

Ohio Grade 6 Mathematics Achievement Test

March 2006

**Answer Key
&
Scoring Guidelines**

**GRADE 6 MATHEMATICS
ANSWER KEY
MARCH 2006**

Question No.	Type	Content Standard	Content Standard Benchmark(s)	Key
1	Multiple Choice	Number, Number Sense and Operations	H	A
2	Multiple Choice	Measurement	E	C
3	Multiple Choice	Geometry and Spatial Sense	D	B
4	Multiple Choice	Number, Number Sense and Operations	E	D
5	Multiple Choice	Measurement	C	D
6	Short Answer	Patterns, Functions and Algebra	E	S
7	Multiple Choice	Patterns, Functions and Algebra	D	C
8	Multiple Choice	Geometry and Spatial Sense	I	D
9	Multiple Choice	Data Analysis and Probability	D	C
10 – 15	Field test questions not used in student score			
16	Short Answer	Number, Number Sense and Operations	I	S
17	Multiple Choice	Data Analysis and Probability	F	C
18	Multiple Choice	Geometry and Spatial Sense	D	A
19	Multiple Choice	Patterns, Functions and Algebra	G	D
20	Multiple Choice	Patterns, Functions and Algebra	M	C
21	Extended Response	Geometry and Spatial Sense	F	E
22	Multiple Choice	Data Analysis and Probability	A	C
23	Multiple Choice	Patterns, Functions and Algebra	H	A
24	Multiple Choice	Number, Number Sense and Operations	G	C
25	Multiple Choice	Data Analysis and Probability	G	C
26	Short Answer	Number, Number Sense and Operations	G	S
27	Multiple Choice	Geometry and Spatial Sense	D	B
28	Multiple Choice	Patterns, Functions and Algebra	M	B
29	Multiple Choice	Number, Number Sense and Operations	E	D
30	Multiple Choice	Geometry and Spatial Sense	F	D
31	Extended Response	Measurement	F	E
32	Multiple Choice	Number, Number Sense and Operations	I	B
33	Multiple Choice	Data Analysis and Probability	A	B
34	Multiple Choice	Number, Number Sense and Operations	D	C
35	Multiple Choice	Number, Number Sense and Operations	C	C
36	Short Answer	Data Analysis and Probability	D	S
37	Multiple Choice	Number, Number Sense and Operations	H	D
38	Multiple Choice	Number, Number Sense and Operations	I	A
39	Multiple Choice	Data Analysis and Probability	K	B
40	Multiple Choice	Measurement	C	C
41	Short Answer	Patterns, Functions and Algebra	E	S
42	Multiple Choice	Measurement	G	C
43	Multiple Choice	Patterns, Functions and Algebra	H	B
44	Multiple Choice	Patterns, Functions and Algebra	D	C
45	Multiple Choice	Data Analysis and Probability	B;G	C

Limited = 0-13; Basic = 14-19; Proficient = 20-28; Accelerated = 29-37; Advanced = 38-50
Multiple Choice = 1 point; Short Answer = 2 points; Extended Response = 4 points

6. Jeff drew a pattern of dots and made the table shown to describe the pattern.

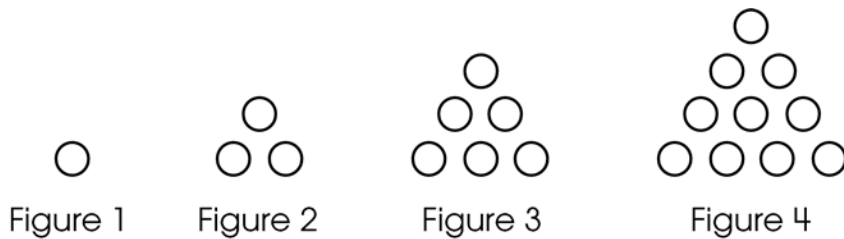


Figure	1	2	3	4	5	6
Number of Dots	1	3	6	10	15	21

In your **Answer Document**, write a rule that Jeff can use to find the number of dots for any figure in this pattern. Show or explain your answer.

Scoring Guidelines

Points	Student Response
2	<p>The focus of this task is using words to describe the rule for this pattern. The response provides a description of the extended pattern.</p> <p>Sample Correct Responses:</p> <ul style="list-style-type: none"> • Add the current figure number and the number of dots in the last figure. • Current figure number + Previous number of dots = Total number of dots for current figure <p>Note: Accept “figure number” and “current figure number.”</p>
1	<p>The response provides partial evidence of using words to describe the rule for this pattern; however, the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State that the current figure’s number of dots is found by adding the previous figure number to the previous figure’s number of dots. • Provide work that continues the pattern without an explanation. • State that the number of dots in each figure increases by the number after it, such as the first figure has 1 dot, the 2nd figure has 2 more dots, and the 3rd figure has 3 more dots than the 2nd figure.
0	<p>The response provides inadequate evidence of using words to describe the rule for this pattern. The response provides major flaws in reasoning or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State that the number of dots increases. • State that you need to add 16 to the figure number. • Be blank or state unrelated statements. • Recopy information from the stem.

16. The original cost of the guitar that Jane wants to buy is \$240 in two different stores. Sam’s Music is having a sale where guitars are discounted by 30%. Melody Music is offering a \$45 discount on the same guitar.

In your **Answer Document**, explain which store is offering the better deal. Show work or provide an explanation to support your answer.

Scoring Guidelines


Points	Student Response
2	<p>The focus of this task is determining the percent of a number to compare two discounts to determine which discount is greater. The response indicates the greater discount and also provides supporting work or an adequate explanation to support the claim.</p> <p>Sample Correct Responses:</p> <ul style="list-style-type: none"> • The 30% discount at Sam’s Music will save Jane the most money. $0.30 \times \\$240 = \\72 \$72 is greater than \$45. • The 30% discount is \$72 ($0.3 \times 240$), which is more than \$45. • \$45 is approximately 19% of \$240 ($45/240 = 19/100$), which is less than 30% of \$240.
1	<p>The response provides partial evidence of determining the percent of a number to compare two discounts to determine which discount is greater; however, the solution is incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Correctly identify the greater discount but with a computational error or incomplete explanation. • State that Sam’s Music offers the greater discount because 30% is more than \$45 with no supporting work or explanation. • Show only that \$45 is 19% of \$240. • Show only that $0.30 \times 240 = \\$72$.
0	<p>The response provides inadequate evidence of determining the percent of a number to compare two discounts to determine which discount is greater. The response provides major flaws in reasoning or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State that Sam’s Music has the better deal with no or an incorrect explanation. • State that Melody Music has the better deal. • State that 30 is less than 45 so \$45 is better. • Be blank or state unrelated statements. • Recopy information from the stem.

21. A rectangular playground is 80 meters long and 50 meters wide.

In your **Answer Document**, create and draw a scale model of the playground.

State the scale you used and label the dimensions of each side of your model. Show or explain how you determined the length of each side of your model.

Scoring Guidelines

Points	Student Response
4	<p>Sample Correct Response: 8 units</p>  <p>5 units</p> <p>Scale: 1 unit = 10 meters I used the scale 1 unit: 10 meters. To determine the lengths of the sides, I divided each measurement of the playground by 10, which gave me 8 x 5, then drew a rectangle that was 8 units long by 5 units wide. NOTE: Acceptable dimensions include 4 x 2.5, 16 x 10, etc. The focus of the task is using a description to draw a scale model. The response provides an accurate scale drawing of the rectangular playground with dimensions labeled AND shows work or gives an adequate explanation of the scale.</p>
3	<p>The response provides evidence of using a description to draw a scale model. The response shows an accurate scale drawing of the rectangular playground with dimensions labeled and a scale provided AND shows work or gives an adequate explanation; however, the response may show minor errors or flaws. For example, the response may:</p> <ul style="list-style-type: none"> • Show an accurate drawing that is correctly labeled, including an accurate explanation, but include no scale. • Show an accurate drawing that is correctly labeled and with a correct scale, but lacks an explanation or work to justify the scale. • Show a drawing with minor flaws and provide an accurate scale and an adequate explanation or work.
2	<p>The response provides partial evidence of using a description to draw a scale model. The response shows an accurate scale drawing of the rectangular playground; however, it includes multiple errors OR a vague explanation. For example, the response may:</p> <ul style="list-style-type: none"> • Show a rectangle that is not drawn to scale, but provide a scale and a vague explanation. • Show and label a rectangle that is drawn to scale and provide the scale, but fail to label the dimensions.

1	<p>The response provides minimal evidence of using a description to draw a scale model. The response contains major flaws and the explanation is incomplete or missing. For example, the response may:</p> <ul style="list-style-type: none">• Show a rectangle with correct dimensions but give no scale, work, or explanation.• Provide a scale that does not match the rectangle.
0	<p>The response provides inadequate evidence of using a description to draw a scale model. The response provides major flaws in explanations or irrelevant information. For example, the response may:</p> <ul style="list-style-type: none">• Show an incomplete or inaccurate drawing.• State that the playground is a rectangle measuring 50 meters by 80 meters.• Show a rectangle that is not drawn to scale and labeled 50 meters x 80 meters with no scale.• Give irrelevant information.

26. Buses to the stadium leave Central Station every 10 minutes. Buses to the zoo leave Central Station every 16 minutes. Both buses leave Central Station at 4 p.m.

In your **Answer Document**, find the next time both buses will leave Central Station at the same time. Show or explain how you found your answer.

Scoring Guidelines

Points	Student Response																				
2	<p>Sample Correct Responses:</p> <ul style="list-style-type: none"> The least common multiple of 10 and 16 is 80. 80 minutes past 4 p.m. is 5:20 p.m. Both buses will leave Central Station at 5:20 p.m. <table border="1" data-bbox="537 596 894 1062"> <thead> <tr> <th>Stadium</th> <th>Zoo</th> </tr> </thead> <tbody> <tr><td>4:00</td><td>4:00</td></tr> <tr><td>4:10</td><td>4:16</td></tr> <tr><td>4:20</td><td>4:32</td></tr> <tr><td>4:30</td><td>4:48</td></tr> <tr><td>4:40</td><td>5:04</td></tr> <tr><td>4:50</td><td>5:20</td></tr> <tr><td>5:00</td><td></td></tr> <tr><td>5:10</td><td></td></tr> <tr><td>5:20</td><td></td></tr> </tbody> </table> <p>The focus of this task is applying the concept of the least common multiple to a real-world problem situation. The response provides the next time both buses leave the station together with an adequate explanation or supporting work. The explanation may include the least common multiples (LCM). Note: Accept 520 in any format.</p>	Stadium	Zoo	4:00	4:00	4:10	4:16	4:20	4:32	4:30	4:48	4:40	5:04	4:50	5:20	5:00		5:10		5:20	
Stadium	Zoo																				
4:00	4:00																				
4:10	4:16																				
4:20	4:32																				
4:30	4:48																				
4:40	5:04																				
4:50	5:20																				
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5:10																					
5:20																					
1	<p>The response provides partial evidence of applying the concept of the least common multiple to a real world problem situation; however, the solution is incomplete and slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> Provide a correct answer with no or incorrect work. State that the least common multiple of 10 and 16 is 80 but does not apply it to find the time or applies it incorrectly. Show a chart of both bus times but does not continue long enough to see when the time is the same or because of a simple arithmetic mistake the times are off. 																				
0	<p>The response provides inadequate evidence of applying the concept of the least common multiple to a real world problem situation. The response provides major flaws in reasoning or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> State an arbitrary time with no work shown. Be blank or make unrelated statements. Recopy information given in the stem. 																				

31. Marla and her cousins invented a game. Marla used chalk to draw a rectangle that was 15 feet wide and 25 feet long for a space to play her game.

Several other children joined in, and Marla realized that the rectangle was now too small. She doubled the length and doubled the width to create a new play area.

In your **Answer Document**, compare the perimeters of the original play space and the new play space. Determine how much greater the new perimeter is than the original perimeter. Show or explain your work.

Then, compare the areas of the original and the new play spaces. Determine how much greater the new area is than the original area. Show or explain your work.

Scoring Guidelines

Points	Student Response
4	<p>The focus of this task is finding the perimeter and area of a rectangular shape and describing what happens to the perimeter and area when the measurements of a shape are changed. The response provides a correct calculation of how much longer the new perimeter is, showing or explaining work, AND a correct calculation of how much larger the new area is, showing or explaining work.</p> <p>Sample Correct Response:</p> <ul style="list-style-type: none">• New Length – $2 \times 25 = 50$ feet <p>New Width – $2 \times 15 = 30$ feet Original chalk line: $25 + 25 + 15 + 15 = 80$ feet New Chalk line: $50 + 50 + 30 + 30 = 160$ feet $160 - 80 = 80$. The new chalk line is 80 feet longer or double than the original line. Original Area: $25 \times 15 = 375$ square feet New Area: $50 \times 30 = 1500$ square feet $1500 - 375 = 1125$. The new area is 1125 square feet or 4 times larger than the original area.</p>
3	<p>The response provides adequate evidence of finding the perimeter and area and describing what happens to the perimeter and area when the measurements of a shape are changed. The response provides work with a minor error or flaw in a calculation or explanation.</p> <p>For example, the response may:</p> <ul style="list-style-type: none">• Provide work with a calculation error in the area or perimeter, but base the comparison on that error.• Provide correct work for the areas and perimeters, but state a comparison for the area or perimeter.

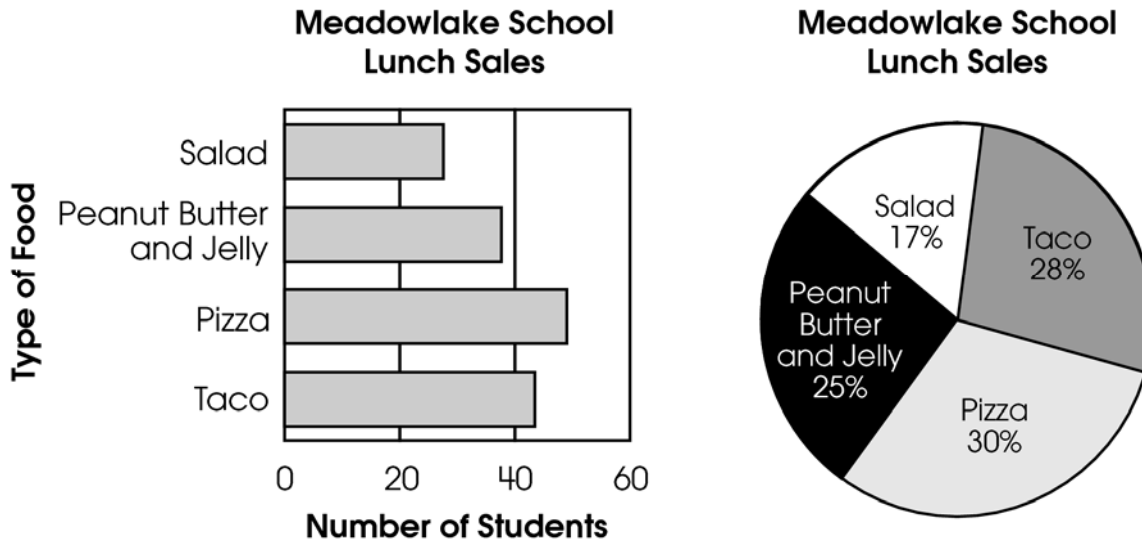
2	<p>The response provides partial evidence of finding the perimeter and area of a rectangular shape and describing what happens to the perimeter and area when the measurements of a shape are changed. The response provides work with minor errors or flaws OR vague explanation.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Show work with calculation errors in the area and perimeter, and fail to state a conclusion. • Provide the correct answers to how much larger the new perimeter is and how much larger the new area is; but, lacks an explanation or work. • Provide correct work for the perimeters or the areas and comparison for the perimeter or the area. • State, the new perimeter is 80 feet longer than the original one and the new area is 1,125 square feet larger than the original area.
1	<p>The response provides minimal evidence of finding the perimeter and area of a rectangular shape and describing what happens to the perimeter and area when the measurements of a shape are changed. The response provides work with multiple errors or flaws and a vague explanation.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • Provide the perimeter of the original or the new play space. • Provide the area of the original or the new play space. • Provide a partially accurate comparison of perimeter and area as it relates to the original and new play areas. • State only the area and perimeter of the original play space.
0	<p>The response provides inadequate evidence of finding the perimeter and area of a rectangular shape and describing what happens to the perimeter and area when the measurements of a shape are changed. The response provides major flaws in explanation or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State the area and perimeter is doubled. • Be blank or state unrelated statements. • Recopy information from the stem.

36. The table shows the lunch choices of 155 students.

Meadowlake School Lunch Sales

Taco	Pizza	Peanut Butter and Jelly	Salad	Total
43	48	38	26	155

A circle graph and a bar graph are constructed to represent these data.



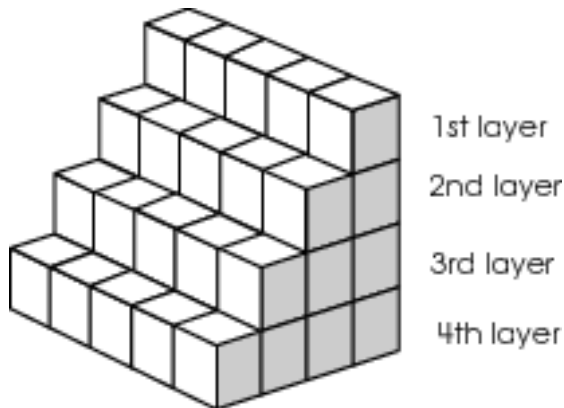
In your **Answer Document**, give one advantage of using the bar graph to display these data. Then give one advantage of using the circle graph to display these data.

Scoring Guidelines

Points	Student Response
2	<p>The focus of this task is comparing representations of the same data in different types of graphs. The response provides adequate support that demonstrates an understanding of comparing the same data in a bar graph and circle graph.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> • State the circle graph makes it easier to see how the amount of students eating one type of food compares to all of the students. The bar graph makes it easier to see the number of students eating the different foods. • State the bar graph shows the actual numbers and the circle graph shows the percents.

1	<p>The response provides partial evidence of comparing representations of the same data in different types of graphs. The response provides a vague explanation with minor flaws.</p> <p>For example, the response may:</p> <ul style="list-style-type: none">• State an advantage of one type of graph but not the other.• State that the circle graph conveys a part to whole relationship as compared to a bar graph that doesn't.• State that the bar graph conveys the number of students as compared to the circle graph that doesn't.
0	<p>The response provides inadequate evidence of understanding of comparing representations of the same data in different types of graphs. The response will provide major flaws in explanations or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none">• Restate information that is already given, including data interpretation; e.g.; 30% of the students ate pizza.• Be highly flawed, blank or states unrelated information.

41. The top 4 layers of a 10-layer staircase are shown.



In your **Answer Document**, tell how many blocks are in the 10th layer of the staircase if the pattern continues. Show or explain how you found your answer.

Scoring Guidelines

Points	Student Response																						
2	<p>The focus of this task is analyzing and extending a pattern. The response includes the correct number of cubes in the 10th layer AND shows supporting work OR gives an adequate explanation of the answer.</p> <p>Sample Correct Responses:</p> <ul style="list-style-type: none"> 50 blocks are in the 10th layer of the staircase. I saw that each layer has 5 blocks times the layer number so the tenth layer has $5 \times 10 = 50$. I found that each layer has 5 more blocks than the previous layer so I made a table to show the pattern. <table border="1" style="margin-left: 40px;"> <tr> <td>Layer</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> </tr> <tr> <td># Blocks</td> <td>5</td> <td>10</td> <td>15</td> <td>20</td> <td>25</td> <td>30</td> <td>35</td> <td>40</td> <td>45</td> <td>50</td> </tr> </table>	Layer	1	2	3	4	5	6	7	8	9	10	# Blocks	5	10	15	20	25	30	35	40	45	50
Layer	1	2	3	4	5	6	7	8	9	10													
# Blocks	5	10	15	20	25	30	35	40	45	50													
1	<p>The response provides partial evidence of analyzing and extending a pattern; however, the solution is incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> Provide a correct description of the pattern but fail to identify the correct number of blocks. Provide the correct number of blocks but not show work or include an explanation. State that each layer has 5 more blocks than the last layer. State that if the pattern continues, the 10th layer will have 50 blocks. 																						

0	<p>The response provides inadequate evidence of analyzing and extending the pattern. The response provides major flaws in reasoning or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none">• State that the first layer has 5, then the 2nd layer has 6, then the 3rd layer has 7. So I counted up and the 10th layer would have 14.
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