

**10th Mathematics Ohio Graduation Test
Data Analysis and Probability Standard**

Benchmark A

Question 31	Spring 2009	D
Question 38	Spring 2009	C
Question 18	March 2008	C
Question 6	March 2003	D
Question 16	March 2003	B
Question 27	March 2006	C
Question 37	March 2003	B
Question 2	March 2004	B
Question 34	March 2004	C
Question 22	March 2005	B
Question 26	March 2007	C
Question 43	March 2007	B

Benchmark B

Question 1	Spring 2009	A
Question 39	March 2008	B
Question 9	March 2006	B
Question 29	March 2004	A
Question 28	March 2005	A
Question 1	March 2007	A

Benchmark C

Question 6	March 2004		B
Question 35	March 2006		D

Question 36	March 2005	<p>Scoring Guidelines for Item 36:</p> <table border="0"> <thead> <tr> <th>Score point</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>4 points</td> <td> <p>The focus of this item is to find the three measures of center (mean, median and mode), compare these three measures of center of the Acme employees to the average for the area (\$255), and make an argument for management's position that no pay increase is needed and for the labor union's position that a pay increase is needed.</p> <p>The response contains the correct values for the measures of center that are labeled correctly. The response identifies a measure to support each of the two positions with an appropriate explanation.</p> </td> </tr> <tr> <td>3 points</td> <td> <p>The response clearly addresses the task; however, it includes errors in completing one or two of the parts.</p> <p>For example, the response may:</p> <p>Contain the correct values for the measures of center labeled correctly. The response contains an appropriate measure choice for one position (management or labor union) with a valid explanation for that choice. OR Contain two correct and one incorrect or missing measure of center. The response contains appropriate measure choices for the two positions, based on the calculated measures, with valid explanations for the choices. OR Contain three correct measures of center that are labeled correctly and two arguments that demonstrate some understanding of the two positions but are not clearly stated.</p> </td> </tr> <tr> <td>2 points</td> <td> <p>The response provides evidence of a partial understanding of the task. The response may adequately address some parts of the task but contains major gaps or flaws in other parts.</p> </td> </tr> </tbody> </table> <p>Continued</p>	Score point	Description	4 points	<p>The focus of this item is to find the three measures of center (mean, median and mode), compare these three measures of center of the Acme employees to the average for the area (\$255), and make an argument for management's position that no pay increase is needed and for the labor union's position that a pay increase is needed.</p> <p>The response contains the correct values for the measures of center that are labeled correctly. The response identifies a measure to support each of the two positions with an appropriate explanation.</p>	3 points	<p>The response clearly addresses the task; however, it includes errors in completing one or two of the parts.</p> <p>For example, the response may:</p> <p>Contain the correct values for the measures of center labeled correctly. The response contains an appropriate measure choice for one position (management or labor union) with a valid explanation for that choice. OR Contain two correct and one incorrect or missing measure of center. The response contains appropriate measure choices for the two positions, based on the calculated measures, with valid explanations for the choices. OR Contain three correct measures of center that are labeled correctly and two arguments that demonstrate some understanding of the two positions but are not clearly stated.</p>	2 points	<p>The response provides evidence of a partial understanding of the task. The response may adequately address some parts of the task but contains major gaps or flaws in other parts.</p>
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		<p>For example, the response may:</p> <p>Contain two correct measures and one incorrect or missing measure. The response contains an appropriate measurement choice for one of the two positions with an appropriate explanation for that choice.</p> <p>OR</p> <p>Contain incorrect values for all measures. The response contains two appropriate measure choices for the two positions based on the values of the measures as calculated with an explanation for the choices.</p> <p>OR</p> <p>Contain correct values for all measures of center that are labeled accurately, but the arguments for the two positions do not support the correct choice made.</p> <p>OR</p> <p>Contain three correct values for the measures of center that are labeled correctly and one argument that demonstrates some understanding of the two positions but is not clearly stated.</p> <p>1 point</p> <p>The response has significant errors or omissions in the solution of the task. There is evidence of minimal understanding of the task or the solution process; however, the response includes significant errors or omissions in most parts of the solution to the task.</p> <p>For example, the response may:</p> <p>Contain two or three correct values for the measures that are correctly labeled. The response contains invalid measure choices and explanations or no attempt to address the two positions of the task.</p> <p>OR</p> <p>Contain no correct values for the measures of center. However, the response makes a valid choice and explanation for one position based on the incorrect values for measures of center.</p> <p>OR</p> <p>Contain correct values for the measures of center that are missing labels or labeled incorrectly. NO attempt is made to address the two positions.</p> <p>0 points</p> <p>The response fails to demonstrate minimal understanding of the task.</p> <p>For example, the response may:</p> <p>Only have one value for a measure of center identified correctly, one invalid or no attempt to address the two positions.</p> <p>OR</p> <p>Recopy information from the item with no attempt to answer.</p> <p>OR</p> <p>Be blank or state "I do not know" or include unrelated statements or work.</p>

Question 5	March 2007	A
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Benchmark D

Question 16	Spring 2009	B								
Question 15	March 2008	A								
Question 22	March 2006	<p>Scoring Guidelines for Item 22:</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 focus of the item is to determine the mean and median for each team and make a comparison of these measures. The response contains the mean and median for each team (Team A – mean 85, median 85; Team B – mean 86, median 87) and compares them to determine that Team B scored higher for both measures.</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> <ul style="list-style-type: none"> • Contain the correct mean for both teams or median for both teams and makes the comparison based on only one measure of center. • Contain calculation errors in determining one or two of the measures but make a correct comparison based on the values provided. • Contain the four correct measures of center with no comparison to determine that Team B scored better. </td> </tr> <tr> <td style="vertical-align: top;">0 points</td> <td> <p>The response indicates inadequate understanding of the task.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Contain fewer than four correct measures of center for the two teams with no comparison of the measures. • State that Team B scored better with no support. • Include unrelated statements or work. </td> </tr> </tbody> </table>	Score Point	Description	2 points	<p>The focus of the item is to determine the mean and median for each team and make a comparison of these measures. The response contains the mean and median for each team (Team A – mean 85, median 85; Team B – mean 86, median 87) and compares them to determine that Team B scored higher for both measures.</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> <ul style="list-style-type: none"> • Contain the correct mean for both teams or median for both teams and makes the comparison based on only one measure of center. • Contain calculation errors in determining one or two of the measures but make a correct comparison based on the values provided. • Contain the four correct measures of center with no comparison to determine that Team B scored better. 	0 points	<p>The response indicates inadequate understanding of the task.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Contain fewer than four correct measures of center for the two teams with no comparison of the measures. • State that Team B scored better with no support. • Include unrelated statements or work.
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Benchmark D (continued)

Question 22	March 2007	
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Benchmark D (continued)

Question 22	March 2007	
Question 24	March 2003	C
Question 31	March 2004	C
Question 19	March 2005	C

Benchmark D (continued)

Question 22	March 2007	4 points	The focus of the item is to calculate scores based on tree measurements, order these scores from largest to smallest (or smallest to largest) and determine a general formula to calculate these scores. The response determines and orders the scores, 1) American Basswood - 261; 2) Eastern Hemlock - 291.05; 3) Black Oak - 328.1; and 4) American Beech 370.75 (order may be reversed). The response includes the general formula, $\text{Score} = c + h + \frac{s}{4}$, to determine the score for any tree in the Big Ohio Tree Program.
		3 points	The response clearly addresses the key aspects of the task; however, it includes minor flaws. For example, the response may: <ul style="list-style-type: none"> Contain an error in one or two of the scores for the four trees, the ranking is correct based on the scores provided and the formula is provided. Contain the correct scores for each of the four trees listed in the chart, the ranking is incorrect or missing. The formula is provided. Contain the correct scores for each of the four trees listed in the chart, the ranking is correct. The formula is flawed or missing. Omit the scores for the four trees; however, ranks the four trees correctly and provides a correct formula.
		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. For example, the response may:

		<ul style="list-style-type: none"> • Contain the correct numerical scores for at least two of the four trees listed in the chart, and the ranking is correct based on the four scores provided. The formula is flawed or missing. • Contain the correct scores for each of the four trees. The ranking and formula are incorrect or missing. • Contain the correct formula and at least two correct scores, the ranking is incorrect or missing. • Contain an incorrect formula but the scores and ranking are correct based on the formula provided. <p>1 point</p> <p>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>For example, the response may:</p> <ul style="list-style-type: none"> • Provide only the formula. The scores for the trees are missing and no ranking is provided. • Contain the correct numerical score for at least two of the four trees. The ranking and formula are incorrect or missing. • Ignore the $\frac{s}{4}$ in calculations and formula; however, the ranking is correct for the values given. • Contain a correct ranking with missing scores and the formula is missing. <p>0 points</p> <p>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"> • Contain the values added without considering the $\frac{s}{4}$, and no ranking or formula is provided. • Contain an incorrect ranking with only incorrect scores or missing scores. • Include unrelated statements or work.
Question 31	March 2007	A

Benchmark E

Question 22	Spring 2009	<p>2 points The focus of the item is to evaluate the street department’s sampling method and explain how it can be improved. The response explains why the sampling method does not provide a good representation of the residents’ claim and provides a way to obtain more valid data.</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>1 point sample answer:</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Explain how the method is flawed but fail to provide an improvement. • Provide a valid alternate way to collect data, but the explanation of the flaw 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.</p> <p>0 point sample answer:</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State that the department’s method was valid and did not require any changes. • Include unrelated statements or work.
Question 34	March 2003	C
Question 44	March 2006	C

Benchmark F

Question 35	Spring 2009	D
Question 6	March 2008	C
Question 2	March 2006	D

Benchmark G

Question 3	March 2008		D								
Question 22	March 2008		No information given								
Question 16	March 2004		C								
Question 39	March 2004	<p>Scoring Guidelines for Item 39:</p> <table border="1"> <thead> <tr> <th>Score point</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>2 Points</td> <td>The response identifies the correct survey location and explains the answer.</td> </tr> <tr> <td>1 Point</td> <td>The response provides evidence of a partially correct answer and solution process. The response shows understanding of some elements of the task but contains gaps or flaws. For example, the response may: Identify the correct survey location but give a vague explanation. OR Misunderstand bias and use this misunderstanding to support a claim; e.g., choose the golf course because the student is more in favor of the recreation center, whereas the other location is less likely to be in favor of the recreation center. OR Show a clear understanding of bias but does not answer the question. For example, the response may address determining which type of facility to build rather than taking the survey. OR Identify the incorrect site because of a misconception, but addresses all three locations using the misconception.</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. For example, the response may: Demonstrate no understanding of bias. OR Identify the Shopping Mall without supporting explanation. OR Identify an incorrect location(s) and is vague or contradictory in selection. 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 statements or work.</td> </tr> </tbody> </table>	Score point	Description	2 Points	The response identifies the correct survey location and explains the answer.	1 Point	The response provides evidence of a partially correct answer and solution process. The response shows understanding of some elements of the task but contains gaps or flaws. For example, the response may: Identify the correct survey location but give a vague explanation. OR Misunderstand bias and use this misunderstanding to support a claim; e.g., choose the golf course because the student is more in favor of the recreation center, whereas the other location is less likely to be in favor of the recreation center. OR Show a clear understanding of bias but does not answer the question. For example, the response may address determining which type of facility to build rather than taking the survey. OR Identify the incorrect site because of a misconception, but addresses all three locations using the misconception.	0 Points	The response indicates inadequate or no understanding of the task and the task does not meet the requirements for one point. For example, the response may: Demonstrate no understanding of bias. OR Identify the Shopping Mall without supporting explanation. OR Identify an incorrect location(s) and is vague or contradictory in selection. 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 statements or work.	
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0 Points	The response indicates inadequate or no understanding of the task and the task does not meet the requirements for one point. For example, the response may: Demonstrate no understanding of bias. OR Identify the Shopping Mall without supporting explanation. OR Identify an incorrect location(s) and is vague or contradictory in selection. 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 statements or work.										
Question 39	March 2005		C								

Benchmark G Continued

Question 34	March 2007	2 points	The focus of this item is the identification of sources of bias in the sample used for a survey. The response provides two distinct reasons why Lisa's sample may be biased.
		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"> • Provide one valid reason why the sample is biased.
		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: <ul style="list-style-type: none"> • Include unrelated statements or work.

Benchmark H

Question 26	Spring 2009	D
Question 8	March 2008	D
Question 31	March 2006	C
Question 39	March 2006	C
Question 41	March 2003	C
Question 43	March 2004	D
Question 17	March 2005	B

Benchmark J

Question 42	Spring 2009	C
Question 43	March 2008	B
Question 14	March 2006	C
Question 5	March 2006	B
Question 19	March 2004	B
Question 35	March 2004	

Benchmark J (continued)

Question 42	March 2005	Scoring Guidelines for Item 42:	
		Score point	Description
		2 points	The focus of this item is to find the probability of creating a four-digit number having a value greater than 6,000 when randomly drawing from the specified number cards. The response identifies the probability as $\frac{3}{5}$ or 0.6 or 60% or equal value and provides a clear explanation that the answer depends only on the first number drawn or accounts for all possibilities.
		1 point	The response shows a partial understanding of the solution process or key elements of the task. The response may contain gaps or flaws in determining the solution. For example, the response may: Contain a correct fraction, decimal or percent for the probability but not state that only the first number matters or does not include an appropriate or complete explanation to support the answer. OR State that only the first number is important or provide appropriate explanation but miscalculate the probability or fail to include the probability. OR Determine the total possible outcomes (120) or the total possible numbers greater than 6,000 (72) with support; e.g., diagrams, lists, trees or mathematical processes.
0 points	The response fails to provide evidence of minimal understanding. For example the response may: Include an incorrect answer with flawed work and/or explanation. OR Recopy information provided in the question with no work toward a solution. OR Be blank or state "I do not know" or include unrelated statements or work.		
Question 23	March 2007		B
Question 39	March 2007		A

Benchmark K

Question 4	Spring 2009		D
Question 12	March 2008		C
Question 32	March 2008		D
Question 20	March 2007		A