

**10th Mathematics Ohio Graduation Test
Number, Number Sense and Operations**

Benchmark A

Question 6	Spring 2009		B
Question 40	March 2008	<p>Score Point Description</p> <p>2 points The response contains diameters 2, 3 and 5 written correctly in scientific notation. The five diameters are correctly ordered from smallest to largest.</p> <p>1 point The response provides a partial solution. Diameters 2, 3 and 5 may be correctly written in scientific notation. The order may be incorrect or missing.</p> <p align="center">OR</p> <p>The scientific notation for the three diameters is incorrect or missing, but the five original values are correctly ordered.</p> <p align="center">OR</p> <p>The response contains errors in scientific notation, but the student's values obtained are correctly ordered.</p> <p align="center">OR</p> <p>The response contains a combination of some correct scientific notation and some correct ordering that indicate some understanding of the concepts involved.</p> <p>0 points The response fails to demonstrate minimal understanding of the task. For example, the response may: -Be blank or give irrelevant information. -Fail to demonstrate minimal understanding of the task.</p>	
Question 18	Spring 2003		D
Question 8	Spring 2004		C
Question 26	Spring 2006		D
Question 40	Spring 2005		A
Question 19	March 2007		C

Benchmark B

Question 11	Spring 2004		B
Question 38	Spring 2006		D

Benchmark C

Question 30	Spring 2009		A
Question 39	Spring 2003		A
Question 25	Spring 2005		D

Benchmark D

Question 2	March 2008		B
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Question 42	Spring 2003	D
Question 23	Spring 2006	B
Question 33	Spring 2003	B
Question 43	Spring 2005	A
Question 2	Spring 2003	A
Question 3	March 2007	B

Benchmark E

Question 19	Spring 2009		C								
Question 30	March 2008		C								
Question 18	Spring 2003		D								
Question 27	Spring 2003		B								
Question 5	Spring 2004	<p>Sample Response for Item 5 (Short Answer):</p> <p>All in percentage terms Poll 1: $\frac{9}{20} = 45\%$ Poll 2: 52% (given) Poll 3: $\frac{55,000}{130,000} = 42.3\%$</p> <p>Poll 2 is the most favorable, because it suggests that a higher percentage of voters will vote for Candidate A than either of the other polls.</p> <p>Scoring Guidelines for Item 5:</p> <table border="0"> <thead> <tr> <th>Score point</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>2 points</td> <td>The response identifies Poll 2 as the most favorable and shows work used to compare the proportions in each poll through a common measurement.</td> </tr> <tr> <td>1 point</td> <td>The response provides evidence of a partially correct answer and/or solution process. The response shows understanding of some key elements of the task, but contains gaps or flaws.</td> </tr> <tr> <td>0 points</td> <td>The response indicates inadequate or no understanding of the task, and the task does not meet the requirements for one point.</td> </tr> </tbody> </table> <p>For example, the response may:</p> <p>Correctly compare two of the polls. Work for the third is incorrect or missing. OR Determine one of the values incorrectly but correctly use the values to make a comparison based on these values. OR Compare the three polls; however, it fails to identify or incorrectly identifies which poll is most favorable for candidate A. OR Identify poll 2 as the correct choice and in the comparison of the three polls fails to use a common measurement.</p> <p>For example, the response may:</p> <p>Fail to provide evidence of minimal understanding of the concept. OR Only identify poll 2 as the correct solution without supporting work. OR Recopy information provided in the item with no work. OR Show no apparent understanding of the task. OR Be blank or the student writes, "I do not know" or includes unrelated statements or work.</p>	Score point	Description	2 points	The response identifies Poll 2 as the most favorable and shows work used to compare the proportions in each poll through a common measurement.	1 point	The response provides evidence of a partially correct answer and/or solution process. The response shows understanding of some key elements of the task, but contains gaps or flaws.	0 points	The response indicates inadequate or no understanding of the task, and the task does not meet the requirements for one point.	
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Question 41	Spring 2004		D								
Question 13	Spring 2005		A								
Question 35	March 2007		C								

Benchmark F

Question 10	March 2008	C								
Question 15	Spring 2004	<p>Sample Response for Item 15 (Short Answer):</p> <p>The area of Florida is larger than the area of the state.</p> <p>OR</p> <p>The ratio of the area of Florida to the area of the state is larger than the ratio of the population of Florida to the population of the state.</p> <p>OR</p> <p>If the state had a population of 12,000,000 people, it could have an area of no more than 43,398 square miles. (any set of numbers with a population less than 14,915,980 and a population density greater than 276.5)</p> <p>Scoring Guidelines for Item 15:</p> <table border="0"> <thead> <tr> <th style="text-align: left;">Score point</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">2 points</td> <td> <p>The success of this item hinges on the response communicating an understanding that the area of the state must be smaller than the area of Florida in order for the population density to be higher in the case where the population is lower. The supporting work and/or explanation are clear and complete.</p> <p>One approach is a written description of the ratios.</p> <p>Another approach is to actually pick numerical values that give correct answers to this problem.</p> </td> </tr> <tr> <td style="vertical-align: top;">1 point</td> <td> <p>The response provides evidence of a partially correct answer and/or solution process. The response shows understanding of some key elements of the task but contains gaps or flaws.</p> <p>For example, the response may:</p> <p>Identify that the area of the state is smaller than that of Florida; however, it states that the population remains the same or is larger than that of Florida.</p> <p>OR</p> <p>Not make a distinction between population and landmass being larger or smaller. The supporting work and/or explanation is not complete or clear.</p> </td> </tr> <tr> <td style="vertical-align: top;">0 points</td> <td> <p>The response indicates inadequate or no understanding of the task and/or incorrect use of the key elements or information. The response does not meet the criteria required to earn one point.</p> <p>For example, the response may:</p> <p>Fail to provide evidence of minimal understanding of the concept.</p> <p>OR</p> <p>Recopy information provided in the item with no work.</p> <p>OR</p> <p>Show no apparent understanding of the task.</p> <p>OR</p> <p>Be blank or the student writes, "I do not know" or includes unrelated statements or work.</p> </td> </tr> </tbody> </table>	Score point	Description	2 points	<p>The success of this item hinges on the response communicating an understanding that the area of the state must be smaller than the area of Florida in order for the population density to be higher in the case where the population is lower. The supporting work and/or explanation are clear and complete.</p> <p>One approach is a written description of the ratios.</p> <p>Another approach is to actually pick numerical values that give correct answers to this problem.</p>	1 point	<p>The response provides evidence of a partially correct answer and/or solution process. The response shows understanding of some key elements of the task but contains gaps or flaws.</p> <p>For example, the response may:</p> <p>Identify that the area of the state is smaller than that of Florida; however, it states that the population remains the same or is larger than that of Florida.</p> <p>OR</p> <p>Not make a distinction between population and landmass being larger or smaller. The supporting work and/or explanation is not complete or clear.</p>	0 points	<p>The response indicates inadequate or no understanding of the task and/or incorrect use of the key elements or information. The response does not meet the criteria required to earn one point.</p> <p>For example, the response may:</p> <p>Fail to provide evidence of minimal understanding of the concept.</p> <p>OR</p> <p>Recopy information provided in the item with no work.</p> <p>OR</p> <p>Show no apparent understanding of the task.</p> <p>OR</p> <p>Be blank or the student writes, "I do not know" or includes unrelated statements or work.</p>
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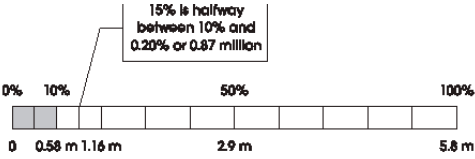
Benchmark G

Question 27	Spring 2009		C
Question 34	Spring 2009	<p>Score Point Description</p> <p>4 points The focus of this item is the comparison of a flat raise for all employees to a raise based upon a percentage of their current salaries. The response indicates that the advantage of one plan versus the other plan depends on the employee's annual salaries. The response determines that more employees would likely vote for the flat \$500 raise than the 2% raise since more employees would benefit more from the flat \$500 raise.</p> <p>3 points The response clearly addresses the key aspects of the task; however, it includes errors in completing one or two components.</p> <p>3 point sample answer:</p> <p>For example, the response may: Demonstrate a correct mathematical procedure but contain a computational error (e.g. in finding the effect of a 2% raise or totaling the number of employees who would vote for each option). The statement about the result of the vote is consistent with work shown.</p> <p>2 points The response provides evidence of a partially correct answer and/or solution process. The response may adequately address some of the components of the task, but contain gaps or flaws in other components.</p> <p>2 point sample answer:</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Provide correct values for the effects of both raises, but fail to state which option will receive the most votes. • Provide correct values for the effects of both raises, but incorrectly determine the winning option. For example, the student may state that the 2% raise will win because there are more salaries (rather than employees) which will be greater. • Demonstrate a correct procedure but contain multiple errors. For example, it may contain errors both in calculating the effects of the raise and the total number of employees voting. The determination of which option will win is consistent with work shown. 	

		<ul style="list-style-type: none"> • Demonstrate a correct procedure and correct work but base the calculations on an incorrect percentage value (e.g., uses 0.2 instead of 0.02). The determination of which option will win is consistent with work shown. <p>1 point The response omits significant aspects of the task. There is evidence of minimal understanding of the concepts involved in the task and/or solution process; however, the response includes significant errors in most of the components of the task.</p> <p>1 point sample answer:</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Contain multiple calculation errors in using correct procedures to determine the effects of the raises and fail to state which option will receive the most votes. • Provide some evidence of a correct procedure. For example, the student may correctly calculate the value of a 2% raise for at least two of the salaries with a comparison to the \$500 raise. <p>0 points The response indicates inadequate understanding of the task and/or the key elements or information. The response does not meet the criteria required to earn one point.</p> <p>0 point sample answer:</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State that the \$500 option should win with incorrect or missing work. • Include unrelated statements or work.
Question 5	March 2008	<p>2 points The focus of this item is to compare the final price of two pairs of shorts either using a coupon to get the second pair at half price or using a discount of 30% on both. The response states that the 30% discounted price is the better buy and provides mathematical support for the answer.</p> <p>1 point The response provides evidence of a partially correct answer and/or solution process. The response shows understanding of some key elements of the task but contains gaps or flaws. For example, the response may:</p> <ul style="list-style-type: none"> -Demonstrate a correct procedure that contains computational errors. The decision is consistent with the computations. -Determine two correct prices, but the comparison is incorrect or missing. <p>0 points The response indicates inadequate understanding of the task, and the response does not meet the criteria required to earn one point. For example, the response may:</p> <ul style="list-style-type: none"> -State that the 30% discount is the better buy with no support. -Include unrelated statements or work.
Question 14	March 2008	A

Question 4	Spring 2006	<p>Scoring Guidelines for Item 4:</p> <table border="0"> <thead> <tr> <th>Score Point</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>2 points</td> <td>The focus of the item is to calculate discounts of original prices. The response states that the sale price of the lawnmower at Lawn Care Depot is \$152.10 and the sale price at Tractors-R-Us is \$140. The student identifies Tractors-R-Us as the most economical place to purchase the mower.</td> </tr> <tr> <td>1 point</td> <td>The response provides evidence of a partially correct answer and/or solution process. The response shows understanding of some key elements of the task but contains gaps or flaws.</td> </tr> <tr> <td colspan="2">For example, the response may:</td> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> • Contain a correct calculation for either store and a conclusion that is consistent with the values given for both stores. • Fail to identify the best buy but provide correct prices for the two stores. • Contain the correct answers (\$152.10, \$140, Tractors-R-Us) but work is incomplete or missing. </td> </tr> <tr> <td>0 points</td> <td>The response indicates inadequate understanding of the task.</td> </tr> <tr> <td colspan="2">For example, the response may:</td> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> • State that Tractors-R-Us is more economical but provide no work or explanation. • Include unrelated statements or work. </td> </tr> </tbody> </table>	Score Point	Description	2 points	The focus of the item is to calculate discounts of original prices. The response states that the sale price of the lawnmower at Lawn Care Depot is \$152.10 and the sale price at Tractors-R-Us is \$140. The student identifies Tractors-R-Us as the most economical place to purchase the mower.	1 point	The response provides evidence of a partially correct answer and/or solution process. The response shows understanding of some key elements of the task but contains gaps or flaws.	For example, the response may:		<ul style="list-style-type: none"> • Contain a correct calculation for either store and a conclusion that is consistent with the values given for both stores. • Fail to identify the best buy but provide correct prices for the two stores. • Contain the correct answers (\$152.10, \$140, Tractors-R-Us) but work is incomplete or missing. 		0 points	The response indicates inadequate understanding of the task.	For example, the response may:		<ul style="list-style-type: none"> • State that Tractors-R-Us is more economical but provide no work or explanation. • Include unrelated statements or work. 	
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Question 8	Spring 2006	B																
Question 8	Spring 2003	A																
Question 15	Spring 2003	Short Answer, No rubric provided																
Question 27	Spring 2003	B																
Question 42	Spring 2004	B																
Question 11	Spring 2005	C																

Benchmark G continued

Question 18	Spring 2005	 <p>$\frac{2}{3}$ of 15% is the same as 10% or 0.58 million.</p> <p>Note: A value of 0.58 million will be accepted as a correct amount of money given to the Toledo Arts Festival.</p> <p>Scoring Guidelines for Item 18:</p> <table border="1"> <thead> <tr> <th>Score point</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>2 points</td> <td>The focus of this item is to find the final amount of money that the Toledo Arts Festival will receive by finding 67% of the 15% that was donated. The response contains a correct value (\$580,000 or \$582,900 or \$583,000 or \$0.58 million) for the contribution to the Toledo Arts Festival. Supporting work or detailed explanation is provided.</td> </tr> <tr> <td>1 point</td> <td>The response provides evidence of a partially correct answer or solution process. The response shows understanding of most of the key elements of the task but contains gaps or flaws. For example, the response may: Provide a correct solution process but give an incorrect amount for the Arts Festival due to errors in computation. OR Provide evidence of a correct first step in the process; e.g., method for finding 15% of \$5.8 million. OR Contain a correct amount—\$580,000 or \$582,900 or \$583,000 or \$0.58 million—with no work or explanation.</td> </tr> <tr> <td>0 points</td> <td>The response fails to demonstrate a minimal understanding of the task. For example, the response may: Include an incorrect amount for the Toledo Arts Festival with no work or explanation to support the solution. OR Show no apparent understanding of the task or possible solution process; e.g., simply adds the three values given in the item. OR Recopy information provided within the item. OR Be blank or state "I do not know," or include unrelated statements or work.</td> </tr> </tbody> </table>	Score point	Description	2 points	The focus of this item is to find the final amount of money that the Toledo Arts Festival will receive by finding 67% of the 15% that was donated. The response contains a correct value (\$580,000 or \$582,900 or \$583,000 or \$0.58 million) for the contribution to the Toledo Arts Festival. Supporting work or detailed explanation is provided.	1 point	The response provides evidence of a partially correct answer or solution process. The response shows understanding of most of the key elements of the task but contains gaps or flaws. For example, the response may: Provide a correct solution process but give an incorrect amount for the Arts Festival due to errors in computation. OR Provide evidence of a correct first step in the process; e.g., method for finding 15% of \$5.8 million. OR Contain a correct amount—\$580,000 or \$582,900 or \$583,000 or \$0.58 million—with no work or explanation.	0 points	The response fails to demonstrate a minimal understanding of the task. For example, the response may: Include an incorrect amount for the Toledo Arts Festival with no work or explanation to support the solution. OR Show no apparent understanding of the task or possible solution process; e.g., simply adds the three values given in the item. OR Recopy information provided within the item. OR Be blank or state "I do not know," or include unrelated statements or work.
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Question 8	March 2007	B								
Question 32	March 2007	D								

Benchmark H

Question 33	Spring 2003	B
Question 33	Spring 2006	B
Question 9	Spring 2005	A

Benchmark I

Question 41	Spring 2009	A
Question 19	March 2008	D
Question 21	Spring 2005	C
Question 43	Spring 2006	C

Benchmark I Continued

<p>Question 28</p>	<p>March 2007</p>	<p>2 points The focus of the item is to determine the number of miles in one light-year and write this number in scientific notation. The response contains the value of $\approx 5.86 \times 10^{12}$ with supporting work.</p> <p>1 point The response provides evidence of a partially correct answer and/or solution process. The response shows understanding of some key elements of the task but contains gaps or flaws.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Contain the correct value written in scientific notation with incomplete or missing work. • Contain the correct value, but it is not written in correct scientific notation. Supporting work is incomplete or missing. • Provide a correct process for determining the number of miles in one light-year but contains computation errors. • Provide evidence of a partially correct process; (e.g., the conversion process includes the number of minutes in a year, but not the number of seconds.) The value found is written in correct scientific notation. <p>0 points The response indicates inadequate understanding of the task and the response does not meet the criteria required to earn one point.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Include unrelated statements or work.
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