

**10th Mathematics Ohio Graduation Test
Geometry and Spatial Sense Standard**

Benchmark A

Question 21	March 2003	B
Question 13	March 2004	D
Question 3	March 2005	B

Benchmark B

Question 29	Spring 2009	B
Question 37	March 2008	C
Question 32	March 2003	C
Question 36	March 2004	D
Question 23	March 2005	C
Question 37	March 2006	A
Question 29	March 2007	C

Benchmark C

Question 3	Spring 2009	D
Question 42	March 2008	C
Question 1	March 2003	C
Question 1	March 2005	A
Question 25	March 2006	C
Question 25	March 2007	A

Benchmark D

Question 23	Spring 2009	B
Question 13	March 2008	B
Question 29	March 2006	D
Question 38	March 2006	A
Question 30	March 2004	A
Question 35	March 2005	A
Question 41	March 2005	C

Benchmark E

Question 7	Spring 2009	A
Question 4	March 2008	A
Question 11	March 2006	D
Question 13	March 2003	B
Question 6	March 2007	B

Question 10	March 2007	2 points	<p>The focus of the item is to sketch a net of a triangular prism with given dimensions. The response shows a sketch of a net with dimensions labeled appropriately.</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"> ▪ Contains a correct net but one or more of the dimensions is labeled incorrectly or missing. ▪ Contains a slightly flawed net (e.g., the student may omit the second triangle, or place the rectangles in an order that does not correspond to the order of the sides of the triangle.)
		0 points	<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"> • Include unrelated statements or work.

Benchmark F

Question 18	Spring 2009			A
Question 40	Spring 2009		<p>Score Point Description</p> <p>2 points The focus of the item is to perform a series of transformations on the image of a kite and to provide the coordinates for the vertices of the final image. The response provides the correct coordinates for the vertices of the final image 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.</p> <p>1 point sample answer:</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Provide a graph showing the correct composition but fail to provide the final coordinates. • Provide the coordinates for the reflected image of the kite with mathematical support but fail to provide the correct coordinates for the final image. • Provide support showing a flawed reflection (e.g., across the y-axis or with incorrect vertices) and a correct translation of the reflected image provided with the coordinates of the final image. <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"> • Provide only the original kite. • Give irrelevant information. 	
Question 34	March 2008	<p>4 points The focus of this item is to show and describe the results of combinations of translations, reflections and rotations. The response contains the correct three triangles labeled I, II and III on the same coordinate grid and contains the correct single transformation that maps Triangle I to Triangle III.</p> <p>3 points The response clearly addresses the key aspects of the task; however, it includes minor flaws. For example, the response may:</p> <ul style="list-style-type: none"> -Contain the original triangle and the two transformations. Triangles are labeled I, II and III. But the response contains an incorrect or missing description of the single transformation that maps Triangle I to Triangle III. -Contain a single error in drawing the triangles. (Any subsequent transformations are consistent with the error.) The single transformation that maps the student's Triangle I to the student's Triangle III is based on the triangles. -Contain three correct triangles and a correct description of the single transformation that maps Triangle I to Triangle III. However, the triangles are not labeled, and the triangles are placed on separate coordinate systems. 		

		<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. For example, the response may:</p> <ul style="list-style-type: none"> -Contain Triangle I drawn correctly and one correct transformation. The description of a single transformation from Triangle I to III is incorrect or missing. -Contain an incorrect Triangle I, but both of the transformations based on the student's Triangle I are correct. The description of a single transformation from Triangle I to III is incorrect or missing. -Contain three correct triangles. But the description of a single transformation from Triangle I to III is incorrect or missing, the labeling is missing and the triangles are placed on separate coordinate systems. -Contain Triangle I drawn correctly, but both of the transformations are incorrect; however, the description is correct based on Triangle I and the student's Triangle III. <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. For example, the response may:</p> <ul style="list-style-type: none"> -Show Triangle I correctly graphed, but both transformations are incorrect or missing. -Describe the correct movements necessary for a single transformation, but the graphs are omitted or incorrect. -Show a minimal understanding by completing one of the required transformations. -Contain an appropriate description of the transformation from the student's Triangle I to the student's Triangle III. <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"> -Contain an incorrect drawing of Triangle I and an incorrect attempt at performing the two transformations on the student's Triangle I. -Recopy information provided in the question with no work toward a solution. -Be blank or the student writes "I do not know" or includes unrelated statements or work.
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Benchmark F (Continued)

Question 28	March 2003	D
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Benchmark F (Continued)

<p>Question 10</p>	<p>March 2004</p>	<p>Scoring Guidelines for Item 10:</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 requires the student to correctly graph triangle DEF and perform the two translations in sequence. Finally, the student will identify the translation moves that would take triangle DEF to the third triangle in the sequence. Labeling is identified within the item and should be included within the response.</p> <p>The response shows triangle DEF and both transformations clearly and correctly drawn, and all triangles DEF, D'E'F', and D''E''F'' are appropriately labeled. An explanation is provided that correctly describes the transformation from triangle DEF to triangle D''E''F'' by translating each vertex one unit to the right and five units up. The work shown is organized and completely accurate.</p> </td> </tr> <tr> <td>3 points</td> <td> <p>The response clearly addresses the key aspects of the task; however, it includes errors in completing one or two of the components.</p> <p>For example, the response may:</p> <p>Show triangle DEF and both transformations correctly graphed and appropriately labeled, but the description of the transformation from DEF to D''E''F'' is missing or incorrect. OR Show triangle DEF graphed correctly and labeled. One transformation is done incorrectly, (example: D'E'F' moves to the left, or down) but everything else is correct, based on this error. OR Contain one minor error in any part of the process. For example, triangle DEF is graphed incorrectly; however, all other parts of the task are correct based on the incorrect triangle. OR Show triangle DEF and both transformations correctly graphed, but the labels are missing. The description of the transformation from DEF and D''E''F'' is correct.</p> </td> </tr> <tr> <td>2 points</td> <td> <p>The response provides evidence of a partial correct answer and/or solution process. The response may adequately address some of the components of the task, but it contains major gaps or flaws in other components.</p> <p>For example, the response may:</p> <p>Show triangle DEF and one of the transformations graphed correctly, but the other transformation is either done incorrectly or is missing. The description given is related only to the one transformation or is missing. OR Show triangle DEF, and both transformations have been graphed correctly, but labels are missing and the description for the single transformation is unclear or missing. OR Show triangle DEF incorrectly graphed. Both transformations are consistent with the original graph, with or without labels. The description is incorrect based on the transformation or is missing. OR Show triangle DEF incorrectly graphed. One of the two transformations has an error, but is consistent with the original graph with or without labels. The description is correct based on the transformation.</p> </td> </tr> </tbody> </table>	Score point	Description	4 points	<p>The focus of this item requires the student to correctly graph triangle DEF and perform the two translations in sequence. Finally, the student will identify the translation moves that would take triangle DEF to the third triangle in the sequence. Labeling is identified within the item and should be included within the response.</p> <p>The response shows triangle DEF and both transformations clearly and correctly drawn, and all triangles DEF, D'E'F', and D''E''F'' are appropriately labeled. An explanation is provided that correctly describes the transformation from triangle DEF to triangle D''E''F'' by translating each vertex one unit to the right and five units up. The work shown is organized and completely accurate.</p>	3 points	<p>The response clearly addresses the key aspects of the task; however, it includes errors in completing one or two of the components.</p> <p>For example, the response may:</p> <p>Show triangle DEF and both transformations correctly graphed and appropriately labeled, but the description of the transformation from DEF to D''E''F'' is missing or incorrect. OR Show triangle DEF graphed correctly and labeled. One transformation is done incorrectly, (example: D'E'F' moves to the left, or down) but everything else is correct, based on this error. OR Contain one minor error in any part of the process. For example, triangle DEF is graphed incorrectly; however, all other parts of the task are correct based on the incorrect triangle. OR Show triangle DEF and both transformations correctly graphed, but the labels are missing. The description of the transformation from DEF and D''E''F'' is correct.</p>	2 points	<p>The response provides evidence of a partial correct answer and/or solution process. The response may adequately address some of the components of the task, but it contains major gaps or flaws in other components.</p> <p>For example, the response may:</p> <p>Show triangle DEF and one of the transformations graphed correctly, but the other transformation is either done incorrectly or is missing. The description given is related only to the one transformation or is missing. OR Show triangle DEF, and both transformations have been graphed correctly, but labels are missing and the description for the single transformation is unclear or missing. OR Show triangle DEF incorrectly graphed. Both transformations are consistent with the original graph, with or without labels. The description is incorrect based on the transformation or is missing. OR Show triangle DEF incorrectly graphed. One of the two transformations has an error, but is consistent with the original graph with or without labels. The description is correct based on the transformation.</p>
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4 points	<p>The focus of this item requires the student to correctly graph triangle DEF and perform the two translations in sequence. Finally, the student will identify the translation moves that would take triangle DEF to the third triangle in the sequence. Labeling is identified within the item and should be included within the response.</p> <p>The response shows triangle DEF and both transformations clearly and correctly drawn, and all triangles DEF, D'E'F', and D''E''F'' are appropriately labeled. An explanation is provided that correctly describes the transformation from triangle DEF to triangle D''E''F'' by translating each vertex one unit to the right and five units up. The work shown is organized and completely accurate.</p>									
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Question 10	March 2004	<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> <p>Show triangle DEF correctly graphed, but both transformations are incorrect or missing. OR Describe the movements necessary for a single transformation, but the graphs are omitted or incorrect. OR Show triangle DEF incorrectly graphed, but there is one correct transformation (two congruent triangles that match one of the translations mentioned in the questions).</p> <p>0 Points</p> <p>The response indicates inadequate or no understanding of the task, and the task does not meet the requirements for one point.</p>								
Question 6	March 2005	<p>Scoring Guidelines for Item 6:</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 task is to draw reflections of the original design in each of the quadrants. The response shows the accurate reflections in each of the remaining three quadrants.</td> </tr> <tr> <td>1 point</td> <td> <p>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.</p> <p>For example, the response may:</p> <p>Show only two accurate reflections of the design in two of the three remaining quadrants OR Show two accurate reflections based upon an initial incorrect reflection OR Show three accurate reflections based on a slightly flawed original design OR Show accurate translation or rotation of the original design in each of the quadrants.</p> </td> </tr> <tr> <td>0 points</td> <td> <p>The response fails to demonstrate minimal understanding of the task.</p> <p>For example, the response may:</p> <p>Only copy the original diagram OR Contain only translation or rotations in fewer than the three remaining quadrants. OR Be blank or the student writes, "I do not know" or unrelated statements.</p> </td> </tr> </tbody> </table>	Score point	Description	2 points	The focus of the task is to draw reflections of the original design in each of the quadrants. The response shows the accurate reflections in each of the remaining three quadrants.	1 point	<p>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.</p> <p>For example, the response may:</p> <p>Show only two accurate reflections of the design in two of the three remaining quadrants OR Show two accurate reflections based upon an initial incorrect reflection OR Show three accurate reflections based on a slightly flawed original design OR Show accurate translation or rotation of the original design in each of the quadrants.</p>	0 points	<p>The response fails to demonstrate minimal understanding of the task.</p> <p>For example, the response may:</p> <p>Only copy the original diagram OR Contain only translation or rotations in fewer than the three remaining quadrants. OR Be blank or the student writes, "I do not know" or unrelated statements.</p>
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Benchmark F (continued)

Question 37	March 2007		B
Question 42	March 2007		B

Benchmark G

<p>Question 40</p>	<p>March 2006</p>	<table border="1"> <thead> <tr> <th>Score Point</th> <th>Directions</th> </tr> </thead> <tbody> <tr> <td>4 points</td> <td> <p>The focus of this item is the use of coordinate geometry to demonstrate relationships within a geometric figure. The response provides a demonstration that the mid-segment is parallel to and one-half the length of side \overline{AC} by finding the midpoints of \overline{AB} and \overline{BC} and comparing the slope and length of the segment formed with the slope and length of \overline{AC} or by completely stating the theorem.</p> </td> </tr> <tr> <td>3 points</td> <td> <p>The response clearly addresses the key aspects of the task; however, it includes errors in completing one or two components.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Correctly locate the midpoints and successfully demonstrate one half of the relationship. For the other part, the response demonstrates a correct procedure but contains computational errors or a minor graphing error (e.g., miscopies initial graph, but correctly demonstrates relationship). </td> </tr> <tr> <td>2 points</td> <td> <p>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>For example, the response may:</p> <ul style="list-style-type: none"> • Correctly locate the midpoints and demonstrate an attempt to compare both slope and length but contain computational errors in each. • Correctly locate the midpoint and correctly compare either the slope or the length algebraically or graphically, but the other is attempted with an incorrect procedure or omitted. • Incorrectly locate the midpoints and attempt to compare both values by correctly finding values for both slopes and lengths or making an appropriate graphical comparison for both relationships. </td> </tr> <tr> <td>1 point</td> <td> <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"> • Correctly find both midpoints algebraically or graphically but contain no other correct work. • Incorrectly determine the midpoints but correctly determine the slope or length of the midsegment based on those values. • Find the slope and/or length of \overline{AC}. </td> </tr> <tr> <td>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"> • Include unrelated statements or work. </td> </tr> </tbody> </table>	Score Point	Directions	4 points	<p>The focus of this item is the use of coordinate geometry to demonstrate relationships within a geometric figure. The response provides a demonstration that the mid-segment is parallel to and one-half the length of side \overline{AC} by finding the midpoints of \overline{AB} and \overline{BC} and comparing the slope and length of the segment formed with the slope and length of \overline{AC} or by completely stating the theorem.</p>	3 points	<p>The response clearly addresses the key aspects of the task; however, it includes errors in completing one or two components.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Correctly locate the midpoints and successfully demonstrate one half of the relationship. For the other part, the response demonstrates a correct procedure but contains computational errors or a minor graphing error (e.g., miscopies initial graph, but correctly demonstrates relationship). 	2 points	<p>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>For example, the response may:</p> <ul style="list-style-type: none"> • Correctly locate the midpoints and demonstrate an attempt to compare both slope and length but contain computational errors in each. • Correctly locate the midpoint and correctly compare either the slope or the length algebraically or graphically, but the other is attempted with an incorrect procedure or omitted. • Incorrectly locate the midpoints and attempt to compare both values by correctly finding values for both slopes and lengths or making an appropriate graphical comparison for both relationships. 	1 point	<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"> • Correctly find both midpoints algebraically or graphically but contain no other correct work. • Incorrectly determine the midpoints but correctly determine the slope or length of the midsegment based on those values. • Find the slope and/or length of \overline{AC}. 	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"> • Include unrelated statements or work.
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Benchmark H

Question 7	March 2003	B
Question 33	March 2004	A

Benchmark I

Question 36	Spring 2009	C
Question 40	March 2003	B
Question 15	March 2005	D