

**8th Mathematics Achievement Test
Measurement Standard**

Benchmark A

Question 40	Spring 2009	A
Question 8	January 2005	D

Benchmark B

Question 5	Spring 2010	B										
Question 44	Spring 2010	D										
Question 2	March 2008	A										
Question 11	March 2008	<table border="1"> <thead> <tr> <th align="left" colspan="2">Scoring Guidelines</th> </tr> <tr> <th align="left">Points</th> <th align="left">Student Response</th> </tr> </thead> <tbody> <tr> <td>2 point</td> <td> <p>Sample Correct Responses:</p> <ul style="list-style-type: none"> $V(\text{cylinder}) = \pi \times r^2 \times h$ $V(\text{cylinder}) = 3.14 \times 9 \times 10 = 282.6 \text{ in}^3$ $V(\text{box}) = l \times w \times h$ $282.6 \text{ in}^3 = l \times w \times 10 \text{ in.}$ $28.26 \text{ in}^2 = l \times w$ Any length and width whose product is approximately 28.26 is acceptable. $V = \pi \times r^2 \times h$ $V = \pi \cdot 9 \cdot 10$ $V = 282.7433$ $282.7 = l \times w \times 10$ $28.3 = l \times w$ $28 = l \times w$ $7 \times 4 \times 10$ could be the dimensions of the box. <p>The focus of this task is to use formulas to find the volume of cylinders and find the dimensions of a rectangular prism. A correct response will find the volume of a cylinder and determine the dimensions of a rectangular prism with a given volume and height. The response gives the approximate correct volume of the cylinder and shows the steps needed to determine an appropriate length and width for the 10-inch-tall box.</p> <p>NOTE: Leaving answers in terms of π is acceptable.</p> </td> </tr> <tr> <td>1 point</td> <td> <p>The response provides partial evidence of how to find the volume of a cylinder and to determine the length and width of a rectangular prism with a given volume and height; however, the solution may be incomplete or slightly flawed. For example, the response may:</p> <ul style="list-style-type: none"> Use the correct formulas but make a calculation error that leads to an incorrect answer. Use the correct formulas and calculations, but fail to provide a final answer; e.g., correctly finds the volume of the cylinder and attempts to find the length and width. </td> </tr> <tr> <td>0 point</td> <td> <p>The response provides inadequate evidence of how to find the volume for a cylinder and a prism, or there is no response. For example the response may:</p> <ul style="list-style-type: none"> State erroneous formulas and arrive at an incorrect solution. Simply state dimensions of a box. State only the volume of the cylinder. Be blank or give irrelevant information. </td> </tr> </tbody> </table>	Scoring Guidelines		Points	Student Response	2 point	<p>Sample Correct Responses:</p> <ul style="list-style-type: none"> $V(\text{cylinder}) = \pi \times r^2 \times h$ $V(\text{cylinder}) = 3.14 \times 9 \times 10 = 282.6 \text{ in}^3$ $V(\text{box}) = l \times w \times h$ $282.6 \text{ in}^3 = l \times w \times 10 \text{ in.}$ $28.26 \text{ in}^2 = l \times w$ Any length and width whose product is approximately 28.26 is acceptable. $V = \pi \times r^2 \times h$ $V = \pi \cdot 9 \cdot 10$ $V = 282.7433$ $282.7 = l \times w \times 10$ $28.3 = l \times w$ $28 = l \times w$ $7 \times 4 \times 10$ could be the dimensions of the box. <p>The focus of this task is to use formulas to find the volume of cylinders and find the dimensions of a rectangular prism. A correct response will find the volume of a cylinder and determine the dimensions of a rectangular prism with a given volume and height. The response gives the approximate correct volume of the cylinder and shows the steps needed to determine an appropriate length and width for the 10-inch-tall box.</p> <p>NOTE: Leaving answers in terms of π is acceptable.</p>	1 point	<p>The response provides partial evidence of how to find the volume of a cylinder and to determine the length and width of a rectangular prism with a given volume and height; however, the solution may be incomplete or slightly flawed. For example, the response may:</p> <ul style="list-style-type: none"> Use the correct formulas but make a calculation error that leads to an incorrect answer. Use the correct formulas and calculations, but fail to provide a final answer; e.g., correctly finds the volume of the cylinder and attempts to find the length and width. 	0 point	<p>The response provides inadequate evidence of how to find the volume for a cylinder and a prism, or there is no response. For example the response may:</p> <ul style="list-style-type: none"> State erroneous formulas and arrive at an incorrect solution. Simply state dimensions of a box. State only the volume of the cylinder. Be blank or give irrelevant information.
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Question 1	January 2005	D										
Question 2	March 2005	C										

Question 43	March 2006		B
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Benchmark C

Question 19	January 2005	B
Question 8	March 2005	C
Question 17	Spring 2007	A

Benchmark D

Question 29	Spring 2009	D
Question 24	March 2008	C
Question 5	March 2005	A
Question 18	March 2006	A
Question 29	March 2005	C
Question 44	March 2005	A

Benchmark E

Question 16	March 2005	<p>Scoring Guidelines</p> <table border="1"> <thead> <tr> <th>Points</th> <th>Student Response</th> </tr> </thead> <tbody> <tr> <td>2</td> <td> <p>Sample Correct Responses:</p> <ul style="list-style-type: none"> • $A(\text{wall}) = 600 \times 8 = 4,800$ sq ft Number of windows = $600 / 12 = 50$ $A(\text{windows}) = 50 \times (2 \times 2) = 200$ sq ft $A(\text{wall-windows}) = 4,800 - 200 = 4,600$ sq ft Paint needed: $4,600 / 250 = 18.4$ gallons OR 19 gallons • Area of wall before windows cut out $4,800 / 250 = 19.2$ gallons to paint full wall. Area of windows $50(4) = 200$ so this means almost a gallon is not needed. So between 18 and 19 gallons are needed. <p>The focus of this task is to use conventional formulas to find area. A correct response will determine the amount of paint required to cover a wall that has a given number of openings. The response shows all work and gives the correct number of gallons.</p> <p>Note: Students may deal with the partial gallon differently as long as process and computation are accurate. For example, if sample corrected response is rounded to 18 with all work shown.</p> </td> </tr> <tr> <td>1</td> <td> <p>The response provides partial evidence of using conventional formulas to find area; however, the solution may be incomplete or slightly flawed.</p> </td> </tr> </tbody> </table> <table border="1"> <tbody> <tr> <td></td> <td> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Show the correct formulas, but an error in calculation results in an incorrect response. • Provide a miscalculation of the number of windows but calculates the rest of the problem correctly. • Use the drawing exactly as shown. • Not consider the windows in the calculation of the area but works the answer down to $4,800/250 = 19.2$ gallons. • State the correct surface area of the wall but forgets to determine how many gallons are needed. </td> </tr> <tr> <td>0</td> <td> <p>The response provides inadequate evidence of using conventional formulas to find area. The response provides an explanation with major flaws and errors of reasoning.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State $600/250 = 2.4$ gallons are needed. • State any number of gallons with no supporting work. • Restate the information provided in the item. </td> </tr> </tbody> </table>	Points	Student Response	2	<p>Sample Correct Responses:</p> <ul style="list-style-type: none"> • $A(\text{wall}) = 600 \times 8 = 4,800$ sq ft Number of windows = $600 / 12 = 50$ $A(\text{windows}) = 50 \times (2 \times 2) = 200$ sq ft $A(\text{wall-windows}) = 4,800 - 200 = 4,600$ sq ft Paint needed: $4,600 / 250 = 18.4$ gallons OR 19 gallons • Area of wall before windows cut out $4,800 / 250 = 19.2$ gallons to paint full wall. Area of windows $50(4) = 200$ so this means almost a gallon is not needed. So between 18 and 19 gallons are needed. <p>The focus of this task is to use conventional formulas to find area. A correct response will determine the amount of paint required to cover a wall that has a given number of openings. The response shows all work and gives the correct number of gallons.</p> <p>Note: Students may deal with the partial gallon differently as long as process and computation are accurate. For example, if sample corrected response is rounded to 18 with all work shown.</p>	1	<p>The response provides partial evidence of using conventional formulas to find area; however, the solution may be incomplete or slightly flawed.</p>		<p>For example, the response may:</p> <ul style="list-style-type: none"> • Show the correct formulas, but an error in calculation results in an incorrect response. • Provide a miscalculation of the number of windows but calculates the rest of the problem correctly. • Use the drawing exactly as shown. • Not consider the windows in the calculation of the area but works the answer down to $4,800/250 = 19.2$ gallons. • State the correct surface area of the wall but forgets to determine how many gallons are needed. 	0	<p>The response provides inadequate evidence of using conventional formulas to find area. The response provides an explanation with major flaws and errors of reasoning.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State $600/250 = 2.4$ gallons are needed. • State any number of gallons with no supporting work. • Restate the information provided in the item.
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Question 34	March 2006		C									
Question 38	March 2005		B									
Question 42	Spring 2007		A									

Benchmark F

Question 16	Spring 2009	Scoring Guidelines	
		Points	Student Response
		4 point	<p>The focus of this task is using and applying proportional relationships and formulas to convert units and solve problems involving rates and measurement concepts. The response provides an adequate argument for why funding of the train should be included in the state budget with supporting work shown.</p> <p>Sample response:</p> <ul style="list-style-type: none"> A Maglev train in California would save 3.5 hours on a trip from San Francisco to LA. Since the train would reduce the travel time by more than 50%, the train should be built. $\frac{30 \text{ km}}{8 \text{ min}} = 3.75$ kilometers per minute $\frac{340 \text{ miles}}{0.62} = 548 \text{ km}$ $548 \text{ km} \times 3.75 \text{ km/min} = 146 \text{ minutes}$ $6 \times 60 = 360$ $360 - 146 = 214 \text{ minutes}$ $\frac{214}{60} = 3.56$ hours or approximately 3 hours and 30 minutes saved. The Maglev train would save about 3.5 hours on the California route. This is more than 50%. Therefore, the train should be built. $1 \text{ km} = 0.62 \text{ miles}$, so $1.61 \text{ kilometers} = 1 \text{ mile}$ $\frac{30 \text{ km}}{1.61} = 18.63 \text{ miles}$ in 8 minutes or $2.33 \text{ miles/minute}$ $2.33 \text{ miles/minute} \times 60 \text{ minute/hour} = 139.8 \text{ miles/hour}$ $\frac{340 \text{ miles}}{139.8} = 2.43$ hours by Maglev train $6 \text{ hours} - 2.43 \text{ hours} = 3.57$ hours saved The train should be built because it will reduce travel time by more than 50%. This is because the train will travel at a speed of about 140 miles per hour, which is more than twice that of the car's speed of about 57 miles per hour. $30 \text{ km} \times 0.62 = 18.60 \text{ miles}$ in 8 min or $2.325 \text{ miles/minute} \times 60 \text{ min/hour} = 139.5 \text{ miles/hour}$ The Maglev train's speed is about $\frac{30 \cdot 60}{340} = 225$ km/hr ($\frac{340}{8} = 42.5$). A distance of 340 miles is about 548 km ($\frac{340}{0.62} = 548.4$) Since Time = Distance/Speed, it will take a Maglev train about 2.44 hours ($\frac{548.4}{225} \approx 2.44$) to travel 548.4 kilometers. 2.44 hours represents about 40.7% of 6 hours, therefore it takes about 59.3% less time than it takes a car to travel the distance of 548.4 km (340 miles).
		3 point	<p>The response provides evidence of using and applying proportional relationships and formulas to convert units and solve problems involving rates and measurement concepts; however, the solution may contain a slight error, a flaw or a vague explanation.</p> <p>Sample response:</p> <ul style="list-style-type: none"> Provide the correct process and calculations to find the amount of time saved, but fail to give a statement that supports building the train. Provide an adequate process for finding the amount of time saved, but include a minor calculation or conversion error and base the statement on this inaccurate number.
		2 point	<p>The response provides partial evidence of using and applying proportional relationships and formulas to convert units and solve problems involving rates and measurement concepts; however, the solution is incomplete and/or contains minor flaws.</p> <p>Sample response:</p> <ul style="list-style-type: none"> Provide only accurate travel times and rates by car and train. Give an accurate statement with correct mathematical reasoning but inadequate supporting work.
		1 point	<p>The response provides minimal evidence of using and applying proportional relationships and formulas to convert units and solve problems involving rates and measurement concepts. The response contains major flaws and the explanation is incomplete or missing.</p> <p>Sample response:</p> <ul style="list-style-type: none"> Provide only accurate rates (kpm or mph) for the Maglev train and the car ride. Provide only the computations for the amount of time the trip will take on the Maglev train. Provide a correct statement about building the train but include incomplete or flawed supporting work.
		0 point	<p>The response provides inadequate evidence of using and applying proportional relationships and formulas to convert units and solve problems involving rates and measurement concepts. The response provides major flaws in explanations or irrelevant information.</p> <p>Sample response:</p> <ul style="list-style-type: none"> State that the train should be built, with no supporting work. Restate the information provided in the item. Be blank or give irrelevant information.

Benchmark F Continued

Question 12	January 2005		C
Question 37	Spring 2007		B