-and-leaf plots (single).	
		f. scatter plots .	
		g. box-and-whiskers plots.	
		4.2.2K.	4.2.2A.
		4.2.3K. Conducts experiments with sampling and describes the results.	4.2.3A.
		4.2.4K. Determines the measures of central tendency (mean, median, mode) for a rational number data set (2.4.K1l).	4.2.4A.
		4.2.5K. Identifies and determines the range and the quartiles of a rational number data set (2.4.K1l).	
		4.2.6K. Identifies potential outliers within a set of data by inspection rather than formal calculation (2.4.K1l).	