

Benchmark Results

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Benchmark#	Description	Remarks/Example	Idea/Standard	Subject	Grade	Body Of Knowledge/ Strand	Cognitive Complexity/ Rating
MA.8.A.1.1	Create and interpret tables, graphs, and models to represent, analyze, and solve problems related to linear equations, including analysis of domain, range, and the difference between discrete and continuous data.	<p>Example 1: Jan decided to save some money. She already had \$25. She received and saved \$5 on Friday each week for 8 weeks. Make a table and a graph of the money she would have each week. If she continues with this same savings plan, how much money will she have after 2 years? Is the situation in this problem continuous or discrete?</p> <p>The problem above is technically a discrete problem. A continuous linear function such as $y=25+ 5x$ may be used to fit the data and to solve the problem. If the domain is integers, this is a discrete function. If the domain is all real numbers, this is a continuous function.</p>	BIG IDEA 1	1	8	Algebra	Level 3: Strategic Thinking & Complex Reasoning
MA.8.A.1.2	Interpret the slope and the x- and y-intercepts when graphing a linear equation for a real-world	<p>Example: For the example 1 in benchmark MA.8.A.1.1, graph the equation $y = 5w + 25$. Tell why the line "slopes up" by 5 each week. Also tell why the line crosses the y-axis at 25.</p>	BIG IDEA 1	1	8	Algebra	Level 2: Basic Application of Skills & Concepts


	problem.						
MA.8.A.1.3	Use tables, graphs, and models to represent, analyze, and solve real-world problems related to systems of linear equations.	<p>Example 1: A zoo has turtles (each with four legs) and pelicans (each with two legs). There were 29 animals and 78 legs. How many of each type of animal were there? Your final solution should involve principles of equality.</p> <p>Example 2: The students in Mr. Kemp's class ordered T-shirts for the class. They found two different quotes for the cost of the shirts. Company A charges \$4 per shirt. Company B charges \$75 plus \$3 per shirt.</p> <ol style="list-style-type: none"> 1. The class plans to order 30 shirts. Which company will be a better deal? 2. For what number of T-shirts is the cost the same for both companies? 3. Does the company you chose for question 1 always offer a better deal? Why or why not? Explain your answers. <p>Students should be encouraged to make tables, graphs, and equations and notice the interconnectedness of these representations.</p>	BIG IDEA 1	1	8	Algebra	Level 3: Strategic Thinking & Complex Reasoning
MA.8.A.1.4	Identify the solution to a	Remarks: Students should recognize that intersecting	BIG IDEA 1	1	8	Algebra	Level 2: Basic


	system of linear equations using graphs.	<p>lines yield a unique solution; parallel lines yield no solution; and coincidental lines yield an infinite number of solutions. Students may use graphing technology to make observations about the effects of slope on the solution of systems of linear equations.</p> <p>Example: Use a graph of the following functions to determine a solution to the system of equations.</p> $y = 5x + 3$ $y = 3x - 9 + 2x$ <p>Example: Jan started with \$25 and saved \$5 each week. Bill started at the same time with no money and saved \$10 per week. Use a graph to determine if or when Bill and Jan will have the same amount of money.</p>					Application of Skills & Concepts
MA.8.A.1.5	Translate among verbal, tabular, graphical, and algebraic representations of linear functions.	<p>Example: Jan started with \$25 and saved \$5 each week. Bill started at the same time with no money and saved \$10 per week. Make a table to display the data, write an equation to show the amount of money each person has each week, and graphically display the situation. Explain the relationship between different representations of the same data.</p>	BIG IDEA 1	1	8	Algebra	Level 2: Basic Application of Skills & Concepts
MA.8.A.1.6	Compare the graphs of linear and non-linear functions for real-world situations.	<p>Students should understand that some situations can be modeled by a linear function and others cannot.</p>	BIG IDEA 1	1	8	Algebra	Level 2: Basic Application of Skills & Concepts

		Example: Mark had \$100 and added \$10 to it each year. Mandy put \$100 in the bank, earned 10% interest each year on her total amount of money in the bank, and left the interest in the bank account. Make a table of their money for 5 years. Graph the values. Explain why one function is linear and the other one is not.					
MA.8.A.4.1	Solve literal equations for a specified variable.	Example 1: Solve the following equation for h: $A=bh$ Example 2: The following equation tells you how much simple interest you will earn if you invest an amount of money (P) at a specified rate (r), for a given amount of time (t): $I = Prt$. Solve for P.	Algebra	1	8	Algebra	Level 1: Recall
MA.8.A.4.2	Solve and graph one- and two-step inequalities in one variable.	Example: Solve the following inequality for x: $6x-3>10$. Graph the solution set.	Algebra	1	8	Algebra	Level 2: Basic Application of Skills & Concepts
MA.8.A.6.1	Use exponents and scientific notation to write large and small numbers and vice versa and to solve problems.	Example 1: Write 3,600,000,000 in standard scientific notation. Example 2: Write 0.000 000 000 47 in standard scientific notation. Example 3: Write 6.02×10^{10} without the use of exponents.	Number and Operations	1	8	Algebra	Level 1: Recall
MA.8.A.6.2	Make reasonable approximations of square roots	Example: The formula $t = \frac{\sqrt{h}}{4}$ represents the time (t) in seconds that it takes	Number and Operations	1	8	Algebra	Level 2: Basic Application of Skills &

	and mathematical expressions that include square roots, and use them to estimate solutions to problems and to compare mathematical expressions involving real numbers and radical expressions.	an object to fall from a height of h feet. If a ball is dropped from a height of 200 ft, estimate how long it will take to reach the ground.					Concepts												
MA.8.A.6.3	Simplify real number expressions using the laws of exponents.	<p>Example 1: $3^2 \cdot 3^3 = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 3^5$</p> <p>Example 2: Find the value of the expression $4^3 - 3^3$.</p> <p>Example 3: Simplify the following expression:</p> $\frac{2^3 3^4 5^6}{4^2 3^2}$	Number and Operations	1	8	Algebra	Level 2: Basic Application of Skills & Concepts												
MA.8.A.6.4	Perform operations on real numbers (including integer exponents, radicals, percents, scientific notation, absolute value, rational numbers, and irrational numbers) using multi-step and real world problems.	<p>Example 1: The table shows Mr. Smith's weight during the first 3 months of his diet. If he started his diet at 245 pounds, fill in the following table.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Month</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>Weight</td> <td>238</td> <td>229</td> <td>224</td> </tr> <tr> <td>Weight change</td> <td></td> <td></td> <td></td> </tr> </table>	Month	1	2	3	Weight	238	229	224	Weight change				Number and Operations	1	8	Algebra	Level 3: Strategic Thinking & Complex Reasoning
Month	1	2	3																
Weight	238	229	224																
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MA.8.G.2.1	Use similar triangles to solve problems	Example 1: At the same time a 10 ft flagpole casts an 8 ft shadow, a nearby	BIG IDEA 2	1	8	Geometry	Level 3: Strategic Thinking &												

	that include height and distances.	tree casts a 40 ft shadow. How tall is the tree? Example 2: A 72-inch tall man casts a shadow that is 96 inches long. At the same time, a nearby crane casts a 52-foot long shadow. How tall is the crane?					Complex Reasoning
MA.8.G.2.2	Classify and determine the measure of angles, including angles created when parallel lines are cut by transversals.	Students identify congruent angles, and unique pairings of angles that can be used to determine the measure of missing angles. Example 1: Given that lines k and l are parallel, determine which angles are vertical, complementary, supplementary, and corresponding.  Example 2: Use a map of your town and ask students to identify vertical, complementary, supplementary, and right angles that are formed by the roads.	BIG IDEA 2	1	8	Geometry	Level 1: Recall
MA.8.G.2.3	Demonstrate that the sum of the angles in a triangle is 180-degrees and apply this fact to find unknown	Example 1: "Make a paper triangle and cut off regions around the vertices. Then place the vertices together, meeting at a common point, to see that they form a (approximate) straight	BIG IDEA 2	1	8	Geometry	Level 2: Basic Application of Skills & Concepts

	measure of angles and the sum of angles in polygons.	<p>angle."</p> <p>Example 2: In the following diagram, line k is parallel to line l. Use properties of angles made when parallel lines are cut by transverse lines to demonstrate that the sum of the three interior angles of a planar triangle is 180 degrees.</p>  <p>Example 3: Determine the sum of the internal angles of a regular hexagon. Investigate whether this sum is the same or different for different hexagons. Explain your findings.</p>					
MA.8.G.2.4	Validate and apply Pythagorean Theorem to find distances in real world situations or between points in the coordinate plane.	<p>Example 1: You are wrapping a gift for your teacher's birthday. It is a very long and skinny pencil. You want to wrap it in a box so that your teacher can not tell what shape it is. Your friend has a shoe box that measures 10 inches by 7 inches by 5 inches. The pencil is 13 inches long. Will you be able to fit the pencil into the shoe box and close the lid? Justify your answer with mathematics.</p> <p>Example 2: You are</p>	BIG IDEA 2	1	8	Geometry	Level 2: Basic Application of Skills & Concepts

		<p>sailing your boat to Key West from Pensacola. Key West is 82°W and 25°N, and your boat is 84°W and 29°N. What is the distance from your boat to Key West? Assume 1° change in longitude or latitude is 70 miles.</p> 					
MA.8.G.5.1	<p>Compare, contrast, and convert units of measure between different measurement systems (US customary or metric (SI)) and dimensions including temperature, area, volume, and derived units to solve problems.</p>	<p>Example 1: Convert 25°C to degrees Fahrenheit.</p> <p>Example 2: Convert 30 miles per hour to feet per second.</p> $\frac{30 \text{ miles}}{\text{hour}} = \frac{30 \text{ miles}}{\text{hour}} \cdot \frac{5280 \text{ feet}}{1 \text{ mile}} \cdot \frac{1 \text{ hour}}{3600 \text{ seconds}}$ <p>Students should not be using only formulas to do this. 1 mile = 5280 feet, and there are 3600 seconds in 1 hour. We may use these equivalencies to substitute feet for miles and seconds for hours.</p> $\frac{30 \text{ miles}}{\text{hour}} = \frac{30 \cdot 5280 \text{ feet}}{3600 \text{ seconds}}$ <p>Another way to convert</p>	Geometry and Measurement	1	8	Geometry	Level 3: Strategic Thinking & Complex Reasoning

		units is demonstrated here:					
MA.8.S.3.1	Select, organize and construct appropriate data displays, including box and whisker plots, scatter plots, and lines of best fit to convey information and make conjectures about possible relationships.	<p>Example: Alfonso's bowling scores are 125, 142, 165, 138, 176, 102, 156, 130, and 142. Make a box-and-whiskers plot of the data.</p> <p>The box and whiskers plot below represents the bowling scores of Anna. Compare the bowling scores of Alfonso and Anna. Who is a better bowler?</p>	BIG IDEA 3	1	8	Statistics	Level 2: Basic Application of Skills & Concepts
MA.8.S.3.2	Determine and describe how changes in data values impact measures of central tendency.	<p>Example: Mrs. Donohue has told her students that she will remove the lowest exam score for each student at the end of the grading period. Sara received grades of 43, 78, 84, 85, 88, 78, and 90 on her exams. What will be the different between the mean, median, and mode of her original grades and the mean, median, and mode of her five grades after Mrs. Donohue removes one grade?</p>	BIG IDEA 3	1	8	Statistics	Level 2: Basic Application of Skills & Concepts