

# Independent School District of Boise City

## Mathematics - 8

### District Course #0803

#### Course Description

Open to: Grade 8 One Year Course

Prerequisite: Pass Mathematics 7

Content: Students will review fundamental arithmetic, including addition, subtraction, multiplication and division of decimals, with emphasis on the structure of the number system. Elementary algebraic concepts will be introduced and problem solving strategies and applications will be emphasized.

#### Adopted Materials

Title: Mathematics: Structure and Method, Course 2

Edition: 2001

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#### Course Scope for Semester 1

Unit 1	Introduction to Algebra	16 Days
Unit 2	The Decimal System	13 Days
Unit 3	Positive and Negative Numbers	18 Days
Unit 4	Rational Numbers	17 Days
Unit 5	Probability	2 Days
Unit 6	Statistics	5 Days

#### Course Scope for Semester 2

Unit 7	Equations and Inequalities	18 Days
Unit 8	Geometry	14 Days
Unit 9	Ratio, Proportion, and Percent	16 Days
Unit 10	The Coordinate Plan	9 Days
Unit 11	Areas and Volumes	12 Days
Unit 12	Square Roots and Right Triangles	10 Days

<b>Math 8</b>		<b>District Reference</b> 0803
<b>Unit 1</b>	<b>Introduction to Algebra</b>	Semester 1, 16 days

<b>Instructional Objective</b>		<b>Standard Reference</b>	
0803.01 Use appropriate vocabulary.		8.M.1.2.7	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use, understand, and apply the appropriate vocabulary given specific mathematical concepts.	Ongoing (Ch. 1-11)	TMA, EOC

<b>Instructional Objective</b> 0803.02 Apply appropriate technology and models to find solutions to problems.			<b>Standard Reference</b>
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use computer applications to display and manipulate data.	Ongoing (Ch. 1-11)	TMA, EOC
02	Select appropriate models to represent mathematical ideas.	Ongoing (Ch. 1-11)	TMA, EOC
03	Use calculator to display, manipulate, and compute data.	Ongoing (Ch. 5.9-11)	TMA, EOC
<b>Instructional Objective</b> 0803.03 Understand and use U.S. customary and metric measurements.			<b>Standard Reference</b> 8.M.2.1.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Illustrate the interrelationship of measurement units through dimensional analysis conversions.	Supplement extension	TMA
02	Convert both metric and customary units of measurement.	Supplement extension	TMA
03	Select and use appropriate units and tools to make formal measurements in both systems.	Supplement extension	TMA
<b>Instructional Objective</b> 0803.04 Understand and use the commutative, associative, identity, zero, inverse, distributive, and substitution properties.			<b>Standard Reference</b> 8.M.3.2.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Explain and use the commutative, associative, distributive, identity, and inverse properties to simplify and solve numerical expressions.	1-5,2-4	TMA, EOC
<b>Instructional Objective</b> 0803.05 Use a variety of methods such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to explain mathematical reasoning and concepts.			<b>Standard Reference</b>
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Identify a problem that could be represented by a mathematical model.	1-8	TMA, EOC

<b>Math 8</b>		<b>District Reference</b> 0803
<b>Unit 2</b>	<b>The Decimal System</b>	Semester 1, 13days

<b>Instructional Objective</b> 0803.06 Understand and use exponents.			<b>Standard Reference</b> 8.M.1.2.3
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment</b>

			<b>Correlation</b>
01	Use the laws of exponents to simplify numerical expressions involving positive and negative integral exponents.	2-1, 2-5	TMA
<b>Instructional Objective</b> 0803.07 Simplify algebraic expressions.		<b>Standard Reference</b> 8.M.3.2.3	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Simplifying expressions using the order of operations.	2-5	TMA, EOC
<b>Instructional Objective</b> 0803.08 Make predictions and decisions based on information.		<b>Standard Reference</b> 8.M.1.3.1	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Determine the reasonableness of solutions to computation and word problems, choosing an appropriate method.	2-6	TMA, EOC
<b>Instructional Objective</b> 0803.09 Recognize when estimation is appropriate and understand the usefulness of an estimate as distinct from an exact answer.		<b>Standard Reference</b> 8.M.1.3.2	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use estimation to predict computation results.	2-6	TMA, EOC
02	Determine whether a given estimate is an overestimate or underestimate.	2-6	TMA, EOC
03	Estimate and judge reasonableness of results.	2-6	TMA, EOC

<b>Math 8</b>		<b>District Reference</b> 0803
<b>Unit 3</b>	<b>Positive and Negative Numbers</b>	Semester 1, 18 days

<b>Instructional Objective</b> 0803.10 Read, write, order, and compare real numbers.		<b>Standard Reference</b> 8.M.1.1.1	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Identify or write a set of positive and negative rational numbers arranged in order from greatest to least or least to greatest.	3-1	TMA
02	Compare rational numbers using appropriate symbols.	3-1	TMA
03	Determine absolute value of one and two-digit integers.	3-1	TMA
<b>Instructional Objective</b> 0803.11 Add, subtract, multiply, and divide rational numbers.		<b>Standard Reference</b> 8.M.1.2.2	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>

01	Find the sum, difference, product, or quotient of positive and negative rational numbers.	3-3,3-4,3-5,3-6	TMA, EOC
<b>Instructional Objective</b>		<b>Standard Reference</b>	
0803.12 Evaluate numerical expressions using the order of operations.		8.M.1.2.4	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use the order of operations to simplify numerical expressions and solve number sentences involving positive and negative rational numbers.	3-4,3-5,3-6	TMA, EOC
<b>Instructional Objective</b>		<b>Standard Reference</b>	
0803.13 Understand and use the order of operations in evaluating basic algebraic expressions.		8.M.3.3.2	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use the correct order of operations to evaluate algebraic expressions including those containing positive and negative exponents.	3-5,3-6	TMA, EOC
<b>Instructional Objective</b>		<b>Standard Reference</b>	
0803.14 Show a sense of magnitudes and relative magnitudes using scientific notation and exponential notation.		8.M1.1.4	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Identify or write numbers in expanded form using exponential notation.	3-7	TMA, EOC
02	Identify a number written in scientific notation and will convert numbers written in standard form or scientific notation interchangeably.	Ch. 3 enrichment	TMA, EOC

<b>Math 8</b>		<b>District Reference</b>
		0803
<b>Unit 4</b>	<b>Rational Numbers</b>	Semester 1, 17 days

<b>Instructional Objective</b>		<b>Standard Reference</b>	
0803.15 Consistently and accurately add, subtract, multiply, and divide rational numbers.		8.M.1.2.2	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Find the sum, difference, product, or quotient of positive and negative rational numbers.	4-1, 4-4,4-5,4-6	TMA, EOC
02	Find the solution to word problems that require the addition and subtraction of rational numbers.	4-4-,4-6	TMA, EOC
<b>Instructional Objective</b>		<b>Standard Reference</b>	
0803.16 Read, write, order, and compare real numbers and absolute value.		8.M.1.1.1	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment</b>

			<b>Correlation</b>
01	Identify or write a set of positive and negative rational numbers arranged in order from greatest to least or least to greatest.	4-1	TMA, EOC
02	Compare rational numbers using appropriate symbols.	4-1, 4-3	TMA, EOC
<b>Instructional Objective</b> 0803.17 Develop and apply number theory concepts.		<b>Standard Reference</b> 8.M.1.1.5	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use prime factors to find greatest common factor of two or more whole numbers.	4-2	TMA, EOC
02	Use prime factors to find the least common multiple of two or more whole numbers	4-3	TMA, EOC
03	Identify prime numbers between one and a hundred	4-2	TMA, EOC
04	Write prime factors of a number.	4-2	TMA, EOC
05	Write the prime factorization of a standard numeral using exponents.	4-1, 4-2	TMA, EOC
<b>Instructional Objective</b> 0803.18 Instantly recall common equivalent fractions, decimals, and percents.		<b>Standard Reference</b> 8.M.1.2.1	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Convert decimals (terminating and repeating), fractions, or percents interchangeably.	4-2, 4-7	TMA, EOC
<b>Instructional Objective</b> 0803.19 Use symbols ( $<$ , $>$ , $=$ , $\leq$ , $\geq$ ) to express relationships.		<b>Standard Reference</b> 8.M.3.1.3	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Compare rational numbers using appropriate symbols.	4-3	TMA, EOC
<b>Instructional Objective</b> 0803.20 Extend patterns and identify a function that generates the pattern using real numbers.		<b>Standard Reference</b> 8.M.3.4.1	
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Find and/or extend a pattern involving multiples, squares, cubes, and reciprocals.	4-3, 4-6, 10-1	TMA, EOC
<b>Math 8</b>		<b>District Reference</b> 0803	
<b>Unit 5</b>	<b>Probability</b>	Semester 1, 2 days	

<b>Instructional Objective</b> 0803.21 Make predictions based on experimental and theoretical probabilities.			<b>Standard Reference</b> 8.M.5.5.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Demonstrate understanding of the prediction and counting of probable outcomes based on data.	11-1	TMA, EOC
<b>Instructional Objective</b> 0803.22 Conduct statistical experiments and interpret results using tables, charts, or graphs.			<b>Standard Reference</b> 8.M.5.5.2
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Distinguish between independent and dependent events and identify conditional probabilities.	11-5, 11-7	TMA, EOC
<b>Instructional Objective</b> 0803.23 Model situations of probability using simulations.			<b>Standard Reference</b> 8.M.5.4.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Determine the probability of the outcome of single or compound events and represent the probability as a fraction.	11-2	TMA, EOC
<b>Math 8</b>			<b>District Reference</b> 0803
<b>Unit 6</b>	<b>Statistics</b>	Semester 1, 5 days	

<b>Instructional Objective</b> 0803.24 Collect, organize, and display data with appropriate notation in tables, charts, and graphs.			<b>Standard Reference</b> 8.M.5.2.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Create a graph, chart, or tables.	12-1, 12-2, 12-5, 12-6	TMA, EOC
<b>Instructional Objective</b> 0803.25 Analyze and interpret tables, charts, and graphs.			<b>Standard Reference</b> 8.M.5.1.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Interpret data given a chart or a table.	12-1, 12-2, 12-3, 12-5, 12-6	TMA, EOC
02	Interpret data given in a bar graph, circle graph, pictograph, or line graph.	12-1, 12-2, 12-3	TMA, EOC
<b>Instructional Objective</b> 0803.26 Explore the significance of range, frequency, and informal distribution.			<b>Standard Reference</b> 8.M.5.3.2
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Identify or generate the appropriate frequency distribution for a set of data.	12-3, 12-5, 12-6	TMA, EOC

<b>Instructional Objective</b> 0803.27 Choose and calculate the appropriate measure of central tendency – mean, median, and mode.			<b>Standard Reference</b> 8.M.5.3.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Compute mean, median, mode or range.	12-3	TMA, EOC

<b>Math 8</b>		<b>District Reference</b> 0803
<b>Unit 7</b>	<b>Equations and Inequalities</b>	Semester 2, 18 days

<b>Instructional Objective</b> 0803.28 Understand and use variables and expressions, equations, and inequalities.			<b>Standard Reference</b> 8.M.3.1.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Simplify or evaluate an equation with one or two variables.	5-1, 5-2, 5-3, 5-4, 5-5,	TMA, EOC
02	Simplify algebraic expressions, including the addition and subtraction of polynomials.	5-2, 5-3	TMA, EOC

<b>Instructional Objective</b> 0803.29 Solve one- and two-step equations and inequalities using inverse operations.			<b>Standard Reference</b> 8.M.3.3.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Identify correct operation and solve a simple equation or inequality using addition of rational numbers.	5-1, 5-3, 5-7	TMA, EOC
02	Identify correct operation and solve a simple equation or inequality using subtraction of rational numbers.	5-1, 5-3, 5-7	TMA, EOC
03	Identify correct operation and solve a simple equation or inequality using multiplication of rational numbers.	5-1, 5-4, 5-7	TMA, EOC
04	Identify correct operation and solve a simple equation or inequality using division of rational numbers.	5-1, 5-4, 5-7	TMA, EOC
05	Solve multiple step equations and inequalities with one variable.	5-1, 5-2, 5-5, 5-6, 5-7	TMA, EOC
06	Translate an algebraic expression or equation into an English phrase or sentence.	5-8, 5-9	TMA, EOC

<b>Math 8</b>		<b>District Reference</b> 0803
<b>Unit 8</b>	<b>Geometry</b>	Semester 2, 14 days

<b>Instructional Objective</b> 0803.30 Construct and measure various angles and shapes using appropriate tools.			<b>Standard Reference</b> 8.M.4.1.2
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Construct special geometric figures, including three-dimensional figures, figures drawn to a specified scale, and figures drawn on a coordinate grid to specified dimensions.	6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-7	TMA, EOC
<b>Instructional Objective</b> 0803.31 Select and use appropriate units and tools to make formal measurements using both systems.			<b>Standard Reference</b> 8.M.2.1.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use a ruler, compass, and/or protractor to solve measurement problems.	6-1, 6-2, 6-3, 6-4, 6-6	TMA, EOC
<b>Instructional Objective</b> 0803.32 Precisely describe, classify, and understand relationships among types of one-, two-, and three-dimensional objects using their defining properties.			<b>Standard Reference</b> 8.M.4.1.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Identify and describe two- and three-dimensional geometric figures, including pyramids, prisms, line segments, rays, and angles.	6-1, 6-2, 6-3, 6-4, 6-5, 6-6, 6-7	TMA, EOC
02	Use geometric terminology for figures and their parts.	Ongoing (Ch. 6 & 9)	TMA, EOC
<b>Instructional Objective</b> 0803.33 Apply formulas for perimeter, circumference, and area to polygons and circles.			<b>Standard Reference</b> 8.M.2.1.4
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Calculate the perimeter of a polygon or the circumference of a circle.	6-2, 6-8	TMA, EOC
02	Calculate the area of a polygon or circle.	9-1, 9-2, 9-3	TMA, EOC
03	Calculate area and circumference, given diameter or radius of a circle.	6-2, 9-3	TMA, EOC
<b>Instructional Objective</b> 0803.34 Understand and apply fundamental concepts, properties, and relationships among points, lines, planes, angles, and shapes.			<b>Standard Reference</b> 8.M.4.1.3
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Find the measure of a missing angles using knowledge of the properties of angles and of the angles within figures.	6-4, 6-5, 6-6, 6-7	TMA, EOC

<b>Instructional Objective</b> 0803.35 Explore and model the effects of reflections, translations, and rotations on various shapes.			<b>Standard Reference</b> 8.M.4.1.4
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Identify relationships between geometric figures and/or transformations of geometric figures.	6-7, 5-8, 6-9, 10-5	TMA, EOC
02	Identify congruence, similarities, and line symmetry of shapes.	6-9	TMA, EOC

<b>Math 8</b>		<b>District Reference</b> 0803
<b>Unit 9</b>	<b>Ratio, Proportion, and Percent</b>	Semester 2, 16 days

<b>Instructional Objective</b> 0803.36 Understand and use proportions, ratios, and scales.			<b>Standard Reference</b> 8.M.2.2.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Identify an equivalent expression and/or identify the terms for a ratio or a proportion.	7-1	TMA, EOC
02	Use ratios to solve word problems.	7-1, 7-2	TMA, EOC
03	Use proportions to solve word problems.	7-1, 7-2, 7-8	TMA, EOC
<b>Instructional Objective</b> 0803.37 Use rates to make indirect measurements			<b>Standard Reference</b> 8.M.2.2.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use formulas and appropriate procedures of solving measurement problems.	7-2	TMA, EOC
<b>Instructional Objective</b> 0803.38 Instantly recall common equivalent fractions, decimals, and percents.			<b>Standard Reference</b> 8.M.1.2.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Convert decimals (terminating and repeating), fractions, and percents interchangeably.	7-4	TMA, EOC
<b>Instructional Objective</b> 0803.39 Use a variety of strategies including common mathematical formulas to compute problems drawn from real-world situations.			<b>Standard Reference</b> 8.M.1.2.6
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Calculate the solutions to number problems using percent.	7-4, 7-5, 7-6, 7-8	TMA, EOC
02	Use percents to solve word problems.	7-5, 7-6, 7-5	TMA, EOC
03	Solve word problems that require converting percents, decimals, or fractions to another form.	7-4, 7-6, 7-8	TMA, EOC
04	Use a problem-solving model to develop and apply	2-6, 7-4, 7-5, 7-6, 7-8	TMA, EOC

	problem-solving strategies.		
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<b>Math 8</b>		<b>District Reference</b> 0803	
<b>Unit 10</b>	<b>The Coordinate Plane</b>	Semester 2, 9 days	

<b>Instructional Objective</b> 0803.40 Explore graphical representation to show simple linear equations.		<b>Standard Reference</b> 8.M.3.3.2, 8.M.3.5.1	
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No.	Performance Objective	Resource Reference	Assessment Correlation
01	Identify the coordinates of points or plot points given the coordinates on a four quadrant coordinate plane.	8-1	TMA, EOC
02	Graph a linear function of one or two variables.	8-2, 8-3	TMA, EOC
03	Determine the slope and x- and y-intercepts of a line from a graph or a table of values.	8-3	TMA, EOC

<b>Instructional Objective</b> 0803.41 Use functional relationships to explain how a change in one quantity results in a change in another.		<b>Standard Reference</b> 8.M.3.4.2	
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No.	Performance Objective	Resource Reference	Assessment Correlation
01	Identify and/or apply the function rule that represents the relationship of a set of number containing related pairs.	8-2	TMA, EOC
02	Complete an incomplete function table by finding the rule and the missing value(s).	8-2	TMA, EOC
03	Determine the domain or range of a function.	8-2	TMA, EOC

<b>Math 8</b>		<b>District Reference</b> 0803	
<b>Unit 11</b>	<b>Areas and Volumes</b>	Semester 2, 12 days	

<b>Instructional Objective</b> 0803.42 Understand the concept of surface area and volume.		<b>Standard Reference</b> 8.M.4.1.6	
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No.	Performance Objective	Resource Reference	Assessment Correlation
01	Calculate the surface area of a rectangular prism, triangular prism, or cylinder.	9-7	TMA, EOC
02	Calculate the volume of a rectangular prism, triangular prism, or cylinder.	9-5	TMA, EOC

<b>Math 8</b>		<b>District Reference</b> 0803	
<b>Unit 12</b>	<b>Square Roots and Right Triangles.</b>	Semester 2, 10 days	

<b>Instructional Objective</b> 0803.43 Understand and use real numbers both rational and irrational.			<b>Standard Reference</b> 8.M.1.1.2
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Determine the square root of a perfect or nonperfect square using a chart, a calculator, or computation.	10-1, 10-2	TMA, EOC
02	Estimate the whole number nearest the square root of a number that has an irrational square root.	10-2	TMA, EOC
<b>Instructional Objective</b> 0803.44 Investigate right triangle in geometry using the Pythagorean Theorem.			<b>Standard Reference</b> 8.M.3.5.1
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Use the Pythagorean Theorem to solve problems involving geometric figures.	10-410-3	TMA, EOC
<b>Instructional Objective</b> 0803.45 Recognize and apply congruence, similarities, and symmetry of shapes.			<b>Standard Reference</b> 8.M.4.1.5
<b>No.</b>	<b>Performance Objective</b>	<b>Resource Reference</b>	<b>Assessment Correlation</b>
01	Find the ratio of two similar polygons given the length of the sides.	10-5	TMA, EOC

**INDEPENDENT SCHOOL DISTRICT OF BOISE CITY  
IDAHO ACHIEVEMENT STANDARDS  
GRADE 8  
MATHEMATICS**

**Students are expected to know content and apply skills from previous grades.**

Mathematical reasoning and problem solving processes should be incorporated throughout all mathematics standards. Students should use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models to communicate mathematical information and to explain mathematical reasoning and concepts.

**Standard 1: Number and Operation**

Students in Grade 8 read, write, compare, order, and place on a number line rational numbers, including integers, fractions, decimals, and percents, and absolute values. Students use rational numbers, including percents and ratios, and  $\pi$  (pi) to solve problems. Students convert between standard form, scientific notation, and exponential form. Students add, subtract, multiply, and divide rational numbers and students recall the common equivalent fractions, decimals, and percents of halves, thirds, fourths, fifths, and tenths. Students evaluate numerical expressions with rational numbers using the order of operations and students evaluate numerical expressions with whole number exponents. Students estimate to predict computation results.

**Goal 1.1: Understand and use numbers.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.1.1.1 Compare magnitudes and relative magnitudes of rational numbers, including integers, fractions, decimals, percents, and absolute values.
- 8.M.1.1.2 Use rational numbers, including percents and ratios, and  $\pi$  (pi) to solve problems.
- 8.M.1.1.3 Locate the position of rational numbers and positive real numbers on a number line.
- 8.M.1.1.4 Convert between standard form, scientific notation, and exponential form.
- 8.M.1.1.5 Apply number theory concepts (primes, composites, prime factorization, LCM, GCF).
- 8.M.1.1.6 Recognize pertinent information for problem solving.
- 8.M.1.1.7 Apply integers in one- and two-step common real-world situations.
- 8.M.1.1.8 Use appropriate vocabulary.

**Goal 1.2: Perform computations accurately.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.1.2.1 Recall the common equivalent fractions, decimals, and percents of halves, thirds, fourths, fifths, and tenths.
- 8.M.1.2.2 Add, subtract, multiply, and divide rational numbers.
- 8.M.1.2.3 Evaluate numerical expressions with whole number exponents.
- 8.M.1.2.4 Evaluate numerical expressions with rational numbers using the order of operations.
- 8.M.1.2.5 Select and use an appropriate method of computation from mental math, paper and pencil, calculator, or a combination of the three.
- 8.M.1.2.6 Use a variety of strategies including common mathematical formulas to compute problems drawn from real life situations.
- 8.M.1.2.7 Use appropriate vocabulary and notations.

**Goal 1.3: Estimate and judge reasonableness of results.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.1.3.1 Estimate to predict computation results.
- 8.M.1.3.2 Identify when estimation is appropriate and apply to problem solving situations.

- 8.M.1.3.3 Identify whether a given estimate is an overestimate or underestimate.
- 8.M.1.3.4 Use a four-function calculator to solve complex grade-level problems.
- 8.M.1.3.5 Formulate conjectures and justify (short of formal proof) why they must be or seem to be true.
- 8.M.1.3.6 Use appropriate vocabulary and notations.

**Standard 2: Concepts and Principles of Measurement**

Students in Grade 8 select and use appropriate units and tools to make formal measurements in both systems. Students apply given formulas for perimeter, circumference, and area of triangles, circles, and quadrilaterals, and the volume and surface area of rectangular prisms. Students solve problems involving area of circles and the perimeter and area of rectangles and triangles. Students use rates, proportions, ratios, and map scales in problem solving situations.

**Goal 2.1: Understand and use U.S. customary and metric measurements.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.2.1.1 Select and use appropriate units and tools to make formal measurements in both systems.
- 8.M.2.1.2 Apply estimation of measurement to real-world and content problems using standard measuring devices.
- 8.M.2.1.3 Compare the differences and relationships among measures of perimeter, area, and volume (capacity) within both systems.
- 8.M.2.1.4 Given the formulas, find the circumference, perimeter, or area of triangles, circles, and quadrilaterals, and the volume and surface area of rectangular prisms.
- 8.M.2.1.5 Convert units of measurement within each system in problem solving situations.
- 8.M.2.1.6 Solve problems involving area of circles and the perimeter and area of rectangles and triangles.
- 8.M.2.1.7 Use appropriate vocabulary and notations.

**Goal 2.2: Apply the concepts of rates, ratios, and proportions.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.2.2.1 Use rates, proportions, ratios, and map scales in problem-solving situations.
- 8.M.2.2.2 Determine unit rates in real-world situations.

**Goal 2.3: Apply dimensional analysis.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.2.3.1 Illustrate the interrelationship of measurement units through dimensional analysis conversions.

**Standard 3: Concepts and Language of Algebra and Functions**

Students in Grade 8 translate simple word statements and story problems into algebraic expressions and equations. Students use the order of operations in evaluating basic algebraic expressions and students solve one- and two-step equations and inequalities. Students represent a set of data in a table, as a graph, and as a mathematical relationship.

**Goal 3.1: Use algebraic symbolism as a tool to represent mathematical relationships.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.3.1.1 Use variables in expressions, equations, and inequalities.
- 8.M.3.1.2 Translate simple word statements and story problems into algebraic expressions and equations.
- 8.M.3.1.3 Use symbols " $<$ ," " $>$ ," " $=$ ," " $\neq$ ," " $\leq$ ," and " $\geq$ " to express relationships.

**Goal 3.2: Evaluate algebraic expressions.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.3.2.1 Use and apply the following properties in evaluating algebraic expressions: commutative, associative, identity, zero, inverse, distributive, and substitution.
- 8.M.3.2.2 Use the order of operations in evaluating simple algebraic expressions.
- 8.M.3.2.3 Simplify algebraic expressions.

**Goal 3.3: Solve algebraic equations and inequalities.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.3.3.1 Solve one- and two-step equations and inequalities.
- 8.M.3.3.2 Match graphical representations with simple linear equations.

**Goal 3.4: Understand the concept of functions.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.3.4.1 Extend patterns and identify a rule (function) that generates the pattern using rational numbers.
- 8.M.3.4.2 Use relationships to explain how a change in one quantity may result in a change in another, and identify the relationship as a positive, negative, or neither.
- 8.M.3.4.3 Use appropriate vocabulary and notations.

**Goal 3.5: Represent equations, inequalities and functions in a variety of formats.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.3.5.1 Represent a set of data in a table, as a graph, and as a mathematical relationship.

**Goal 3.6: Apply functions to a variety of problems.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.3.6.1 Use patterns and linear functions to represent and solve problems.

**Standard 4: Concepts and Principles of Geometry**

Students in Grade 8 describe and classify relationships among types of one-, two-, and three-dimensional geometric figures using their defining properties. Students apply the fundamental concepts, properties, and relationships among points, lines, rays, planes, angles, and shapes. Students identify and apply congruence, similarities, and line symmetry of shapes.

**Goal 4.1: Apply concepts of size, shape, and spatial relationships.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.4.1.1 Describe and classify relationships among types of one-, two-, and three-dimensional geometric figures, using their defining properties.
- 8.M.4.1.2 Draw and measure various angles and shapes using appropriate tools.
- 8.M.4.1.3 Apply the fundamental concepts, properties, and relationships among points, lines, rays, planes, and angles.
- 8.M.4.1.4 Identify and model the effects of reflections, translations, rotations, and scaling on various shapes.
- 8.M.4.1.5 Identify congruence, similarities, and line symmetry of shapes.
- 8.M.4.1.6 Explain the concept of surface area and volume (capacity).
- 8.M.4.1.7 Use appropriate vocabulary and symbols.

**Goal 4.2: Apply the geometry of right triangles.**

No objectives at this grade level.

**Goal 4.3: Apply graphing in two dimensions.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.4.3.1 Identify and plot points on a coordinate plane.

**Standard 5: Data Analysis, Probability, and Statistics**

Students in Grade 8 analyze and interpret tables, charts and graphs, including frequency tables, scatter plots, line graphs, line plots, bar graphs, histograms, circle graphs, and stem-and-leaf plots. Students collect, organize, and display data with appropriate notation in tables, charts, and graphs, including scatter plots, line graphs, line plots, bar graphs, histograms, and stem-and-leaf plots. Students choose and calculate the appropriate measure of central tendency – mean, median, and mode. Students recognize equally likely outcomes and make predictions based on experimental and theoretical probabilities.

**Goal 5.1: Understand data analysis.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.5.1.1 Analyze and interpret tables, charts, and graphs, including frequency tables, scatter plots, broken line graphs, line plots, bar graphs, histograms, circle graphs, and stem-and-leaf plots.
- 8.M.5.1.2 Explain and justify conclusions drawn from tables, charts, and graphs.
- 8.M.5.1.3 Use appropriate vocabulary and notations.

**Goal 5.2: Collect, organize, and display data.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.5.2.1 Collect, organize, and display data with appropriate notation in tables, charts, and graphs, including scatter plots, broken line graphs, line plots, bar graphs, histograms, and stem-and-leaf plots.

**Goal 5.3: Apply simple statistical measurements.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.5.3.1 Choose and calculate the appropriate measure of central tendency – mean, median, and mode.
- 8.M.5.3.2 Explain the significance of distribution of data, including range, frequency, gaps, and clusters.

**Goal 5.4: Understand basic concepts of probability.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.5.4.1 Model situations of probability using simulations.
- 8.M.5.4.2 Recognize equally likely outcomes.
- 8.M.5.4.3 Explain that probability ranges from 0% to 100% and identify a situation as having high or low probability.
- 8.M.5.4.4 Use the language of probability.

**Goal 5.5: Make predictions or decisions based on data.**

**Objective(s): By the end of Grade 8, the student will be able to:**

- 8.M.5.5.1 Make predictions based on experimental and theoretical probabilities.
- 8.M.5.5.2 Conduct statistical experiments and interpret results using tables, charts, or graphs.
- 8.M.5.5.3 Use appropriate vocabulary and notations.