

# **Ohio Grade 5 Mathematics Achievement Test**

**March 2006**

**Answer Key  
&  
Scoring Guidelines**

**GRADE 5 MATHEMATICS  
ANSWER KEY  
MARCH 2006**

Question No.	Type	Content Standard	Content Standard Benchmark(s)	Key
1	Multiple Choice	Geometry and Spatial Sense	D	D
2	Multiple Choice	Patterns, Functions and Algebra	C	A
3	Multiple Choice	Data Analysis and Probability	F	B
4	Multiple Choice	Measurement	E	A
5	Short Answer	Data Analysis and Probability	H	S
6	Multiple Choice	Patterns, Functions and Algebra	E	C
7	Multiple Choice	Number, Number Sense and Operations	I	B
8	Multiple Choice	Data Analysis and Probability	F	D
9	Multiple Choice	Measurement	C;D	C
10	Short Answer	Number, Number Sense and Operations	B	S
11 – 16	Field test questions not used in student score			
17	Multiple Choice	Data Analysis and Probability	J	A
18	Multiple Choice	Geometry and Spatial Sense	I	D
19	Multiple Choice	Measurement	A	C
20	Extended Response	Number, Number Sense and Operations	H;I	E
21	Multiple Choice	Geometry and Spatial Sense	G	A
22	Multiple Choice	Data Analysis and Probability	I	D
23	Multiple Choice	Number, Number Sense and Operations	E	C
24	Multiple Choice	Patterns, Functions and Algebra	A	C
25	Short Answer	Measurement	G	S
26	Multiple Choice	Number, Number Sense and Operations	I	B
27	Multiple Choice	Geometry and Spatial Sense	B	C
28	Multiple Choice	Number, Number Sense and Operations	A	A
29	Short Answer	Data Analysis and Probability	A	S
30	Multiple Choice	Geometry and Spatial Sense	A;G	B
31	Multiple Choice	Measurement	B	D
32	Multiple Choice	Data Analysis and Probability	E	A
33	Extended Response	Patterns, Functions and Algebra	E;F	E
34	Multiple Choice	Measurement	E	A
35	Multiple Choice	Number, Number Sense and Operations	D	A
36	Multiple Choice	Geometry and Spatial Sense	C	C
37	Multiple Choice	Number, Number Sense and Operations	I	C
38	Short Answer	Measurement	B;E	S
39	Multiple Choice	Geometry and Spatial Sense	I	C
40	Multiple Choice	Number, Number Sense and Operations	B	B
41	Multiple Choice	Patterns, Functions and Algebra	C	A
42	Short Answer	Geometry and Spatial Sense	A	S
43	Multiple Choice	Data Analysis and Probability	F	C
44	Multiple Choice	Geometry and Spatial Sense	B	B
45	Multiple Choice	Patterns, Functions and Algebra	F	C
46	Multiple Choice	Number, Number Sense and Operations	F	D

Limited = 0-17; Basic = 18-23; Proficient = 24-32; Accelerated = 33-37; Advanced = 38-52  
Multiple Choice = 1 point; Short Answer = 2 points; Extended Response = 4 points

5. Gregg has four shirts and three pairs of pants. His shirts are red, green, white, and yellow. His pants are navy, black and tan.

In your **Answer Document** , list all the different shirt and pants combinations that Gregg can wear. (2 points)

**Scoring Guidelines**

Points	Student Response
2	<p>The focus of this task is finding and listing all possible outcomes of a problem situation. The response provides all possible combinations in a list, tree diagram or pictures.</p> <p>Sample response:</p> <ul style="list-style-type: none"> <li>• Red, navy; Red, black; Red, tan; Green, navy; Green, black; Green, tan; White, navy; White, black; White, tan; Yellow, navy; Yellow, black; Yellow, tan</li> <li>• Tree diagram showing all the possible combinations</li> </ul> <p>Drawing of all the combinations.</p>
1	<p>The response provides partial evidence of finding and listing all possible outcomes of a problem situation; however, the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide at least 6 correct combinations.</li> <li>• State that there are 12 combinations, but fail to list them.</li> <li>• Provide a tree diagram with omissions.</li> </ul>
0	<p>The response provides inadequate evidence of finding and listing all possible outcomes of a 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"> <li>• Provide a random list of a few combinations.</li> <li>• Be blank or provide unrelated statements.</li> <li>• Recopy information from the stem.</li> </ul>

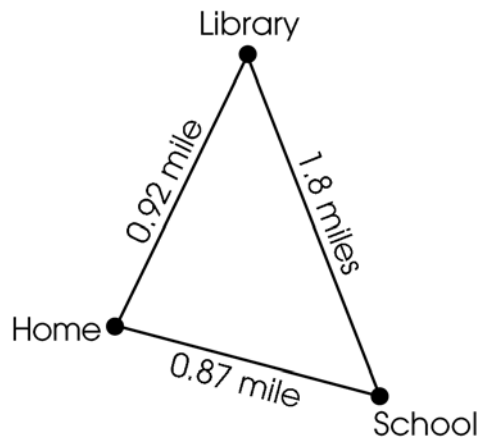
10. Maria found the same pair of shoes on sale at three different stores. All the stores have the same original price. The first store has the shoes on sale for  $\frac{1}{3}$  off. The second store has them on sale for 20% off. The third store has them on sale for one-fourth off.

In your **Answer Document**, determine which store has the best sale for the shoes. Explain your answer, using pictures, numbers or words. (2 points)

### Scoring Guidelines

Points	Student Response
2	<p>The focus of this task is identifying and generating equivalent forms of fractions, decimals or percents. The response correctly converts the numbers to the same form (all fractions or all decimals or all percents), OR correctly compares the amounts off with adequate evidence AND chooses the first store as having the best sale.</p> <p>Sample responses:</p> <ul style="list-style-type: none"> <li>• Store 1 = <math>33\frac{1}{3}\%</math> or 33% off, Store 2 = 20% off, Store 3 = 25% off. Store 1 gives the most off, because it has the largest percent off.</li> <li>• Store 1 = <math>\frac{1}{3}</math> off, Store 2 = <math>\frac{1}{5}</math> off and Store 3 = <math>\frac{1}{4}</math> off. Store 1 gives the most off because it has the largest fraction.</li> </ul> <p>Store 1 = .3 or 0.33 off, Store 2 = .20 off, Store 3 = .25 off. Store 1 gives the most off, because it has the largest decimal.</p>
1	<p>The response provides partial evidence of identifying and generating equivalent forms of fractions, decimals or percents; however, the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide correct conversions of the numbers to the same form without an explanation.</li> <li>• Provide correct store with no supporting work.</li> <li>• Provide incorrect conversions of one of the numbers, but find the best sale based on the incorrect calculation.</li> </ul>
0	<p>The response provides inadequate evidence of identifying and generating equivalent forms of fractions, decimals or percents. The response provides major flaws in reasoning or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Compare two stores, without identifying correct store.</li> <li>• Be blank or state unrelated statements.</li> <li>• Recopy information from the stem.</li> </ul>

20. The diagram shows how far it is from Anna's home to her school, from her school to the library, and from the library to her home.



Each school day, Anna rides her bike from her home to her school. After school, she rides to the library and then home. On Saturday, Anna rides her bike from home to the library and back home. She does not ride her bike on Sunday. Anna's mother says that her daughter rides about 30 miles every week between her home, the school and the library.

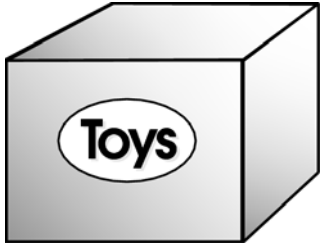
In your **Answer Document** , use estimation to determine whether Anna's mother has made a reasonable estimate. Show or explain your work. (4 points)

### Scoring Guidelines

Points	Student Response
4 point text	<p>The focus of this task is using an estimation strategy to solve a problem and determine the reasonableness of the result. The response provides a reasonable estimate for the number of miles biked from Monday through Saturday with an adequate explanation or supporting work. The response also gives an adequate explanation of the reasonableness of the mother's estimate.</p> <p>Sample response:</p> <ul style="list-style-type: none"> <li>• 0.87 is almost 1 mile</li> <li>• 1.8 is almost 2 miles</li> <li>• 0.92 is almost 1 mile</li> <li>• <math>1 + 2 + 1 = 4</math>; <math>4 \times 5 = 20</math> miles</li> <li>• 0.92 is almost 1 mile</li> <li>• <math>1 \times 2 = 2</math>; <math>20 + 2 = 22</math> miles</li> </ul> <p>Total for the week is 22 miles. Her mother's estimate is not reasonable because 22 is less than 30.</p> <p>NOTE: Rounding distances to nearest tenth is an acceptable estimation strategy.</p>

3	<p>The response provides adequate evidence of using an estimation strategy to solve a problem and determine the reasonableness of the result; however, the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide an accurate estimate for the total miles biked in 6 days without support, AND the explanation of the reasonableness of the mother's estimate is correct.</li> <li>• Provide work with an error in the estimation strategy AND provide an explanation of the reasonableness of the mother's estimate that is based on that error.</li> </ul>
2	<p>The response provides partial evidence of using an estimation strategy to solve a problem and determine the reasonableness of the result; however, the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide an accurate estimate with supporting work, but the explanation of the reasonableness of the mother's estimate is missing or incorrect.</li> <li>• Provide a correct estimate for an incorrect number of days and an explanation of the reasonableness of the mother's estimate that is based on that error.</li> </ul>
1	<p>The response provides minimal evidence of using an estimation strategy to solve a problem and determine the reasonableness of the result; however, the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide exact, correct computation rather than an estimate, AND provide a correct explanation of the reasonableness of the mother's estimate.</li> <li>• Provide a correct estimate for one day with or without an explanation of the reasonableness for the mother's estimate.</li> </ul>
0	<p>The response provides inadequate evidence of using an estimation strategy to solve a problem and determine the reasonableness of the result. The response provides major flaws in reasoning or gives irrelevant information.</p> <p>For example, the response may:</p> <p>Provide an exact calculation and rounds the result of that calculation without an explanation of the reasonableness of the mother's estimation.</p> <ul style="list-style-type: none"> <li>• Provide an exact calculation with no evidence of estimation.</li> <li>• Show a total of 30 miles biked.</li> <li>• Be blank or give unrelated statements.</li> <li>• Recopy information from the stem.</li> </ul>

25. Justin keeps his toys in a box like the one shown.



In your **Answer Document** , explain the difference between the volume and the surface area of the box.

**Scoring Guidelines**

Points	Student Response
2	<p>The focus of this task is describing the difference between surface area and volume for a three-dimensional object. The response provides an adequate explanation of the difference between surface area and volume, using appropriate examples.</p> <p>Sample response:</p> <ul style="list-style-type: none"> <li>• The surface area is the area of the faces (top, bottom and sides) of the toy box and the volume is the amount of space inside the toy box.</li> <li>• The surface area is measured with square units but the volume is measured in cubic units.</li> </ul> <p>The surface area is how much material is used to cover the toy box and the volume is how many toys Justin can fit into the box.</p>
1	<p>The response provides partial evidence of describing the difference between surface area and volume for a figure; however, the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide an adequate explanation of surface area as it pertains to the toy box, but the explanation of volume is incorrect or missing.</li> <li>• Provide an adequate explanation of volume as it pertains to the toy box, but the explanation of surface area is incorrect or missing.</li> <li>• State that the surface area is outside of the box and/or the volume is inside of the box.</li> </ul>
0	<p>The response provides inadequate evidence of describing the difference between surface area and volume for a figure. The response provides major flaws in reasoning or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• State that volume and surface area are the same.</li> <li>• Be blank or provide unrelated statements.</li> <li>• Recopy information from the stem.</li> </ul>

29. Mike surveys his class to find each student's favorite dessert and records his data as shown.

**Desserts**

Student	Favorite Dessert
Oscar	Ice Cream
Jasmine	Brownies
Ashley	Ice Cream
Marcus	Ice Cream
James	Brownies
Cody	Cookies
Jessica	Cookies
Courtney	Ice Cream
Kayla	Brownies
Taylor	Cup Cakes
Antonio	Ice Cream
Mike	Brownies

In your **Answer Document**, construct a frequency table to summarize the data. Be sure to include labels. (2 points)

**Scoring Guidelines**

Points	Student Response										
2	<p>The focus of this task is constructing a frequency table. The response includes an accurate frequency table that is labeled. Sample responses:</p> <p style="text-align: center;"><b>Student's Favorite Dessert</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Dessert</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>Brownies</td> <td>    </td> </tr> <tr> <td>Cookies</td> <td>  </td> </tr> <tr> <td>Cupcakes</td> <td> </td> </tr> <tr> <td>Ice Cream</td> <td>   </td> </tr> </tbody> </table>	Dessert	Frequency	Brownies		Cookies		Cupcakes		Ice Cream	
Dessert	Frequency										
Brownies											
Cookies											
Cupcakes											
Ice Cream											

<b>Student's Favorite Dessert</b>	
<b>Dessert</b>	<b>Frequency</b>
Brownies	4
Cookies	2
Cupcakes	1
Ice Cream	5

1	<p>The response provides partial evidence of constructing a frequency table; however the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide a frequency table that does not accurately list the data shown in the table.</li> <li>• Provide a correct frequency table with missing or flawed labels.</li> </ul>
0	<p>The response provides inadequate evidence of constructing a frequency table. The response provides major flaws in reasoning or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide representation that does not meet the criteria of the task such as a graph.</li> <li>• Be blank or state unrelated statements.</li> <li>• Recopy information from the stem.</li> </ul>

33. Ethan rakes leaves to earn money. He uses the information in the table shown to find how long he takes to rake lawns of different sizes.

Size of Lawn (square feet)	Time to Rake (minutes)
200	40
250	50
300	60
350	70
400	80

In your **Answer Document**, write a rule that tells how the amount of time Ethan needs to rake a lawn is related to the number of square feet in the lawn.

One of Ethan's neighbors has a 150-square-foot lawn. Use the table or your rule to state how long it will take Ethan to rake this lawn. Show or explain your work.

Use the table or your rule to state what size lawn Ethan can rake in 65 minutes. Show or explain your work. (4 points)

### Scoring Guidelines

Points	Student Response
4	<p>The focus of this task is using data in a table to draw conclusions and make predictions. The response includes a rule that accurately relates the size of the lawn and the time needed and uses the rule to explain how long it will take Ethan to rake a 150-square-foot lawn and the size of the lawn Ethan can rake in 65 minutes.</p> <p>Sample response:</p> <ul style="list-style-type: none"> <li>The size of a lawn is 5 times the number of minutes it takes to rake it.</li> </ul> <p>OR</p> <p>The time it takes to rake a lawn is <math>\frac{1}{5}</math> the number of square feet in the lawn.</p> <p>AND</p> <p><math>150 \div 5 = 30</math>. I predict it will take Ethan 30 minutes to rake a 150-square-foot lawn.</p> <p>AND</p> <p><math>65 \times 5 = 325</math>. Ethan can rake a 325-square-foot lawn in 65 minutes.</p> <ul style="list-style-type: none"> <li>The time increases by 10 minutes for each additional 50 square feet</li> </ul> <p>AND</p> <p>150 square feet will take 30 minutes (<math>40 - 10 = 30</math>)</p> <p>AND</p> <p>Ethan can rake 325 square feet of lawn in 65 minutes (<math>300 + 25</math>, since it's halfway).</p>

3	<p>The response provides adequate evidence of using data in a table to draw conclusions and make predictions. However, the solution may contain a slight error, a flaw or a vague explanation.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide the correct rule relating the size of the lawn to the amount of time it takes to rake, AND the correct amount of time it will take Ethan to rake 150 square feet, AND the correct size of a lawn Ethan can rake in 65 minutes with little or no work shown.</li> <li>• Provide a correct prediction for the amount of time it will take Ethan to rake 150 square feet AND the correct size of a lawn Ethan can rake in 65 minutes with an adequate explanation, but not provide a rule.</li> </ul>
2	<p>The response provides partial evidence of using data in a table to draw conclusions or make predictions. However, the solution is incomplete and/or contains minor flaws.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide an adequate rule and one of the predictions.</li> <li>• Provide correct predictions with inadequate or no support AND the rule is flawed or missing.</li> </ul>
1	<p>The response provides minimal evidence of using data in a table to draw conclusions and make predictions. The response contains major flaws and the explanation is incomplete or missing.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide one correct prediction.</li> <li>• Provide an appropriate rule.</li> </ul>
0	<p>The response provides inadequate evidence of using data in a table to draw conclusions and make predictions. The response provides major flaws in reasoning or gives irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>• State <math>200 - 40 = 160</math>.</li> <li>• Be blank or make unrelated statements.</li> <li>• Recopy information from the stem.</li> </ul>

38. Peter's goal is to read 5 hours every school week. He reads every evening during the school week and records his time in the chart shown.

### Peter's Reading Time

Day	Time Read
Monday	30 minutes
Tuesday	1 hour 15 minutes
Wednesday	1 hour 5 minutes
Thursday	40 minutes
Friday	?

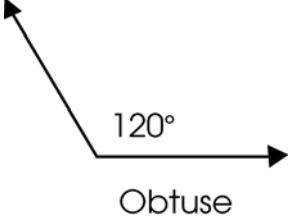
In your **Answer Document**, determine how much time Peter should read on Friday to meet his goal. Show or explain how you found your answer. (2 points)

### Scoring Guidelines

Points	Student Response
2	<p>The focus of this task is converting units of time within the same measurement system. The response correctly determines the time Peter should read on Friday with supporting work or an adequate explanation.</p> <p>Sample response:</p> <ul style="list-style-type: none"> <li>30 minutes + 1 hour 15 minutes + 1 hour 5 minutes + 40 minutes = 2 hours 90 minutes; 60 minutes = 1 hour so 2 hours 90 minutes = 3 hours 30 minutes. 5 hours – 3 hours 30 minutes = 1 hour 30 minutes.</li> <li>60 minutes = 1 hour, so 30 minutes + 75 minutes + 65 minutes + 40 minutes = 210 minutes. 5 hours = 300 minutes, so 300 minutes – 210 minutes = 90 minutes. Peter must read for 90 minutes.</li> </ul> <p>3 hours 30 minutes = 3.5 hours so 5 hours – 3.5 hours = 1.5 hours.</p>
1	<p>The response provides partial evidence of converting units of time within the same measurement system; however, the solution may be incomplete or slightly flawed.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>Show a minor computational error when converting, adding or subtracting.</li> <li>Find only the total time Peter has already read.</li> <li>Provide the correct answer without an explanation or work.</li> </ul>
0	<p>The response provides inadequate evidence of converting units of time within the same measurement system. The response provides major flaws in conversion or irrelevant information.</p> <p>For example, the response may:</p> <ul style="list-style-type: none"> <li>State 100 minutes.</li> <li>Be blank or provide unrelated statements.</li> <li>Recopy information from the stem.</li> </ul>

42. In your **Answer Document** , draw an obtuse angle. Use your protractor to give the measure of the obtuse angle. (2 points)

**Scoring Guidelines**

Points	Student Response
2	<p>The focus of this task is drawing an angle and using a tool to measure the angle. The response shows the drawing of an obtuse angle with the appropriate measure of the angle drawn.</p> <p>Sample response:</p>  <p>NOTE: An appropriate angle measure must be within 5° of the actual angle measure and have a measurement from 91° to 179°.</p>
1	<p>The response provides partial evidence of drawing an angle and using a tool to measure the angle; however, the solution may be incomplete or slightly flawed. For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide a drawing of an angle that is obtuse, but fail to measure it or states that it is greater than 90°.</li> <li>• Provide a drawing of an acute angle, but accurately measures and labels the angle.</li> <li>• Provide the drawing of an obtuse angle that is not accurately measured.</li> </ul>
0	<p>The response provides inadequate evidence of drawing an angle and using a tool to measure the angle. The response provides major flaws in angle construction or irrelevant information. For example, the response may:</p> <ul style="list-style-type: none"> <li>• Provide a drawing of an angle that is not obtuse and not measure it.</li> <li>• Provide a drawing of an angle that is not obtuse and give an angle measure that does not reflect the angle shown.</li> <li>• Be blank or provide unrelated statements.</li> <li>• Recopy information from the stem.</li> </ul>