MARCH 2007 OHIO GRADUATION TESTS

STATISTICAL SUMMARY

This document is a summary of the March 2007 administration of the Ohio Graduation Tests (OGT). Students attempt the tests for the first time in the spring of grade 10. Students who take the tests later in high school do so because they have not yet achieved proficient score(s) on one or more tests. Because these students are not representative of the population as a whole, only tenth-graders are included in this report.

Tables 1 and 2 summarize the performance of tenth-graders in public and chartered non-public schools, respectively. Community school students are included in the public totals.

Table 1. Summary Statistics of the March 2007 Administration for Public Grade 10 Students.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Reading</th>
<th>Mathematics</th>
<th>Writing</th>
<th>Science</th>
<th>Social Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Tested</td>
<td>136,958</td>
<td>137,709</td>
<td>136,399</td>
<td>137,709</td>
<td>136,998</td>
</tr>
<tr>
<td>Max. Raw Score</td>
<td>48</td>
<td>46</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Max. Scaled Score</td>
<td>549</td>
<td>555</td>
<td>560</td>
<td>608</td>
<td>626</td>
</tr>
<tr>
<td>Min. Scaled Score</td>
<td>260</td>
<td>250</td>
<td>276</td>
<td>212</td>
<td>231</td>
</tr>
<tr>
<td>Raw Mean</td>
<td>29.90</td>
<td>27.62</td>
<td>32.76</td>
<td>25.74</td>
<td>27.81</td>
</tr>
<tr>
<td>Raw SD</td>
<td>8.49</td>
<td>9.90</td>
<td>6.47</td>
<td>8.23</td>
<td>9.24</td>
</tr>
<tr>
<td>Raw SEM</td>
<td>2.40</td>
<td>2.21</td>
<td>1.71</td>
<td>2.18</td>
<td>2.07</td>
</tr>
<tr>
<td>Scaled Mean</td>
<td>423.29</td>
<td>427.32</td>
<td>427.92</td>
<td>417.47</td>
<td>424.48</td>
</tr>
<tr>
<td>Scaled SD</td>
<td>22.09</td>
<td>30.58</td>
<td>23.11</td>
<td>31.94</td>
<td>34.41</td>
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<tr>
<td>Scaled SEM</td>
<td>6.25</td>
<td>6.84</td>
<td>6.12</td>
<td>8.45</td>
<td>7.70</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.92</td>
<td>0.95</td>
<td>0.93</td>
<td>0.93</td>
<td>0.95</td>
</tr>
</tbody>
</table>
Table 2. Summary Statistics of the March 2007 Administration for Non-Public Grade 10 Students.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Reading</th>
<th>Mathematics</th>
<th>Writing</th>
<th>Science</th>
<th>Social Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Tested</td>
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<td>13,678</td>
<td>13,656</td>
<td>13,667</td>
<td>13,629</td>
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<tr>
<td>Max. Raw Score</td>
<td>48</td>
<td>46</td>
<td>48</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Max. Scaled Score</td>
<td>549</td>
<td>555</td>
<td>560</td>
<td>608</td>
<td>626</td>
</tr>
<tr>
<td>Min. Scaled Score</td>
<td>260</td>
<td>250</td>
<td>276</td>
<td>212</td>
<td>231</td>
</tr>
<tr>
<td>Raw Mean</td>
<td>34.96</td>
<td>32.36</td>
<td>36.51</td>
<td>29.75</td>
<td>32.10</td>
</tr>
<tr>
<td>Raw SD</td>
<td>6.12</td>
<td>8.14</td>
<td>4.02</td>
<td>6.63</td>
<td>7.07</td>
</tr>
<tr>
<td>Raw SEM</td>
<td>1.73</td>
<td>1.82</td>
<td>1.06</td>
<td>1.75</td>
<td>1.58</td>
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<tr>
<td>Scaled Mean</td>
<td>436.52</td>
<td>441.50</td>
<td>442.00</td>
<td>432.97</td>
<td>440.01</td>
</tr>
<tr>
<td>Scaled SD</td>
<td>17.72</td>
<td>26.93</td>
<td>17.13</td>
<td>26.45</td>
<td>27.94</td>
</tr>
<tr>
<td>Scaled SEM</td>
<td>5.01</td>
<td>6.02</td>
<td>4.53</td>
<td>7.00</td>
<td>6.25</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.92</td>
<td>0.95</td>
<td>0.93</td>
<td>0.93</td>
<td>0.95</td>
</tr>
</tbody>
</table>
Tables 3 and 4 present the number and percent of students at each of the five performance levels for each test for public and chartered non-public schools, respectively. Community school students are included in the public totals.

**Table 3. Number and Percent of Public Grade 10 Students at Each Performance Level.**

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reading</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proficient or above:</td>
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<td></td>
</tr>
<tr>
<td>Advanced</td>
<td>16,058</td>
<td>11.7</td>
</tr>
<tr>
<td>Accelerated</td>
<td>42,238</td>
<td>30.8</td>
</tr>
<tr>
<td>Proficient</td>
<td>60,488</td>
<td>44.2</td>
</tr>
<tr>
<td>Below proficient:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>11,645</td>
<td>8.5</td>
</tr>
<tr>
<td>Limited</td>
<td>6,529</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Mathematics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proficient or above:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td>42,030</td>
<td>30.5</td>
</tr>
<tr>
<td>Accelerated</td>
<td>31,447</td>
<td>22.8</td>
</tr>
<tr>
<td>Proficient</td>
<td>38,077</td>
<td>27.7</td>
</tr>
<tr>
<td>Below proficient:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>15,289</td>
<td>11.1</td>
</tr>
<tr>
<td>Limited</td>
<td>10,866</td>
<td>7.9</td>
</tr>
<tr>
<td><strong>Writing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proficient or above:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td>1,945</td>
<td>1.4</td>
</tr>
<tr>
<td>Accelerated</td>
<td>71,298</td>
<td>52.3</td>
</tr>
<tr>
<td>Proficient</td>
<td>48,499</td>
<td>35.6</td>
</tr>
<tr>
<td>Below proficient:</td>
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<td></td>
</tr>
<tr>
<td>Basic</td>
<td>10,972</td>
<td>8.0</td>
</tr>
<tr>
<td>Limited</td>
<td>3,685</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proficient or above:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced</td>
<td>30,545</td>
<td>22.2</td>
</tr>
<tr>
<td>Accelerated</td>
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<td>22.0</td>
</tr>
<tr>
<td>Proficient</td>
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<td>27.8</td>
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<tr>
<td>Below proficient:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>26,628</td>
<td>19.3</td>
</tr>
<tr>
<td>Limited</td>
<td>11,857</td>
<td>8.6</td>
</tr>
</tbody>
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### Table 3 (continued)

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>39,105</td>
<td>28.5</td>
</tr>
<tr>
<td>Accelerated</td>
<td>25,433</td>
<td>18.6</td>
</tr>
<tr>
<td>Proficient</td>
<td>39,606</td>
<td>28.9</td>
</tr>
<tr>
<td>Below proficient:</td>
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<td></td>
</tr>
<tr>
<td>Basic</td>
<td>16,158</td>
<td>11.8</td>
</tr>
<tr>
<td>Limited</td>
<td>16,696</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>76.0</td>
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<tr>
<td></td>
<td></td>
<td>24.0</td>
</tr>
</tbody>
</table>

### Table 4. Number and Percent of Non-Public Grade 10 Students at Each Performance Level.

#### Reading

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proficient or above:</td>
<td></td>
<td>98.0</td>
</tr>
<tr>
<td>Advanced</td>
<td>3,524</td>
<td>25.8</td>
</tr>
<tr>
<td>Accelerated</td>
<td>5,922</td>
<td>43.3</td>
</tr>
<tr>
<td>Proficient</td>
<td>3,954</td>
<td>28.9</td>
</tr>
<tr>
<td>Below proficient:</td>
<td></td>
<td>2.0</td>
</tr>
<tr>
<td>Basic</td>
<td>198</td>
<td>1.4</td>
</tr>
<tr>
<td>Limited</td>
<td>72</td>
<td>0.5</td>
</tr>
</tbody>
</table>

#### Mathematics

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proficient or above:</td>
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<td>94.7</td>
</tr>
<tr>
<td>Advanced</td>
<td>6,486</td>
<td>47.4</td>
</tr>
<tr>
<td>Accelerated</td>
<td>3,641</td>
<td>26.6</td>
</tr>
<tr>
<td>Proficient</td>
<td>2,820</td>
<td>20.6</td>
</tr>
<tr>
<td>Below proficient:</td>
<td></td>
<td>5.3</td>
</tr>
<tr>
<td>Basic</td>
<td>534</td>
<td>3.9</td>
</tr>
<tr>
<td>Limited</td>
<td>197</td>
<td>1.4</td>
</tr>
</tbody>
</table>

#### Writing

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proficient or above:</td>
<td></td>
<td>98.8</td>
</tr>
<tr>
<td>Advanced</td>
<td>443</td>
<td>3.2</td>
</tr>
<tr>
<td>Accelerated</td>
<td>10,649</td>
<td>78.0</td>
</tr>
<tr>
<td>Proficient</td>
<td>2,401</td>
<td>17.6</td>
</tr>
<tr>
<td>Below proficient:</td>
<td></td>
<td>1.2</td>
</tr>
<tr>
<td>Basic</td>
<td>137</td>
<td>1.0</td>
</tr>
<tr>
<td>Limited</td>
<td>26</td>
<td>0.2</td>
</tr>
</tbody>
</table>

### Table 4 (continued)

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>4,832</td>
<td>35.4</td>
</tr>
<tr>
<td>Accelerated</td>
<td>4,016</td>
<td>29.4</td>
</tr>
<tr>
<td>Proficient</td>
<td>3,462</td>
<td>25.3</td>
</tr>
<tr>
<td><strong>Proficient or above:</strong></td>
<td></td>
<td><strong>90.1</strong></td>
</tr>
<tr>
<td>Below proficient:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>1,180</td>
<td>8.6</td>
</tr>
<tr>
<td>Limited</td>
<td>177</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Below proficient:</strong></td>
<td></td>
<td><strong>9.9</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced</td>
<td>5,947</td>
<td>43.6</td>
</tr>
<tr>
<td>Accelerated</td>
<td>3,243</td>
<td>23.8</td>
</tr>
<tr>
<td>Proficient</td>
<td>3,418</td>
<td>25.1</td>
</tr>
<tr>
<td><strong>Proficient or above:</strong></td>
<td></td>
<td><strong>92.5</strong></td>
</tr>
<tr>
<td>Below proficient:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>699</td>
<td>5.1</td>
</tr>
<tr>
<td>Limited</td>
<td>322</td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Below proficient:</strong></td>
<td></td>
<td><strong>7.5</strong></td>
</tr>
</tbody>
</table>
Table 5 provides the raw and scaled scores associated with each performance level on each test for the March 2007 administration. The scaled score required to achieve a certain performance level does not change from administration to administration, but the raw score required to achieve that scaled score may change.

**Table 5. Score ranges for all subjects and all performance levels.**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Performance Level</th>
<th>Raw Score</th>
<th>Scaled Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>Advanced</td>
<td>39.5 – 48.0</td>
<td>448 – 549</td>
</tr>
<tr>
<td></td>
<td>Accelerated</td>
<td>33.0 – 39.0</td>
<td>429 – 447</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
<td>20.0 – 32.5</td>
<td>400 – 428</td>
</tr>
<tr>
<td></td>
<td>Basic</td>
<td>13.0 – 19.5</td>
<td>383 – 399</td>
</tr>
<tr>
<td></td>
<td>Limited</td>
<td>0.0 – 12.5</td>
<td>260 – 382</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Advanced</td>
<td>34.5 – 46.0</td>
<td>444 – 555</td>
</tr>
<tr>
<td></td>
<td>Accelerated</td>
<td>27.5 – 34.0</td>
<td>425 – 443</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
<td>17.5 – 27.0</td>
<td>400 – 424</td>
</tr>
<tr>
<td></td>
<td>Basic</td>
<td>13.0 – 17.0</td>
<td>384 – 399</td>
</tr>
<tr>
<td></td>
<td>Limited</td>
<td>0.0 – 12.5</td>
<td>250 – 383</td>
</tr>
<tr>
<td>Writing</td>
<td>Advanced</td>
<td>43.0 – 48.0</td>
<td>476 – 560</td>
</tr>
<tr>
<td></td>
<td>Accelerated</td>
<td>34.0 – 42.5</td>
<td>430 – 475</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
<td>25.0 – 33.5</td>
<td>400 – 429</td>
</tr>
<tr>
<td></td>
<td>Basic</td>
<td>17.0 – 24.5</td>
<td>378 – 399</td>
</tr>
<tr>
<td></td>
<td>Limited</td>
<td>0.0 – 16.5</td>
<td>276 – 377</td>
</tr>
<tr>
<td>Science</td>
<td>Advanced</td>
<td>33.0 – 48.0</td>
<td>445 – 608</td>
</tr>
<tr>
<td></td>
<td>Accelerated</td>
<td>28.0 – 32.5</td>
<td>425 – 444</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
<td>21.0 – 27.5</td>
<td>400 – 424</td>
</tr>
<tr>
<td></td>
<td>Basic</td>
<td>13.5 – 20.5</td>
<td>371 – 399</td>
</tr>
<tr>
<td></td>
<td>Limited</td>
<td>0.0 – 13.0</td>
<td>212 – 370</td>
</tr>
<tr>
<td>Social Studies</td>
<td>Advanced</td>
<td>34.5 – 48.0</td>
<td>446 – 626</td>
</tr>
<tr>
<td></td>
<td>Accelerated</td>
<td>30.0 – 34.0</td>
<td>429 – 445</td>
</tr>
<tr>
<td></td>
<td>Proficient</td>
<td>21.0 – 29.5</td>
<td>400 – 428</td>
</tr>
<tr>
<td></td>
<td>Basic</td>
<td>15.5 – 20.5</td>
<td>382 – 399</td>
</tr>
<tr>
<td></td>
<td>Limited</td>
<td>0.0 – 15.0</td>
<td>231 – 381</td>
</tr>
</tbody>
</table>
Performance levels for each content standard (subscale) on each of the five tests are presented in Table 6. A score “at” the band, or mid-range, represents the level of performance typical of a minimally proficient student. These data are provided for diagnostic purposes only; students do not “pass” or “fail” standards.

### Table 6. Raw score bands for content standards.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Content Standard</th>
<th>Below Band</th>
<th>At Band</th>
<th>Above Band</th>
<th>Total Points</th>
</tr>
</thead>
<tbody>
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<td><strong>Reading</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquisition of Vocabulary</td>
<td></td>
<td>0.0-3.0</td>
<td>3.5-5.0</td>
<td>5.5-8.0</td>
<td>8</td>
</tr>
<tr>
<td>Reading Process</td>
<td></td>
<td>0.0-4.0</td>
<td>4.5-6.0</td>
<td>6.5-10.0</td>
<td>10</td>
</tr>
<tr>
<td>Informational, Technical, and Persuasive Text</td>
<td></td>
<td>0.0-6.5</td>
<td>7.0-9.0</td>
<td>9.5-16.0</td>
<td>16</td>
</tr>
<tr>
<td>Literary Text</td>
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<td>0.0-4.0</td>
<td>4.5-6.0</td>
<td>6.5-14.0</td>
<td>14</td>
</tr>
<tr>
<td><strong>Mathematics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number, Number Sense, and Operations</td>
<td></td>
<td>0.0-3.0</td>
<td>3.5-4.5</td>
<td>5.0-8.0</td>
<td>8</td>
</tr>
<tr>
<td>Measurement</td>
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<td>0.0-1.5</td>
<td>2.0-3.0</td>
<td>3.5-7.0</td>
<td>7</td>
</tr>
<tr>
<td>Geometry and Spatial Sense</td>
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<td>0.0-2.5</td>
<td>3.0-4.0</td>
<td>4.5-8.0</td>
<td>8</td>
</tr>
<tr>
<td>Patterns, Functions, and Algebra</td>
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<td>0.0-2.5</td>
<td>3.0-4.5</td>
<td>5.0-12.0</td>
<td>12</td>
</tr>
<tr>
<td>Data Analysis and Probability</td>
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Concordance between Raw Scores and Cut Scores

Tables 7-11 provide the concordance between raw scores and scaled scores for all five tests in the March 2007 administration of the OGT.
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March 2007 Administration

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Table 10. Raw Score to Scaled Score Conversion for Science, March 2007 Administration

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Table 11. Raw Score to Scaled Score Conversion for Social Studies, March 2007 Administration

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Equating and Scaling: The Conversion of Raw Scores to Scaled Scores

Ohio uses the Rasch model (a single-parameter logistic model) for computing item difficulties and student abilities. This model is used because of its widespread acceptance, its relative simplicity and ease of use, and the commercial availability of software for implementing it. The model measures each student’s ability and each item’s difficulty, and places all students and items on the same scale. Both ability and difficulty are measured in log-odds units, or logits. When student ability and item difficulty are equal, the probability of a correct response is 50%.

Pre-Equating and Test Form Construction

Equating is a process by which test forms composed of different items are calibrated to the same performance standards. Because each test form is made up of items that have been field-tested, items can be selected so that the new form is approximately equal to previous forms in overall difficulty.

Common Item Post-Equating

Following the administration of the March 2007 OGT, item difficulty values were estimated using data from an early return sample of grade 10 students. This sample was selected to be statistically representative of the Ohio student population.

Calibration and equating proceeded through four steps. First, the March 2007 operational difficulty values were computed from the early return data and compared to the “bank” or reference difficulty values. Because field-test difficulty estimates for all operational items were available, all operational items could potentially serve as anchor items in the equating process. The mean difference between the current and the bank difficulties of the anchor items is called the equating constant, or EQK. Second, the equating constant was added to each March 2007 difficulty value so that the mean item difficulties from the March 2007 administration and from the bank were equal. Next, the adjusted current values were subtracted from the bank values to identify the item with the largest absolute difference between the two values. If the absolute value of the difference was greater than 0.3 logits, the item was eliminated as an anchor item. This procedure was repeated until the largest difference between the adjusted current value and the bank value was less than 0.3 logits. This procedure ensured that the items used to anchor the operational test to the reference scale were stable. Finally, the difficulties of the anchor items were reset to their bank values, and the difficulties of the remaining items were placed on the bank scale.
Scaling

Ohio’s performance standards are expressed in scaled scores. Scaled scores are constant across different forms of the same test, while raw scores may reflect minor differences in the difficulty of test items on different forms. A scaled score of 430 for the March 2007 administration represents the same level of performance as a scaled score of 430 from any other administration of the same test, but the raw score corresponding to a 430 may change slightly from administration to administration.

After the equating process was complete, Rasch ability estimates, or theta scores, were computed for each possible raw score. The Rasch ability estimates were then converted to the appropriate scale by a linear transformation. In all cases, the proficient standard is equal to a scaled score of 400. The advanced, accelerated, and basic standards are also constant across different forms of the same test, but are not constant across different tests.

Ohio Rounding Rule

Raw scores are reported to the nearest half-point, but scaled scores are reported as whole numbers. In general, scaled scores are rounded to the nearest whole number; e.g., 417.848 would be reported as 418. Occasional exceptions must be made at the cut points used to mark the performance standards for each test so that the scaled score associated with each possible raw score is placed in the correct performance level.

Ohio uses a rounding rule to match the raw score closest to the performance standard with the associated scaled cut score for that standard. For example, if a raw score of 21.0 is associated with a scaled score of 399.437, and this is the closest scaled score to the proficient performance standard of 400, the scaled score associated with 21.0 is reported as 400 rather than 399.

If the closest scaled score exceeds the standard, the rounded scaled score is not changed. For example, if a raw score of 22.0 produces a scaled score of 398.126 and a raw score of 22.5 produces a scaled score of 401.246, the raw cut would be 22.5 and the associated scaled score would be reported as 401.