



Functional Independence

ELA, Mathematics, and Science

Michigan's Alternate Assessment Program

**Michigan Department of Education
Office of Educational Assessment and Accountability**

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INTRODUCTION

The MI-Access Technical Reports provide information about (a) the nature of the tests; (b) their intended uses; (c) the processes involved in their development; (d) technical information related to scoring, interpretation, and evidence of reliability and validity; (e) scaling and equating; and (f) guidelines for test administration and interpretation, as recommended by the Standards for Educational and Psychological Testing (1999, p. 67). Technical Reports have been developed for the Functional Independence assessments and the Participation/Supported Independence level of assessments.

The following Technical Reports have been developed:

Functional Independence ELA/Mathematics, March 2007

Participation and Supported Independence ELA/Mathematics, June 2007

Participations/Supported Independence/Functional Independence Science, August 2008

Each year, an addendum will be produced to provide the technical quality evidence for the most recent operational administrations of the tests. This is the third annual addendum and includes the Functional Independence ELA, Mathematics, and Science tests administered in the 2008-2009 school year.

As indicated in the full technical reports for MI-Access, the reports are designed to communicate with multiple users, including state policy makers and their staffs, school and district administrators, teachers, and parents and other advocates interested in such documentation. However, the addendums are designed to provide annual technical quality updates for a much smaller audience. The addendums will focus on reliability and validity evidence gathered at the time of test administration, scoring and equating, and reporting.

1. Form Design

The form design of the 2008-2009 operational tests were unchanged from the original 2005-2006 design, as described in the full Technical Report. Tables 1.1 to 1.4 contain the test blueprints. In ELA, 6 forms were developed for each grade level, in Mathematics and Science, 3 forms were developed.

Each form also contained a set of anchor items that were used to facilitate equating to the score scale originally developed in 2005-2006 for ELA and Mathematics, and in 2007-2008 for Science. Anchor items were included among the core items as they counted toward the total score. See Section 3 for the number of anchor items by test and grade.

Table 1.1
Operational Mathematics Test Blueprint Grades 3 to 8

| Strand | Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 |
|---------------------------|---------|---------|---------|---------|---------|---------|
| Numbers and Operations | 10 | 16 | 16 | 18 | 17 | 17 |
| Algebra | | | | | | 2 |
| Measurement | 8 | 8 | 10 | 12 | 12 | 10 |
| Geometry | 9 | 4 | 2 | 2 | 3 | 3 |
| Data and Probability | 3 | 2 | 2 | 3 | 3 | 3 |
| Total Core Items | 30 | 30 | 30 | 35 | 35 | 35 |
| Embedded Field-test Items | 8 | 8 | 8 | 10 | 10 | 10 |
| Total Test Items | 38 | 38 | 38 | 45 | 45 | 45 |

Table 1.2
Operational Mathematics Test Blueprint Grade 11

| Strand | Grade 11 |
|------------------------------------|----------|
| Patterns and Relationships | 4 |
| Geometry and Measurement | 16 |
| Data analysis and Statistics | 2 |
| Number Sense and Numeration | 15 |
| Numerical and Algebraic Operations | 3 |
| Total Core Items | 40 |
| Embedded Field-test Items | 10 |
| Total Test Items | 50 |

Table 1.3
Operational English Language Arts Test Blueprint Grades 3 to 11

| Strand | Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 | Grade 11 |
|---------------------------|---------|---------|---------|---------|---------|---------|----------|
| Word Recognition | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Text Comprehension | | | | | | | |
| Narrative Text | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Informational Text | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Functional Text | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Accessing Print Total | 41 | 41 | 41 | 41 | 41 | 41 | 41 |
| Expressing Ideas Prompt | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Total Core Items | 42 | 42 | 42 | 42 | 42 | 42 | 42 |
| Embedded Field-test Items | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Total Test Items | 54 | 54 | 54 | 54 | 54 | 54 | 54 |

Table 1.4
Operational Science Test Blueprint Grades 5, 8, and 11

| Strand | Grade 5 | Grade 8 | Grade 11 |
|---------------------------|---------|---------|----------|
| Constructing & Reflecting | 4 | 4 | 4 |
| Life Science | 13 | 14 | 14 |
| Physical Science | 12 | 14 | 15 |
| Earth Science | 6 | 8 | 12 |
| Total Core Items | 35 | 40 | 45 |
| Embedded Field Test Items | 8 | 10 | 10 |
| Total Test Items | 43 | 50 | 55 |

2. Participation

Participation in the assessments is monitored by racial/ethnic group and by gender. These two student-level characteristics are also used to evaluate differential item functioning (DIF) when the groups are large enough to support the analysis. These results are reported in Section 8.

Participation counts and percentages by gender and grade are given in Tables 2.1 – 2.4 for ELA, Mathematics, and Science, respectively, and participation counts and percentages by race/ethnicity and grade are given in Tables 2.4 – 2.6. In general, there are twice as many males as females. The largest racial/ethnic group is White students with from 60% to 67% of the students, followed by Black students with from 24% to 31% of the students, Hispanic students with from 3% to 6% of the students, and Asian/Pacific Islanders with about 1% of the students.

Table 2.1
2008-2009 N-Counts and Percents by Gender and Grade for ELA

| | Gender | | | | |
|-------|--------|-------|------|-------|-------|
| Grade | Female | | Male | | Total |
| | N | % | N | % | N |
| 3 | 710 | 31.6% | 1539 | 68.4% | 2249 |
| 4 | 819 | 33.2% | 1650 | 66.8% | 2469 |
| 5 | 861 | 34.2% | 1658 | 65.8% | 2519 |
| 6 | 884 | 35.8% | 1587 | 64.2% | 2471 |
| 7 | 874 | 36.7% | 1508 | 63.3% | 2382 |
| 8 | 837 | 35.5% | 1518 | 64.5% | 2355 |
| 11 | 694 | 37.3% | 1168 | 62.7% | 1862 |

Table 2.2
2008-2009 N-Counts and Percents by Gender and Grade for Mathematics

| | Gender | | | | |
|-------|--------|-------|------|-------|-------|
| Grade | Female | | Male | | Total |
| | N | % | N | % | N |
| 3 | 634 | 33.3% | 1271 | 66.7% | 1905 |
| 4 | 714 | 34.9% | 1330 | 65.1% | 2044 |
| 5 | 813 | 36.7% | 1403 | 63.3% | 2216 |
| 6 | 837 | 37.7% | 1386 | 62.3% | 2223 |
| 7 | 875 | 38.1% | 1422 | 61.9% | 2297 |
| 8 | 855 | 37.0% | 1457 | 63.0% | 2312 |
| 11 | 694 | 37.3% | 1165 | 62.7% | 1859 |

Table 2.3
2008-2009 N-Counts and Percents by Gender and Grade for Science

| Grade | Gender | | | | |
|-------|--------|-------|------|-------|-------|
| | Female | | Male | | Total |
| | N | % | N | % | N |
| 5 | 721 | 35.4% | 1313 | 64.6% | 2034 |
| 8 | 775 | 36.5% | 1351 | 63.5% | 2126 |
| 11 | 692 | 37.3% | 1164 | 62.7% | 1856 |

Table 2.4
2008-2009 N-Counts and Percents by Ethnicity and Grade for ELA

| Grade | American Indian or Alaskan Native | | Asian or Pacific Islander | | Black, Not of Hispanic Origin | | Hispanic | | White, Not of Hispanic Origin | | Multi-racial | | Other | | Unknown | | Total |
|-------|-----------------------------------|------|---------------------------|------|-------------------------------|-------|----------|------|-------------------------------|-------|--------------|------|-------|------|---------|------|-------|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N |
| 3 | 25 | 1.1% | 28 | 1.2% | 540 | 24.0% | 124 | 5.5% | 1503 | 66.8% | 25 | 1.1% | 0 | 0.0% | 4 | 0.2% | 2249 |
| 4 | 40 | 1.6% | 23 | 0.9% | 621 | 25.2% | 105 | 4.3% | 1647 | 66.7% | 30 | 1.2% | 0 | 0.0% | 3 | 0.1% | 2469 |
| 5 | 28 | 1.1% | 24 | 1.0% | 643 | 25.5% | 129 | 5.1% | 1663 | 66.0% | 31 | 1.2% | 0 | 0.0% | 1 | 0.0% | 2519 |
| 6 | 34 | 1.4% | 19 | 0.8% | 677 | 27.4% | 120 | 4.9% | 1600 | 64.8% | 19 | 0.8% | 1 | 0.0% | 1 | 0.0% | 2471 |
| 7 | 18 | 0.8% | 28 | 1.2% | 683 | 28.7% | 116 | 4.9% | 1507 | 63.3% | 27 | 1.1% | 2 | 0.1% | 1 | 0.0% | 2382 |
| 8 | 40 | 1.7% | 23 | 1.0% | 725 | 30.8% | 102 | 4.3% | 1436 | 61.0% | 28 | 1.2% | 0 | 0.0% | 1 | 0.0% | 2355 |
| 11 | 32 | 1.7% | 10 | 0.5% | 530 | 28.5% | 58 | 3.1% | 1220 | 65.5% | 10 | 0.5% | 1 | 0.1% | 1 | 0.1% | 1862 |

Table 2.5
2008-2009 N-Counts and Percents by Ethnicity and Grade for Mathematics

| Grade | American Indian or Alaskan Native | | Asian or Pacific Islander | | Black, Not of Hispanic Origin | | Hispanic | | White, Not of Hispanic Origin | | Multi-racial | | Other | | Unknown | | Total |
|-------|-----------------------------------|------|---------------------------|------|-------------------------------|-------|----------|------|-------------------------------|-------|--------------|------|-------|------|---------|------|-------|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N |
| 3 | 25 | 1.3% | 27 | 1.4% | 489 | 25.7% | 102 | 5.4% | 1237 | 64.9% | 21 | 1.1% | 0 | 0.0% | 4 | 0.2% | 1905 |
| 4 | 34 | 1.7% | 20 | 1.0% | 557 | 27.3% | 86 | 4.2% | 1318 | 64.5% | 27 | 1.3% | 0 | 0.0% | 2 | 0.1% | 2044 |
| 5 | 27 | 1.2% | 23 | 1.0% | 617 | 27.8% | 111 | 5.0% | 1408 | 63.5% | 28 | 1.3% | 0 | 0.0% | 2 | 0.1% | 2216 |
| 6 | 29 | 1.3% | 19 | 0.9% | 643 | 28.9% | 107 | 4.8% | 1406 | 63.2% | 17 | 0.8% | 1 | 0.0% | 1 | 0.0% | 2223 |
| 7 | 15 | 0.7% | 25 | 1.1% | 681 | 29.6% | 106 | 4.6% | 1437 | 62.6% | 30 | 1.3% | 2 | 0.1% | 1 | 0.0% | 2297 |
| 8 | 36 | 1.6% | 22 | 1.0% | 728 | 31.5% | 94 | 4.1% | 1403 | 60.7% | 28 | 1.2% | 0 | 0.0% | 1 | 0.0% | 2312 |
| 11 | 32 | 1.7% | 10 | 0.5% | 531 | 28.6% | 57 | 3.1% | 1217 | 65.5% | 10 | 0.5% | 1 | 0.1% | 1 | 0.1% | 1859 |

Table 2.6
2008-2009 N-Counts and Percents by Ethnicity and Grade for Science

| Grade | American Indian or Alaskan Native | | Asian or Pacific Islander | | Black, Not of Hispanic Origin | | Hispanic | | White, Not of Hispanic Origin | | Multi-racial | | Other | | Unknown | | Total |
|-------|-----------------------------------|------|---------------------------|------|-------------------------------|-------|----------|------|-------------------------------|-------|--------------|------|-------|------|---------|------|-------|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N |
| 5 | 25 | 1.2% | 23 | 1.1% | 580 | 28.5% | 94 | 4.6% | 1285 | 63.2% | 26 | 1.3% | 0 | 0.0% | 1 | 0.0% | 2034 |
| 8 | 32 | 1.5% | 23 | 1.1% | 694 | 32.6% | 85 | 4.0% | 1264 | 59.5% | 27 | 1.3% | 0 | 0.0% | 1 | 0.0% | 2126 |
| 11 | 32 | 1.7% | 10 | 0.5% | 529 | 28.5% | 57 | 3.1% | 1216 | 65.5% | 10 | 0.5% | 1 | 0.1% | 1 | 0.1% | 1856 |

Form Distribution

Recall from Section 1, six forms were developed for ELA and three forms were developed for Mathematics and Science. These forms were distributed to districts and schools according to the guidelines from the Michigan Department of Education, Office of Educational Assessment and Accountability. Except for the four largest districts of Detroit, Dearborn, Grand Rapids, and Utica, the sampling unit was the district. For the four largest districts, the sampling unit was the school. Forms were randomly assigned using stratified random sampling where stratification was based on the enrollment counts provided to Questar. Except for the four largest districts, each district received the same form. For the four largest districts, each school received the same form. One additional condition was imposed on the distribution of forms. Due to cost considerations, only Form 1 was developed for the audio, Braille, and enlarged print accommodations. Hence, all students who required these accommodations were administered Form 1.

The percent of students by various subgroups and form for the 2008-2009 school year are given in the tables below. Each table contains the number of students tested by form at each grade as well as the grade total. At each grade, the percent of students for the various subgroups is given by form as well as for the grade total. The percents for ELA, Mathematics, and Science are given in Tables 2.7, 2.8, and 2.9, respectively. The subgroups consist of gender, three racial/ethnic groups (Black, Hispanic, and White), and three other subgroups (Economically Disadvantaged, English Language Learners or ELL, and Formerly Limited English Proficient or FLEP). As seen from the tables for all three content areas, each form is well represented by the various subgroups. Moreover, for each form at a grade, the percent of students across the subgroups is generally consistent with the percents for the grade population.

Table 2.7
2008-2009 MI-Access Functional Independence - ELA
Percent of Students by Subgroup and Form

| | N | Female | Male | Black | Hispanic | White | Economic Disadv | ELL | FLEP |
|----------------|------|--------|-------|-------|----------|-------|-----------------|------|------|
| Grade 3 | | | | | | | | | |
| All Forms | 2249 | 31.6% | 68.4% | 24.0% | 5.5% | 66.8% | 66.7% | 3.5% | 2.1% |
| Form 1* | 661 | 31.2% | 68.8% | 23.0% | 4.7% | 68.5% | 67.8% | 2.7% | 2.1% |
| Form 2 | 274 | 34.3% | 65.7% | 26.3% | 5.5% | 64.2% | 69.7% | 2.6% | 1.5% |
| Form 3 | 315 | 34.3% | 65.7% | 23.5% | 6.3% | 64.8% | 68.9% | 5.1% | 3.5% |
| Form 4 | 351 | 28.8% | 71.2% | 16.5% | 5.7% | 73.8% | 65.0% | 2.6% | 2.6% |
| Form 5 | 303 | 30.7% | 69.3% | 26.4% | 5.6% | 64.7% | 66.0% | 5.3% | 3.0% |
| Form 6 | 345 | 31.3% | 68.7% | 30.1% | 6.1% | 62.3% | 62.9% | 3.8% | 0.3% |
| Grade 4 | | | | | | | | | |
| All Forms | 2469 | 33.2% | 66.8% | 25.2% | 4.3% | 66.7% | 67.4% | 2.8% | 1.7% |
| Form 1* | 723 | 31.1% | 68.9% | 19.8% | 4.6% | 72.2% | 66.7% | 2.5% | 1.7% |
| Form 2 | 333 | 36.0% | 64.0% | 31.5% | 4.5% | 60.7% | 69.4% | 2.1% | 0.3% |
| Form 3 | 317 | 36.0% | 64.0% | 25.2% | 5.7% | 65.9% | 76.0% | 3.5% | 1.3% |
| Form 4 | 343 | 34.4% | 65.6% | 25.7% | 5.2% | 64.1% | 70.6% | 2.9% | 4.4% |
| Form 5 | 384 | 31.5% | 68.5% | 29.2% | 2.1% | 63.8% | 59.6% | 1.8% | 2.3% |
| Form 6 | 369 | 32.8% | 67.2% | 25.2% | 3.5% | 67.5% | 64.5% | 4.6% | 0.5% |
| Grade 5 | | | | | | | | | |
| All Forms | 2519 | 34.2% | 65.8% | 25.5% | 5.1% | 66.0% | 67.1% | 3.1% | 1.9% |
| Form 1* | 753 | 33.6% | 66.4% | 22.0% | 4.6% | 69.9% | 66.4% | 1.9% | 1.5% |
| Form 2 | 341 | 32.6% | 67.4% | 24.3% | 5.6% | 64.8% | 66.6% | 4.7% | 1.2% |
| Form 3 | 338 | 35.5% | 64.5% | 26.9% | 5.3% | 65.7% | 71.0% | 3.8% | 2.4% |
| Form 4 | 345 | 33.9% | 66.1% | 27.2% | 5.8% | 64.3% | 65.5% | 1.7% | 4.3% |
| Form 5 | 397 | 34.8% | 65.2% | 31.0% | 4.5% | 60.7% | 63.7% | 4.3% | 1.0% |
| Form 6 | 345 | 35.4% | 64.6% | 24.9% | 5.5% | 67.0% | 70.7% | 3.8% | 1.4% |
| Grade 6 | | | | | | | | | |
| All Forms | 2471 | 35.8% | 64.2% | 27.4% | 4.9% | 64.8% | 64.3% | 3.0% | 2.5% |
| Form 1* | 755 | 39.6% | 60.4% | 20.7% | 5.2% | 71.7% | 64.9% | 1.9% | 2.0% |
| Form 2 | 340 | 36.2% | 63.8% | 30.9% | 4.7% | 61.2% | 66.2% | 3.5% | 1.2% |
| Form 3 | 321 | 34.6% | 65.4% | 20.2% | 7.2% | 69.5% | 62.0% | 4.4% | 4.7% |
| Form 4 | 360 | 31.1% | 68.9% | 30.3% | 4.4% | 61.4% | 63.9% | 4.4% | 0.8% |
| Form 5 | 370 | 33.5% | 66.5% | 39.2% | 3.5% | 52.7% | 63.5% | 3.2% | 6.2% |
| Form 6 | 325 | 35.4% | 64.6% | 29.8% | 4.0% | 65.2% | 64.3% | 2.2% | 0.6% |
| Grade 7 | | | | | | | | | |
| All Forms | 2382 | 36.7% | 63.3% | 28.7% | 4.9% | 63.3% | 64.8% | 3.6% | 1.7% |
| Form 1* | 714 | 39.9% | 60.1% | 23.4% | 5.6% | 68.5% | 61.3% | 3.2% | 1.0% |
| Form 2 | 306 | 35.9% | 64.1% | 30.4% | 6.5% | 59.8% | 68.0% | 7.8% | 0.0% |
| Form 3 | 312 | 35.3% | 64.7% | 19.2% | 4.5% | 71.2% | 64.1% | 2.2% | 4.5% |
| Form 4 | 375 | 37.6% | 62.4% | 36.8% | 3.5% | 57.3% | 65.6% | 2.7% | 0.5% |
| Form 5 | 312 | 36.5% | 63.5% | 38.8% | 3.5% | 55.1% | 72.4% | 3.5% | 5.1% |
| Form 6 | 363 | 31.4% | 68.6% | 28.7% | 5.0% | 62.3% | 62.0% | 2.8% | 0.3% |

Table 2.7 (Continued)
2008-2009 MI-Access Functional Independence - ELA
Percent of Students by Subgroup and Form

| | N | Female | Male | Black | Hispanic | White | Economic Disadv | ELL | FLEP |
|-----------|------|--------|-------|-------|----------|-------|-----------------|------|------|
| Grade 8 | | | | | | | | | |
| All Forms | 2355 | 35.5% | 64.5% | 30.8% | 4.3% | 61.0% | 63.6% | 2.5% | 1.5% |
| Form 1* | 698 | 36.2% | 63.8% | 25.9% | 5.0% | 66.3% | 63.6% | 1.4% | 1.1% |
| Form 2 | 327 | 29.4% | 70.6% | 36.1% | 4.0% | 55.7% | 62.7% | 3.1% | 0.0% |
| Form 3 | 320 | 38.4% | 61.6% | 17.2% | 4.7% | 72.2% | 57.2% | 1.6% | 4.4% |
| Form 4 | 362 | 36.7% | 63.3% | 36.2% | 5.2% | 54.7% | 65.7% | 3.9% | 1.4% |
| Form 5 | 311 | 36.7% | 63.3% | 43.4% | 4.5% | 49.2% | 70.1% | 4.8% | 2.3% |
| Form 6 | 337 | 35.0% | 65.0% | 31.2% | 1.8% | 62.0% | 62.0% | 1.8% | 0.6% |
| Grade 11 | | | | | | | | | |
| All Forms | 1862 | 37.3% | 62.7% | 28.5% | 3.1% | 65.5% | 59.3% | 1.1% | 0.4% |
| Form 1* | 618 | 35.9% | 64.1% | 26.5% | 3.9% | 67.8% | 57.1% | 1.1% | 0.5% |
| Form 2 | 259 | 42.5% | 57.5% | 24.7% | 3.9% | 66.4% | 57.9% | 1.5% | 0.0% |
| Form 3 | 235 | 34.9% | 65.1% | 25.5% | 2.1% | 67.7% | 64.3% | 0.4% | 0.9% |
| Form 4 | 245 | 39.6% | 60.4% | 29.0% | 1.6% | 66.5% | 55.5% | 0.4% | 0.8% |
| Form 5 | 257 | 33.5% | 66.5% | 31.1% | 2.7% | 62.3% | 59.9% | 2.3% | 0.0% |
| Form 6 | 248 | 39.1% | 60.9% | 36.7% | 3.2% | 59.3% | 64.9% | 0.8% | 0.4% |

*Form 1 is administered to all students who require the audio, braille, or enlarged print accommodation. Across all grades, the number of students tested with these accommodations ranges from 215 to 350.

Table 2.8
2008-2009 MI-Access Functional Independence - Mathematics
Percent of Students by Subgroup and Form

| | N | Female | Male | Black | Hispanic | White | Economic Disadv | ELL | FLEP |
|-----------------|------|--------|-------|-------|----------|-------|-----------------|------|------|
| Grade 3 | | | | | | | | | |
| All Forms | 1905 | 33.3% | 66.7% | 25.7% | 5.4% | 64.9% | 66.6% | 3.3% | 1.9% |
| Form 1* | 788 | 35.7% | 64.3% | 22.6% | 5.2% | 67.5% | 66.6% | 2.0% | 1.5% |
| Form 2 | 537 | 31.7% | 68.3% | 27.2% | 4.5% | 63.9% | 64.1% | 4.5% | 1.3% |
| Form 3 | 580 | 31.6% | 68.4% | 28.4% | 6.4% | 62.4% | 68.8% | 4.0% | 3.1% |
| Grade 4 | | | | | | | | | |
| All Forms | 2044 | 34.9% | 65.1% | 27.3% | 4.2% | 64.5% | 68.2% | 2.7% | 1.9% |
| Form 1* | 861 | 35.2% | 64.8% | 24.3% | 3.5% | 68.4% | 66.3% | 1.7% | 1.4% |
| Form 2 | 584 | 33.4% | 66.6% | 25.7% | 4.1% | 65.9% | 69.2% | 3.4% | 3.8% |
| Form 3 | 599 | 36.1% | 63.9% | 33.1% | 5.3% | 57.4% | 70.1% | 3.3% | 0.7% |
| Grade 5 | | | | | | | | | |
| All Forms | 2216 | 36.7% | 63.3% | 27.8% | 5.0% | 63.5% | 67.3% | 3.1% | 1.9% |
| Form 1* | 1023 | 37.1% | 62.9% | 24.9% | 5.3% | 66.6% | 64.8% | 3.4% | 1.9% |
| Form 2 | 588 | 35.5% | 64.5% | 30.8% | 4.4% | 61.2% | 72.3% | 2.7% | 1.5% |
| Form 3 | 605 | 37.0% | 63.0% | 29.9% | 5.1% | 60.7% | 66.8% | 3.0% | 2.3% |
| Grade 6 | | | | | | | | | |
| All Forms | 2223 | 37.7% | 62.3% | 28.9% | 4.8% | 63.2% | 64.7% | 3.1% | 2.7% |
| Form 1* | 1087 | 39.7% | 60.3% | 26.7% | 4.1% | 66.5% | 63.4% | 2.0% | 2.7% |
| Form 2 | 581 | 37.7% | 62.3% | 28.9% | 5.9% | 60.8% | 66.4% | 4.6% | 1.7% |
| Form 3 | 555 | 33.5% | 66.5% | 33.3% | 5.0% | 59.5% | 65.6% | 3.4% | 3.8% |
| Grade 7 | | | | | | | | | |
| All Forms | 2297 | 38.1% | 61.9% | 29.6% | 4.6% | 62.6% | 65.2% | 3.4% | 1.8% |
| Form 1* | 1017 | 38.7% | 61.3% | 28.9% | 4.8% | 63.8% | 62.3% | 3.4% | 1.7% |
| Form 2 | 656 | 39.0% | 61.0% | 30.5% | 2.6% | 63.6% | 66.3% | 3.0% | 1.2% |
| Form 3 | 624 | 36.1% | 63.9% | 30.0% | 6.4% | 59.5% | 68.6% | 3.7% | 2.6% |
| Grade 8 | | | | | | | | | |
| All Forms | 2312 | 37.0% | 63.0% | 31.5% | 4.1% | 60.7% | 63.6% | 2.6% | 1.5% |
| Form 1* | 1011 | 36.5% | 63.5% | 30.2% | 4.5% | 62.2% | 63.1% | 2.1% | 0.9% |
| Form 2 | 693 | 36.4% | 63.6% | 36.5% | 2.6% | 56.1% | 65.2% | 1.6% | 1.4% |
| Form 3 | 608 | 38.5% | 61.5% | 28.0% | 4.9% | 63.3% | 62.5% | 4.4% | 2.5% |
| Grade 11 | | | | | | | | | |
| All Forms | 1859 | 37.3% | 62.7% | 28.6% | 3.1% | 65.5% | 59.4% | 1.1% | 0.4% |
| Form 1* | 859 | 35.3% | 64.7% | 30.7% | 3.0% | 63.8% | 59.5% | 1.2% | 0.5% |
| Form 2 | 500 | 39.6% | 60.4% | 32.2% | 2.8% | 61.4% | 60.6% | 1.2% | 0.2% |
| Form 3 | 500 | 38.6% | 61.4% | 21.2% | 3.4% | 72.4% | 58.0% | 1.0% | 0.6% |

*Form 1 is administered to all students who require the audio, braille, or enlarged print accommodation. Across all grades, the number of students tested with these accommodations ranges from 167 to 321.

Table 2.9
2008-2009 MI-Access Functional Independence - Science
Percent of Students by Subgroup and Form

| | N | Female | Male | Black | Hispanic | White | Economic Disadv | ELL | FLEP |
|-----------|------|--------|-------|-------|----------|-------|-----------------|------|------|
| Grade 5 | | | | | | | | | |
| All Forms | 2034 | 35.4% | 64.6% | 28.5% | 4.6% | 63.2% | 67.1% | 3.1% | 2.0% |
| Form 1* | 906 | 32.3% | 67.7% | 31.3% | 5.1% | 59.3% | 68.2% | 2.1% | 2.1% |
| Form 2 | 586 | 36.0% | 64.0% | 31.4% | 4.3% | 60.8% | 67.1% | 4.1% | 2.0% |
| Form 3 | 542 | 40.0% | 60.0% | 20.7% | 4.2% | 72.3% | 65.3% | 3.7% | 1.8% |
| Grade 8 | | | | | | | | | |
| All Forms | 2126 | 36.5% | 63.5% | 32.6% | 4.0% | 59.5% | 63.8% | 2.6% | 1.6% |
| Form 1* | 980 | 35.9% | 64.1% | 28.4% | 3.8% | 64.4% | 63.8% | 2.0% | 1.2% |
| Form 2 | 589 | 36.7% | 63.3% | 41.4% | 4.2% | 50.9% | 65.7% | 2.4% | 1.7% |
| Form 3 | 557 | 37.2% | 62.8% | 30.9% | 4.1% | 59.8% | 61.8% | 3.9% | 2.2% |
| Grade 11 | | | | | | | | | |
| All Forms | 1856 | 37.3% | 62.7% | 28.5% | 3.1% | 65.5% | 59.3% | 1.1% | 0.4% |
| Form 1* | 867 | 35.1% | 64.9% | 25.7% | 3.7% | 67.1% | 57.9% | 0.9% | 0.5% |
| Form 2 | 481 | 35.3% | 64.7% | 31.6% | 3.3% | 62.8% | 61.3% | 1.9% | 0.4% |
| Form 3 | 508 | 42.9% | 57.1% | 30.3% | 1.8% | 65.4% | 59.6% | 0.8% | 0.4% |

*Form 1 is administered to all students who require the audio, braille, or enlarged print accommodation. Across all grades, the number of students tested with these accommodations ranges from 215 to 350.

3. Item Analysis to Facilitate Equating

New secure forms must continually be constructed for future test administrations. The test forms are equated so as to convert the raw scores obtained from two forms of the test so that the scores derived from the two forms after conversion will be directly equivalent. Different forms of the test are designed to have comparable item content and similar distributions of item statistics based on field testing. The equating adjusts for unintended differences in difficulty of the forms. The equating adjusts raw test scores from different forms to a common scale so that identical scale scores earned this year and last year reflect the same level of student achievement, even though the corresponding raw scores may differ.

Equating of the MI-Access Functional Independence ELA, Mathematics, and Science assessments was done using a common item or anchor test design. The description of equating is based on the Fall 2007 and Fall 2008 forms for grades 3 - 8 and the Spring 2008 and Spring 2009 forms for grade 11, but applies to all future forms. Anchor items are the same, identical items that appeared in both the 2007 school year form and in the 2008 school year form. For each assessment at each grade, at least 20% of the items were in common between the two forms. The anchor items were used to develop a linking constant that places the Rasch item difficulties from the 2008 school year form on the same logit scale as the 2007 school year form. The linking constant is computed as the difference between the average Rasch difficulty for the anchor items from the 2007 school year form's Winsteps analysis, minus the average Rasch difficulty from the 2008 school year form's Winsteps analysis. In mathematics and science, linking constants are computed in each grade that the assessment is administered (grades 3-8 and 11 for mathematics and grades 5, 8, and 11 for science). In ELA, linking constants are computed in four grade bands (grade 3, grades 4-5, grades 6-8, and grade 11) since the core and anchor items administered in these grade bands are identical across forms.

Adding this linking constant to the Rasch difficulties for each of the items in the 2008 school year form places all of the 2008 school year form's Rasch difficulties (and log ability estimates) on the same Rasch logit scale as the 2007 school year form. Then previous years' linking constants are added to the current year's linking constant to place the 2008 school year form's Rasch log ability scale on the original 2005 scale. Recall that scale scores were developed for each assessment at each grade in the first year by setting the attained cut score to a pre-specified value and the standard deviation to 25. This includes separate scale score transformations at each grade in ELA since unique cut scores are defined at each grade. The same linear transformation that was developed in the first year for each assessment at each grade was then applied to the equated Rasch log ability scale for the 2008 school year form to yield equated scale scores.

Since equating involves comparing the Rasch difficulties for the anchor items from the 2008 school year form with those from the 2007 school year form, a plot of those difficulties provides information about the quality of the equating. The plot of the 2008 school year Rasch difficulties versus the 2007 school year Rasch difficulties for the anchor items for each assessment at each grade is given in Appendix A. The number of plotted points for an assessment ranges from 8 to 11 depending on the grade and content area. Also shown in each plot is the 45-degree straight line that passes through the mean of the 2008 school year Rasch difficulties and the mean of the 2007 school year Rasch difficulties.

The plots show that the Rasch difficulties fall along this 45-degree line as the model requires. Of course, not all points are on or right next to the line due to the inherent error that is in all measurement. Across the 14 assessments, grade 7 Mathematics shows the greatest dispersion of points from the line. The point for one item is quite noticeably further from the line than any of the other points on this test or any of the other 13 tests. In addition, the displacement value for this item is greater than the criterion of .5 logits given in the Winsteps manual for deleting an item as an anchor item (Linacre, 2006). This outlier item, therefore, was dropped as an anchor item, and the linking constant was then computed on the remaining 8 items.

Another way to evaluate the plots is to compute the correlation coefficient between the 2008 Rasch difficulties and the 2007 Rasch difficulties. The correlation coefficient (r) is given in the upper right-hand corner of each plot. Across all fourteen 2008-2009 assessments, the correlations ranged from .946 to .998 with a median correlation of .988. These correlations are as close to 1 as can practically be expected. As noted in the plot for grade 7 Mathematics, the original correlation with all 9 anchor items is .911, but when the outlier item was dropped the correlation increased noticeably to .966.

Equating involved only the core, operational items on each content area and grade level test. Following the equating, the field test items for each test were calibrated using a concurrent, anchor design. For each test, the core items plus the field test items across all forms were calibrated together in a single Winsteps run by fixing or anchoring the core items to the Rasch values obtained during equating. This single run placed all field test items on the same scale as the core, operational items.

The Test Characteristic Curve (TCC) and Standard Error Curve (SEC) for each assessment at each grade are given in Appendix B. The raw score cuts are denoted in each TCC and the scale scores associated with the raw score cuts are denoted in each SEC.

4. Score Reliability & Summary Statistics

Score reliability is estimated by Cronbach's Coefficient Alpha using item raw score data in SPSS and by the model reliability estimated by the Rasch modeling in Winsteps version 3.67.0 (Linacre, 2006). Raw score and scale score summary statistics are also presented in Table 4.1 for all assessments.

Table 4.1
Score Reliability and Summary Statistics by Grade

| | Grade Level | | | | | | |
|-------------------|-------------|------|------|------|------|------|------|
| ELA | 3 | 4 | 5 | 6 | 7 | 8 | 11 |
| Model Reliability | .85 | .86 | .85 | .86 | .85 | .83 | .81 |
| Cronbach's Alpha | .89 | .89 | .88 | .90 | .90 | .90 | .91 |
| Raw Score Mean | 32.5 | 30.3 | 32.6 | 31.2 | 32.5 | 34.3 | 36.2 |
| Raw Score SD | 8.0 | 8.3 | 8.1 | 8.6 | 8.4 | 7.9 | 7.9 |
| Raw Score Max | 45 | 45 | 45 | 45 | 45 | 45 | 45 |
| Raw Score Min | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Scale Score Mean | 2320 | 2420 | 2521 | 2626 | 2725 | 2829 | 3132 |
| Scale Score SD | 24.3 | 23.2 | 24.3 | 23.3 | 22.5 | 22.5 | 27.4 |

| | Grade Level | | | | | | |
|-------------------|-------------|------|------|------|------|------|------|
| Mathematics | 3 | 4 | 5 | 6 | 7 | 8 | 11 |
| Model Reliability | .76 | .75 | .77 | .79 | .82 | .79 | .85 |
| Cronbach's Alpha | .82 | .81 | .83 | .85 | .85 | .79 | .86 |
| Raw Score Mean | 22.4 | 22.2 | 21.2 | 25.7 | 23.7 | 21.2 | 26.1 |
| Raw Score SD | 5.0 | 4.8 | 5.4 | 6.1 | 6.4 | 5.6 | 6.9 |
| Raw Score Max | 30 | 30 | 30 | 35 | 35 | 35 | 40 |
| Raw Score Min | 5 | 4 | 3 | 3 | 0 | 2 | 6 |
| Scale Score Mean | 2318 | 2420 | 2516 | 2618 | 2714 | 2815 | 3113 |
| Scale Score SD | 23.5 | 21.8 | 23.2 | 21.9 | 23.3 | 17.7 | 25.0 |

| | Grade Level | | | | | | |
|-------------------|-------------|--|------|--|--|------|------|
| Science | | | 5 | | | 8 | 11 |
| Model Reliability | | | .80 | | | .78 | .79 |
| Cronbach's Alpha | | | .81 | | | .78 | .78 |
| Raw Score Mean | | | 22.7 | | | 24.0 | 23.6 |
| Raw Score SD | | | 5.7 | | | 6.0 | 6.6 |
| Raw Score Max | | | 35 | | | 40 | 43 |
| Raw Score Min | | | 4 | | | 6 | 4 |
| Scale Score Mean | | | 2505 | | | 2799 | 3112 |
| Scale Score SD | | | 29.2 | | | 28.9 | 24.9 |

5. Rater Consistency of ELA Expressing Ideas Prompt Scores

The writing prompt responses are scored by human raters. In grades 3 – 8 and 11, 17% to 20% of the core EI prompts were scored by two raters. Across the grades, the percent perfect agreement for the operational prompt scores ranges from 75% to 85% with a median of 80%. In grades 3 – 8 and 11, 16% to 20% of the field-test EI prompts were double-scored. For the field-test prompt scores, the percent perfect agreement across all grades ranges from 76% to 87% with a median of 80%. As seen in Tables 5.1 and 5.2, differences of more than one point occur infrequently.

Table 5.1

Interrater Agreement Rates for Operational Expressing Ideas Prompt Scores by Grade

| Grade | Perfect Agreement | | 1 Point Difference | | More than 1 Point Difference | |
|-------|-------------------|------|--------------------|------|------------------------------|----|
| | N | % | N | % | N | % |
| 3 | 356 | 82.4 | 73 | 16.9 | 3 | .7 |
| 4 | 402 | 83.2 | 81 | 16.8 | | |
| 5 | 368 | 78.3 | 100 | 21.3 | 2 | .4 |
| 6 | 362 | 79.6 | 93 | 20.4 | | |
| 7 | 319 | 78.6 | 84 | 20.7 | 3 | .7 |
| 8 | 356 | 75.4 | 112 | 23.7 | 4 | .8 |
| 11 | 292 | 85.1 | 51 | 14.9 | | |

Table 5.2

Interrater Agreement Rates for Field Test Expressing Ideas Prompt Scores by Grade

| Grade | Perfect Agreement | | 1 Point Difference | | More than 1 Point Difference | |
|-------|-------------------|------|--------------------|------|------------------------------|-----|
| | N | % | N | % | N | % |
| 3 | 383 | 86.7 | 59 | 13.3 | | |
| 4 | 411 | 83.7 | 79 | 16.1 | 1 | .2 |
| 5 | 391 | 82.5 | 81 | 17.1 | 2 | .4 |
| 6 | 350 | 79.7 | 87 | 19.8 | 2 | .5 |
| 7 | 295 | 78.2 | 79 | 20.9 | 3 | .8 |
| 8 | 350 | 76.6 | 100 | 21.9 | 7 | 1.5 |
| 11 | 246 | 76.2 | 76 | 23.5 | 1 | .3 |

6. Conditional Standard Error of Measurement at Cut-Points

The conditional standard error of measurement is estimated in the raw-score to scale-score conversion table after equating. These estimates are based on the ratio of raw-score and scale-score standard deviations to scale the conditional SEM associated with each theta as estimated by the Rasch model in Winsteps. See Appendix B for the plot of all conditional standard errors for each assessment, the standard error curve. The scale score cuts denoted in each assessment's standard error curve are at the first raw score with a scale score equal to or greater than the scale score cuts given in Table 6.1.

Table 6.1
Conditional Standard Error of Measurement of Cut-Points by Subject and Grade

| Grade | Attained | | Surpassed | |
|-------------|-------------|-----------------|-------------|-----------------|
| | Scale Score | Conditional SEM | Scale Score | Conditional SEM |
| ELA | | | | |
| 3 | 2300 | 6 | 2315 | 7 |
| 4 | 2400 | 6 | 2415 | 7 |
| 5 | 2500 | 6 | 2511 | 7 |
| 6 | 2600 | 6 | 2614 | 6 |
| 7 | 2700 | 6 | 2713 | 6 |
| 8 | 2800 | 5 | 2820 | 6 |
| 11 | 3100 | 6 | 3129 | 8 |
| Mathematics | | | | |
| 3 | 2300 | 8 | 2314 | 9 |
| 4 | 2400 | 7 | 2417 | 8 |
| 5 | 2500 | 8 | 2515 | 8 |
| 6 | 2600 | 7 | 2617 | 8 |
| 7 | 2700 | 7 | 2714 | 8 |
| 8 | 2800 | 7 | 2817 | 7 |
| 11 | 3100 | 8 | 3135 | 10 |
| Science | | | | |
| 5 | 2500 | 11 | 2517 | 13 |
| 8 | 2800 | 12 | 2816 | 13 |
| 11 | 3100 | 11 | 3122 | 11 |

7. Classification Accuracy and Consistency

Classification accuracy and consistency are indices of agreement for performance-level classification as a score. Classification accuracy is a way to estimate the difference between true classification and observed classification due to measurement error. Classification consistency is a way to estimate the difference between the observed classification and the classification on a parallel form. The MI-Access Functional Independence classification accuracy and consistency indices were calculated by applying procedures given in Livingston and Lewis (1995) via the BB-CLASS computer program (Brennan, 2004). These indices are presented in the following table, Table 7.1. The accuracy indices can be interpreted as the proportion of examinees that would be classified accurately into the performance-level score categories given infinite replications of identical conditions. The consistency indices can be interpreted as the proportion of examinees that would be classified into the same performance-level score categories on the assessment and a parallel form of the assessment.

Table 7.1
Estimated Classification Accuracy and Consistency by Subject and Grade

| Grade | 2 Categories Emerging vs Attained plus Surpassed | | 3 Categories Emerging vs Attained vs Surpassed | |
|--------------------|---|-------------|--|-------------|
| | Accuracy | Consistency | Accuracy | Consistency |
| ELA | | | | |
| 3 | 0.94 | 0.92 | 0.85 | 0.79 |
| 4 | 0.94 | 0.91 | 0.84 | 0.77 |
| 5 | 0.94 | 0.92 | 0.86 | 0.81 |
| 6 | 0.95 | 0.93 | 0.87 | 0.82 |
| 7 | 0.96 | 0.94 | 0.89 | 0.85 |
| 8 | 0.97 | 0.95 | 0.88 | 0.83 |
| 11 | 0.97 | 0.96 | 0.88 | 0.83 |
| Mathematics | | | | |
| 3 | 0.91 | 0.87 | 0.76 | 0.68 |
| 4 | 0.93 | 0.90 | 0.79 | 0.72 |
| 5 | 0.90 | 0.86 | 0.79 | 0.72 |
| 6 | 0.93 | 0.90 | 0.81 | 0.73 |
| 7 | 0.90 | 0.86 | 0.80 | 0.73 |
| 8 | 0.90 | 0.85 | 0.78 | 0.69 |
| 11 | 0.97 | 0.95 | 0.83 | 0.76 |
| Science | | | | |
| 5 | 0.88 | 0.83 | 0.76 | 0.69 |
| 8 | 0.86 | 0.81 | 0.76 | 0.69 |
| 11 | 0.89 | 0.85 | 0.80 | 0.72 |

The classification accuracy when categorizing students into the NCLB categories of proficient (attained + surpassed) and not proficient (emerging), is at least 90% for ELA and Mathematics, and the classification consistency is at least 85%. For Science, the accuracy and consistency indices are somewhat smaller. Across all grades and the three content areas, the classification accuracy when categorizing students into three categories (emerging, attained, and surpassed) is 76% or higher and the classification consistency is 68% or higher. The 76% and 68% are for the shortest tests with the lowest reliability where a three category classification would have the greatest effect on the agreement indices. The accuracy indices will be higher than the consistency indices because the former estimates accuracy between observed scores containing measurement error and true scores with no error, whereas the latter estimates accuracy between observed scores on parallel forms of the assessment where both scores contain measurement error.

These estimates represent strong proportions of students classified accurately for an assessment of the length appropriate for students with disabilities such as those that take the MI-Access Functional Independence assessments.

8. Differential Item Functioning of Field-Test Items

Differential Item Functioning (DIF) is assessed through a Mantel-Haenzel statistic estimated in Winsteps. The item is identified for potential DIF based on the associated p-value (where p-value < 0.05).

A summary of DIF results is reported in Table 8.1. Across the grades, 5% of the Science items, 10% of the ELA items, and 15% of the Mathematics items were statistically flagged for potential gender DIF. Across the grades, 10% of the ELA items, 12% of the Mathematics items, and 25% of the Science items were statistically flagged for potential black/white DIF. The statistically flagged items were noted as such, and special attention was given to them during the review process by the Sensitivity Review Committee.

Table 8.1
Field Test DIF Summary by Grade

| | Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 | Grade 11 |
|----------------------------|---------|---------|---------|---------|---------|---------|----------|
| Mathematics 3 Forms | | | | | | | |
| Total number of items | 47 | 53 | 54 | 65 | 58 | 65 | 70 |
| Field-Test Items | 17 | 23 | 24 | 30 | 23 | 30 | 30 |
| Statistically Flagged for | | | | | | | |
| Gender DIF | 3 | 3 | 2 | 6 | 2 | 8 | 3 |
| Black/White DIF | 1 | 5 | 2 | 0 | 5 | 4 | 5 |
| ELA 6 Forms | | | | | | | |
| Total number of items | 79 | 80 | 80 | 69 | 69 | 69 | 99 |
| Field-Test Items | 37 | 38 | 38 | 27 | 27 | 27 | 57 |
| Statistically Flagged for | | | | | | | |
| Gender DIF | 3 | 2 | 2 | 4 | 4 | 4 | 5 |
| Black/White DIF | 4 | 4 | 4 | 2 | 2 | 2 | 6 |
| Science 3 Forms | | | | | | | |
| Total number of items | | | 47 | | | 57 | 75 |
| Field-Test Items | | | 12 | | | 17 | 30 |
| Statistically Flagged for | | | | | | | |
| Gender DIF | | | 1 | | | 1 | 1 |
| Black/White DIF | | | 4 | | | 7 | 4 |

9. Interrelations Among Strands within Measures

One important source of validity evidence is the consistency of the relations of test subcomponents – interrelations among strands within the test. The correlations were computed based on subscore raw scores and estimated as Pearson correlations in SPSS.

The correlation between multiple choice (Accessing Print) and constructed response (Expressing Ideas) scores by grade is given in Table 9.1. Across the grades, the correlation ranges from .33 to .39. Table 9.2 contains mean Accessing Print scores for each possible Expressing Ideas score, where Accessing Print scores increase consistently as Expressing Ideas scores increase from 1 to 4. Expressing Ideas scores of 0 are difficult to interpret in a consistent way since this score results from a number of alternative non-scorable responses or condition codes. Table 9.3 contains the ELA strand Pearson product-moment intercorrelations by grade. Across the grades, the three types of passages are typically correlated among each other in the .50s. They are each correlated very highly with text comprehension, but this is not surprising since text comprehension consists of the three passages. Expressing Ideas is typically correlated in the .20s with each of the passage types and with Word Recognition. These are moderately high correlations given the maximum score is only four for Expressing Ideas. The correlation between Word Recognition and Text Comprehension is in the very high .40s to mid .50s except at grade 3 where it is .40 and at grade 11 where it is .68. Table 9.4 contains the Mathematics strand Pearson product-moment intercorrelations for grades 3 to 8, and Table 9.5 contains the intercorrelations for grade 11. Across the grades, the intercorrelations among Mathematics strands are typically high, in the .40s or higher. The lower correlations are associated with stands with only two or three items. Table 9.6 contains the Science strand Pearson product-moment intercorrelations. Typically, these intercorrelations are in the .40s and .50s.

The N, mean, standard deviation, and Cronbach's Coefficient Alpha along with the minimum and maximum score of the strand scores are also provided. These summary statistics are given in Table 9.7 for ELA, in Table 9.8 for Mathematics, and in Table 9.9 for Science.

Table 9.1
Correlations between Multiple Choice (Accessing Print) and Constructed Response (Expressing Ideas) Scores by Grade

| Grade | N | Correlation |
|-------|------|-------------|
| 3 | 2249 | .36 |
| 4 | 2469 | .33 |
| 5 | 2519 | .38 |
| 6 | 2471 | .37 |
| 7 | 2382 | .39 |
| 8 | 2355 | .33 |
| 11 | 1862 | .39 |

Table 9.2
Mean Accessing Print Score by Expressing Ideas Prompt Score

| Grade | Expressing Ideas Score | N | Accessing Print | |
|-------|------------------------|------|-----------------|--------------------|
| | | | Mean | Standard Deviation |
| 3 | 0 | 138 | 25.5 | 9.6 |
| | 1 | 538 | 26.8 | 7.8 |
| | 2 | 998 | 31.6 | 6.7 |
| | 3 | 478 | 33.4 | 6.6 |
| | 4 | 97 | 35.2 | 5.0 |
| 4 | 0 | 133 | 24.0 | 10.6 |
| | 1 | 560 | 24.5 | 7.8 |
| | 2 | 1153 | 28.8 | 7.4 |
| | 3 | 527 | 31.6 | 6.6 |
| | 4 | 96 | 32.9 | 5.9 |
| 5 | 0 | 128 | 25.0 | 9.6 |
| | 1 | 470 | 25.8 | 8.3 |
| | 2 | 1052 | 30.6 | 7.1 |
| | 3 | 728 | 33.3 | 6.0 |
| | 4 | 141 | 35.2 | 4.3 |
| 6 | 0 | 137 | 23.7 | 9.8 |
| | 1 | 375 | 23.9 | 8.2 |
| | 2 | 1007 | 28.8 | 7.7 |
| | 3 | 791 | 31.7 | 6.9 |
| | 4 | 161 | 34.1 | 5.2 |
| 7 | 0 | 184 | 25.0 | 10.0 |
| | 1 | 297 | 25.3 | 8.1 |
| | 2 | 890 | 29.6 | 7.3 |
| | 3 | 790 | 32.7 | 6.5 |
| | 4 | 221 | 35.4 | 5.3 |
| 8 | 0 | 133 | 27.6 | 9.9 |
| | 1 | 209 | 26.7 | 8.4 |
| | 2 | 889 | 30.8 | 7.4 |
| | 3 | 841 | 33.6 | 6.4 |
| | 4 | 283 | 35.9 | 5.6 |
| 11 | 0 | 134 | 29.0 | 10.5 |
| | 1 | 87 | 25.7 | 9.5 |
| | 2 | 563 | 31.7 | 7.6 |
| | 3 | 647 | 34.8 | 6.1 |
| | 4 | 431 | 37.3 | 4.2 |

Table 9.3
ELA Strand Pearson Product-Moment Intercorrelations by Grade

| | Informational Passage | Narrative Passage | Functional Passage | Expressing Ideas | Word Recognition |
|--------------------|--------------------------|----------------------|-----------------------|---------------------|---------------------|
| Grade 3 | | | | | |
| Narrative Passage | 0.56 | | | | |
| Functional Passage | 0.54 | 0.67 | | | |
| Expressing Ideas | 0.22 | 0.23 | 0.24 | | |
| Word Recognition | 0.38 | 0.33 | 0.32 | 0.29 | |
| Text Comprehension | 0.82 | 0.88 | 0.86 | 0.27 | 0.40 |
| Grade 4 | | | | | |
| Narrative Passage | 0.51 | | | | |
| Functional Passage | 0.47 | 0.54 | | | |
| Expressing Ideas | 0.16 | 0.23 | 0.21 | | |
| Word Recognition | 0.34 | 0.48 | 0.44 | 0.32 | |
| Text Comprehension | 0.80 | 0.84 | 0.82 | 0.25 | 0.51 |
| Grade 5 | | | | | |
| Narrative Passage | 0.53 | | | | |
| Functional Passage | 0.49 | 0.58 | | | |
| Expressing Ideas | 0.20 | 0.28 | 0.24 | | |
| Word Recognition | 0.34 | 0.47 | 0.43 | 0.34 | |
| Text Comprehension | 0.81 | 0.84 | 0.84 | 0.29 | 0.50 |
| Grade 6 | | | | | |
| Narrative Passage | 0.52 | | | | |
| Functional Passage | 0.51 | 0.55 | | | |
| Expressing Ideas | 0.24 | 0.26 | 0.28 | | |
| Word Recognition | 0.44 | 0.52 | 0.48 | 0.32 | |
| Text Comprehension | 0.82 | 0.84 | 0.83 | 0.31 | 0.58 |
| Grade 7 | | | | | |
| Narrative Passage | 0.51 | | | | |
| Functional Passage | 0.51 | 0.55 | | | |
| Expressing Ideas | 0.25 | 0.27 | 0.28 | | |
| Word Recognition | 0.41 | 0.53 | 0.48 | 0.34 | |
| Text Comprehension | 0.82 | 0.84 | 0.83 | 0.32 | 0.58 |
| Grade 8 | | | | | |
| Narrative Passage | 0.52 | | | | |
| Functional Passage | 0.51 | 0.55 | | | |
| Expressing Ideas | 0.25 | 0.25 | 0.26 | | |
| Word Recognition | 0.42 | 0.52 | 0.48 | 0.28 | |
| Text Comprehension | 0.82 | 0.83 | 0.83 | 0.31 | 0.58 |
| Grade 11 | | | | | |
| Narrative Passage | 0.54 | | | | |
| Functional Passage | 0.58 | 0.63 | | | |
| Expressing Ideas | 0.29 | 0.30 | 0.30 | | |
| Word Recognition | 0.57 | 0.60 | 0.56 | 0.35 | |
| Text Comprehension | 0.83 | 0.85 | 0.87 | 0.35 | 0.68 |

Table 9.4
Mathematics Strand Pearson Product-Moment Intercorrelations for Grades 3 - 8

| | Numbers & Operations | Measurement | Geometry | Data & Probability |
|--------------------|----------------------|-------------|----------|--------------------|
| Grade 3 | | | | |
| Measurement | 0.56 | | | |
| Geometry | 0.55 | 0.57 | | |
| Data & Probability | 0.37 | 0.33 | 0.36 | |
| Grade 4 | | | | |
| Measurement | 0.59 | | | |
| Geometry | 0.49 | 0.43 | | |
| Data & Probability | 0.39 | 0.27 | 0.30 | |
| Grade 5 | | | | |
| Measurement | 0.66 | | | |
| Geometry | 0.28 | 0.28 | | |
| Data & Probability | 0.40 | 0.35 | 0.21 | |
| Grade 6 | | | | |
| Measurement | 0.66 | | | |
| Geometry | 0.40 | 0.45 | | |
| Data & Probability | 0.46 | 0.44 | 0.30 | |
| Grade 7 | | | | |
| Measurement | 0.67 | | | |
| Geometry | 0.36 | 0.37 | | |
| Data & Probability | 0.61 | 0.54 | 0.29 | |
| Grade 8 | | | | |
| Measurement | 0.54 | | | |
| Geometry | 0.41 | 0.35 | | |
| Data & Probability | 0.32 | 0.29 | 0.25 | |
| Algebra | 0.35 | 0.28 | 0.16 | 0.18 |

Table 9.5
Mathematics Strand Pearson Product-Moment Intercorrelations for Grade 11

| | Patterns & Relationships | Geometry & Measurement | Data & Probability |
|------------------------|--------------------------|------------------------|--------------------|
| Grade 11 | | | |
| Geometry & Measurement | 0.57 | | |
| Data & Probability | 0.37 | 0.47 | |
| Numbers & Operations | 0.48 | 0.63 | 0.44 |

Table 9.6
Science Strand Pearson Product-Moment Intercorrelations

| | Constructing & Reflecting | Life Science | Physical Science |
|------------------|---------------------------|--------------|------------------|
| Grade 5 | | | |
| Life Science | 0.47 | | |
| Physical Science | 0.42 | 0.53 | |
| Earth Science | 0.47 | 0.55 | 0.50 |
| Grade 8 | | | |
| Life Science | 0.37 | | |
| Physical Science | 0.43 | 0.53 | |
| Earth Science | 0.39 | 0.43 | 0.50 |
| Grade 11 | | | |
| Life Science | 0.39 | | |
| Physical Science | 0.34 | 0.43 | |
| Earth Science | 0.41 | 0.46 | 0.47 |

Table 9.7
ELA Strand Summary Statistics

| | N | Minimum Score | Maximum Score | Mean | Standard Deviation | Cronbach's Alpha |
|-----------------------|------|---------------|---------------|-------|--------------------|------------------|
| Grade 3 | | | | | | |
| Informational Passage | 2249 | 0 | 7 | 4.39 | 1.91 | 0.65 |
| Narrative Passage | 2249 | 0 | 7 | 5.09 | 2.00 | 0.77 |
| Functional Passage | 2249 | 0 | 7 | 4.69 | 1.80 | 0.63 |
| Expressing Ideas | 2249 | 0 | 4 | 1.94 | 0.93 | |
| Word Recognition | 2249 | 0 | 20 | 16.44 | 4.28 | 0.89 |
| Text Comprehension | 2249 | 0 | 21 | 14.17 | 4.86 | 0.85 |
| Grade 4 | | | | | | |
| Informational Passage | 2469 | 0 | 7 | 3.69 | 1.75 | 0.51 |
| Narrative Passage | 2469 | 0 | 7 | 4.87 | 1.81 | 0.67 |
| Functional Passage | 2469 | 0 | 7 | 4.63 | 1.84 | 0.64 |
| Expressing Ideas | 2469 | 0 | 4 | 1.96 | 0.90 | |
| Word Recognition | 2469 | 0 | 20 | 15.11 | 4.74 | 0.88 |
| Text Comprehension | 2469 | 0 | 21 | 13.19 | 4.42 | 0.80 |
| Grade 5 | | | | | | |
| Informational Passage | 2519 | 0 | 7 | 3.98 | 1.79 | 0.55 |
| Narrative Passage | 2519 | 0 | 7 | 5.28 | 1.75 | 0.70 |
| Functional Passage | 2519 | 0 | 7 | 4.91 | 1.84 | 0.68 |
| Expressing Ideas | 2519 | 0 | 4 | 2.11 | 0.94 | |
| Word Recognition | 2519 | 0 | 20 | 16.31 | 4.43 | 0.89 |
| Text Comprehension | 2519 | 0 | 21 | 14.17 | 4.46 | 0.82 |
| Grade 6 | | | | | | |
| Informational Passage | 2471 | 0 | 7 | 4.04 | 1.84 | 0.60 |
| Narrative Passage | 2471 | 0 | 7 | 5.01 | 1.86 | 0.70 |
| Functional Passage | 2471 | 0 | 7 | 4.58 | 1.80 | 0.61 |
| Expressing Ideas | 2471 | 0 | 4 | 2.19 | 0.96 | |
| Word Recognition | 2471 | 0 | 20 | 15.41 | 4.63 | 0.88 |
| Text Comprehension | 2471 | 0 | 21 | 13.63 | 4.55 | 0.82 |
| Grade 7 | | | | | | |
| Informational Passage | 2382 | 0 | 7 | 4.19 | 1.83 | 0.60 |
| Narrative Passage | 2382 | 0 | 7 | 5.15 | 1.87 | 0.72 |
| Functional Passage | 2382 | 0 | 7 | 4.77 | 1.79 | 0.63 |
| Expressing Ideas | 2382 | 0 | 4 | 2.24 | 1.04 | |
| Word Recognition | 2382 | 0 | 20 | 16.19 | 4.37 | 0.89 |
| Text Comprehension | 2382 | 0 | 21 | 14.11 | 4.54 | 0.82 |
| Grade 8 | | | | | | |
| Informational Passage | 2355 | 0 | 7 | 4.47 | 1.80 | 0.60 |
| Narrative Passage | 2355 | 0 | 7 | 5.38 | 1.76 | 0.71 |
| Functional Passage | 2355 | 0 | 7 | 5.10 | 1.74 | 0.64 |
| Expressing Ideas | 2355 | 0 | 4 | 2.40 | 1.00 | |
| Word Recognition | 2355 | 0 | 20 | 16.95 | 4.14 | 0.90 |
| Text Comprehension | 2355 | 0 | 21 | 14.95 | 4.37 | 0.82 |

Table 9.7 Continued
ELA Strand Summary Statistics

| | N | Minimum Score | Maximum Score | Mean | Standard Deviation | Cronbach's Alpha |
|-----------------------|------|---------------|---------------|-------|--------------------|------------------|
| Grade 11 | | | | | | |
| Informational Passage | 1862 | 0 | 7 | 5.49 | 1.65 | 0.68 |
| Narrative Passage | 1862 | 0 | 7 | 5.85 | 1.64 | 0.76 |
| Functional Passage | 1862 | 0 | 7 | 5.29 | 1.74 | 0.68 |
| Expressing Ideas | 1862 | 0 | 4 | 2.62 | 1.11 | |
| Word Recognition | 1862 | 0 | 20 | 16.98 | 3.88 | 0.88 |
| Text Comprehension | 1862 | 0 | 21 | 16.63 | 4.27 | 0.86 |

Table 9.8
Mathematics Strand Summary Statistics

| | N | Minimum Score | Maximum Score | Mean | Standard Deviation | Cronbach's Alpha |
|----------------------|------|---------------|---------------|-------|--------------------|------------------|
| Grade 3 | | | | | | |
| Numbers & Operations | 1905 | 0 | 10 | 7.16 | 1.99 | 0.62 |
| Measurement | 1905 | 0 | 8 | 5.85 | 1.80 | 0.61 |
| Geometry | 1905 | 0 | 9 | 7.27 | 1.67 | 0.62 |
| Data & Probability | 1905 | 0 | 3 | 2.08 | 0.82 | 0.31 |
| Grade 4 | | | | | | |
| Numbers & Operations | 2044 | 1 | 16 | 11.66 | 2.93 | 0.71 |
| Measurement | 2044 | 0 | 8 | 5.48 | 1.54 | 0.48 |
| Geometry | 2044 | 0 | 4 | 3.27 | 0.97 | 0.49 |
| Data & Probability | 2044 | 0 | 2 | 1.78 | 0.51 | 0.47 |
| Grade 5 | | | | | | |
| Numbers & Operations | 2216 | 1 | 16 | 11.08 | 3.27 | 0.74 |
| Measurement | 2216 | 0 | 10 | 6.70 | 2.15 | 0.63 |
| Geometry | 2216 | 0 | 2 | 1.63 | 0.54 | 0.18 |
| Data & Probability | 2216 | 0 | 2 | 1.77 | 0.51 | 0.48 |
| Grade 6 | | | | | | |
| Numbers & Operations | 2223 | 1 | 18 | 12.56 | 3.61 | 0.77 |
| Measurement | 2223 | 1 | 12 | 9.33 | 2.30 | 0.68 |
| Geometry | 2223 | 0 | 2 | 1.68 | 0.55 | 0.29 |
| Data & Probability | 2223 | 0 | 3 | 2.12 | 0.77 | 0.27 |
| Grade 7 | | | | | | |
| Numbers & Operations | 2297 | 0 | 17 | 10.93 | 3.40 | 0.74 |
| Measurement | 2297 | 0 | 12 | 8.47 | 2.48 | 0.68 |
| Geometry | 2297 | 0 | 3 | 2.17 | 0.82 | 0.24 |
| Data & Probability | 2297 | 0 | 3 | 2.14 | 0.91 | 0.49 |
| Grade 8 | | | | | | |
| Numbers & Operations | 2312 | 1 | 17 | 9.69 | 3.17 | 0.66 |
| Measurement | 2312 | 1 | 10 | 6.28 | 1.96 | 0.51 |
| Geometry | 2312 | 0 | 3 | 2.23 | 0.83 | 0.33 |
| Data & Probability | 2312 | 0 | 3 | 1.95 | 0.80 | 0.18 |
| Algebra | 2312 | 0 | 2 | 1.01 | 0.73 | 0.18 |

Table 9.8 Continued
Mathematics Strand Summary Statistics

| | N | Minimum Score | Maximum Score | Mean | Standard Deviation | Cronbach's Alpha |
|----------------------------|------|---------------|---------------|-------|--------------------|------------------|
| Grade 11 | | | | | | |
| Patterns & Relationships | 1859 | 0 | 4 | 2.50 | 1.24 | 0.62 |
| Geometry & Measurement | 1859 | 1 | 16 | 11.45 | 2.96 | 0.72 |
| Data Analysis & Statistics | 1859 | 0 | 2 | 1.40 | 0.71 | 0.35 |
| Numbers & Operations | 1859 | 0 | 15 | 8.70 | 2.82 | 0.67 |

Table 9.9
Science Strand Summary Statistics

| | N | Minimum Score | Maximum Score | Mean | Standard Deviation | Cronbach's Alpha |
|-----------------------------|------|---------------|---------------|------|--------------------|------------------|
| Grade 5 | | | | | | |
| Constructing and Reflecting | 2034 | 0 | 4 | 2.70 | 1.02 | 0.37 |
| Life Science | 2034 | 1 | 12 | 8.43 | 2.31 | 0.62 |
| Physical Science | 2034 | 0 | 11 | 6.13 | 1.99 | 0.46 |
| Earth Science | 2034 | 0 | 8 | 5.46 | 1.79 | 0.57 |
| Grade 8 | | | | | | |
| Constructing and Reflecting | 2126 | 0 | 4 | 2.82 | 0.94 | 0.26 |
| Life Science | 2126 | 0 | 14 | 8.19 | 2.41 | 0.51 |
| Physical Science | 2126 | 0 | 14 | 8.47 | 2.73 | 0.62 |
| Earth Science | 2126 | 0 | 8 | 4.53 | 1.60 | 0.43 |
| Grade 11 | | | | | | |
| Constructing and Reflecting | 1856 | 0 | 5 | 3.40 | 1.24 | 0.40 |
| Life Science | 1856 | 0 | 13 | 6.59 | 2.40 | 0.51 |
| Physical Science | 1856 | 0 | 15 | 6.92 | 2.62 | 0.53 |
| Earth Science | 1856 | 0 | 12 | 6.70 | 2.36 | 0.27 |

10. Verification of Psychometric Procedures

As the independent psychometric quality assurance provider for the MI-Access Functional Independence program, HumRRO was responsible for reviewing and assuring that all psychometric procedures were carried out accurately by Questar Assessment, Inc. at each step of the equating process for ELA (grades 3 – 8 and 11), Mathematics (grades 3 – 8 and 11), and Science (grades 5, 8, and 11). Two phases of the process were checked: (a) equating with core items and (b) final item analyses with core and field-test items.

Equating with Core Items:

HumRRO checked and matched data from Questar for all assessments and grades at each of the following steps of the equating phase.

Classical Statistics:

The first step in the process was to check Questar's classical statistics results. HumRRO staff wrote custom SAS® programs to calculate a predetermined set of statistics variables. HumRRO compared their results to Questar's. The variables checked were:

- Number of Students
- P-value or item mean divided by maximum score
- Item Standard Deviation
- Corrected/Adjusted Item-Total Correlation- For core items the total score excludes the item. For field-test items, correlation is between the item and the total raw score for core items.
- Number of students with multiple marks on MC items
- Number of students with condition code A on prompt
- Number of students with condition code B on prompt
- Number of students with condition code C on prompt
- Number of students with condition code D on prompt or omit
- Number of students with score of 1 point on prompt or selecting option A for MC items
- Number of students with score of 2 points on prompt or selecting option B for MC items
- Number of students with score of 3 points on prompt or selecting option C for MC items
- Number of students with score of 4 points on prompt
- Number of students who had multi-marked answer for MC item
- Percent of students with condition code A for a CR item
- Percent of students with condition code B for a CR item
- Percent of students with condition code C for a CR item
- Percent of students with condition code D for a CR item
- Corrected point biserial correlation for option A for MC items
- Corrected point biserial correlation for option B for MC items
- Corrected point biserial correlation for option C for MC items
- Corrected point biserial correlation for those scoring 1 point, CR items only
- Corrected point biserial correlation for those scoring 2 points, CR items only
- Corrected point biserial correlation for those scoring 3 points, CR items only
- Corrected point biserial correlation for those scoring 4 points, CR items only
- Corrected point biserial correlation for those with omitted MC item
- Corrected point biserial correlation for "blank/refused to respond"

- P-Value Flag: if an item's p-value was less than 0.25 or greater than 0.85
- Item-Total Correlation Flag: if the point biserial was less than 0.20.

HumRRO matched all the variables (which were rounded to the second decimal place) at all grade/subject levels.

Calibration:

Calibration was done using Winsteps. HumRRO matched the following Winsteps output files (file extension given in parentheses) that were provided by Questar; IFILE (.ITM), ISFILE (.ISF), and SFILE (.CSF). All comparisons for each grade/subject were exact matches. Comparisons were made of each Winsteps output file. An example of the comparisons is shown in Table 10.1.

Table 10.1
Example of Winsteps verification record provided to MDE

| Match Results? (HumRRO vs. Questar) | | | |
|-------------------------------------|---------------|------|------|
| Winsteps files | Subject/Grade | | |
| | ELA11 | MA11 | SC11 |
| .ISF | Yes | Yes | Yes |
| .ITM | Yes | Yes | Yes |
| .CSF | Yes | N/A | N/A |

Equating:

HumRRO matched Questar's linking constants (LCs). Table 10.2 shows the LCs that were calculated and matched between HumRRO and Questar for Mathematics, Science, and ELA.

Table 10.2
Linking Constant (LC) Comparison

| Subject/Grade | Questar LC | HumRRO LC |
|---------------|--------------|--------------|
| M03 | 0.219 | 0.219 |
| M04 | 0.139 | 0.139 |
| M05 | -0.097 | -0.097 |
| M06 | -0.182 | -0.182 |
| M07 | 0.098/0.020* | 0.098/0.020* |
| M08 | 0.126 | 0.126 |
| MA11 | 0.025 | 0.025 |
| S05 | -0.296 | -0.296 |
| S08 | -0.433 | -0.433 |
| SC11 | 0.072 | 0.072 |
| ELA03 | 0.162 | 0.162 |
| ELA45 | 0.049 | 0.049 |
| ELA678 | 0.063 | 0.063 |
| ELA11 | -0.066 | -0.066 |

* - One item was dropped from equating. First value is the LC for all items, the second value is LC after item (60001528) was dropped.

Raw Score to Scale Score Tables:

HumRRO used the LCs to calculate the RS-SS tables in an Excel spreadsheet. A separate spreadsheet program was developed for comparison purposes. Questar's scale score results were copied and pasted into this spreadsheet and subtracted from the HumRRO-calculated scale score at each raw score point. There were no differences in any of the grade/subjects RS-SS conversion tables. An Excel spreadsheet with the conversion table comparisons was included with the verification emails.

Final Item Analyses with Core and Field-Test Items:

HumRRO checked and matched field test item data from Questar for all assessments and grades.

Classical Statistics:

The classical statistics described above were computed for the Total population and the subgroups male, female, white and black. HumRRO matched all variables for all groups, see Table 10.3 for an example with Science. Similar verification tables were produced for ELA and Mathematics.

Table 10.3
HumRRO's verification table for classical statistics on Science field test items, by subgroup

| Subject/ Grade | Group | Match Results? HumRRO vs Questar) | Number of Items (Core/FT) |
|-------------------|--------|--------------------------------------|------------------------------|
| SC05 | All | Yes | 35/12 |
| | Male | Yes | 35/12 |
| | Female | Yes | 35/12 |
| | White | Yes | 35/12 |
| | Black | Yes | 35/12 |
| SC08 | All | Yes | 40/17 |
| | Male | Yes | 40/17 |
| | Female | Yes | 40/17 |
| | White | Yes | 40/17 |
| | Black | Yes | 40/17 |
| SC11 | All | Yes | 45/30 |
| | Male | Yes | 45/30 |
| | Female | Yes | 45/30 |
| | White | Yes | 45/30 |
| | Black | Yes | 45/30 |

Winsteps Output Files:

Field-test items were calibrated by anchoring the core items to the values obtained during Equating. HumRRO checked Winsteps output (using version 3.67) from the calibration of core and field test items. As seen in Table 10.4, all of HumRRO's output matched Questar's exactly for FI-M (grades 03-08), FI-ELA grades 03-08, and for FI-S grades 05 and 08.

Table 10.4
Verification of matches of Winsteps output between HumRRO and Questar for Mathematics, ELA, and Science

| Winsteps files | Match results? (HumRRO vs Questar) | | | | | | |
|------------------------|------------------------------------|------|-------|------|------|------|------|
| | Subject/Grade | | | | | | |
| | MA03 | MA04 | MA05 | MA06 | MA07 | MA08 | MA11 |
| .ISF | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| .ITM | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| DIF– F/M (Table 30.1) | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| DIF– B/W (Table 30.5) | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | RD03 | RD45 | RD678 | RD11 | | | |
| .CSF | Yes | Yes | Yes | Yes | | | |
| .ISF | Yes | Yes | Yes | Yes | | | |
| .ITM | Yes | Yes | Yes | Yes | | | |
| DIF– F/M (Table 30.1) | Yes | Yes | Yes | Yes | | | |
| DIF– B/W (Table 30.5) | Yes | Yes | Yes | Yes | | | |
| | SC05 | SC08 | SC11 | | | | |
| .ISF | Yes | Yes | Yes | | | | |
| .ITM | Yes | Yes | Yes | | | | |
| DIF – F/M (Table 30.1) | Yes | Yes | Yes | | | | |
| DIF – B/W (Table 30.5) | Yes | Yes | Yes | | | | |

The following emails were sent by HumRRO to the Michigan Department of Education, Office of Educational Assessment and Accountability to announce when verification of a particular assessment had been made:

- December 9, 2008 Re: Calibration to RS-SS, double check of Questar Results for MI-Access (Mathematics and Science) [Equating Results grades 3–8]
- December 11, 2008 Re: Calibration to RS-SS, Verification of Questar's Results for MI-Access (ELA grades 03-08) [Equating Results]
- February 12, 2009 Re: Verification of Questar's Results for MI-Access (FI ELA) [Final Item Analyses]
- February 12, 2009 Re: Verification of Questar's Results for MI-Access (FI Mathematics) [Final Item Analyses]
- February 12, 2009 Re: Verification of Questar's Results for MI-Access (FI Science) [Final Item Analyses]
- April 29, 2009 Re: Verification of Questar's Results for MI-Access (Grade 11 – ELA, Mathematics, & Science) [Equating Results]
- June 11, 2009 Re: Verification of Questar's MI-Access Results for Grade 11 – FI, SI, and PA [Final Item Analyses]

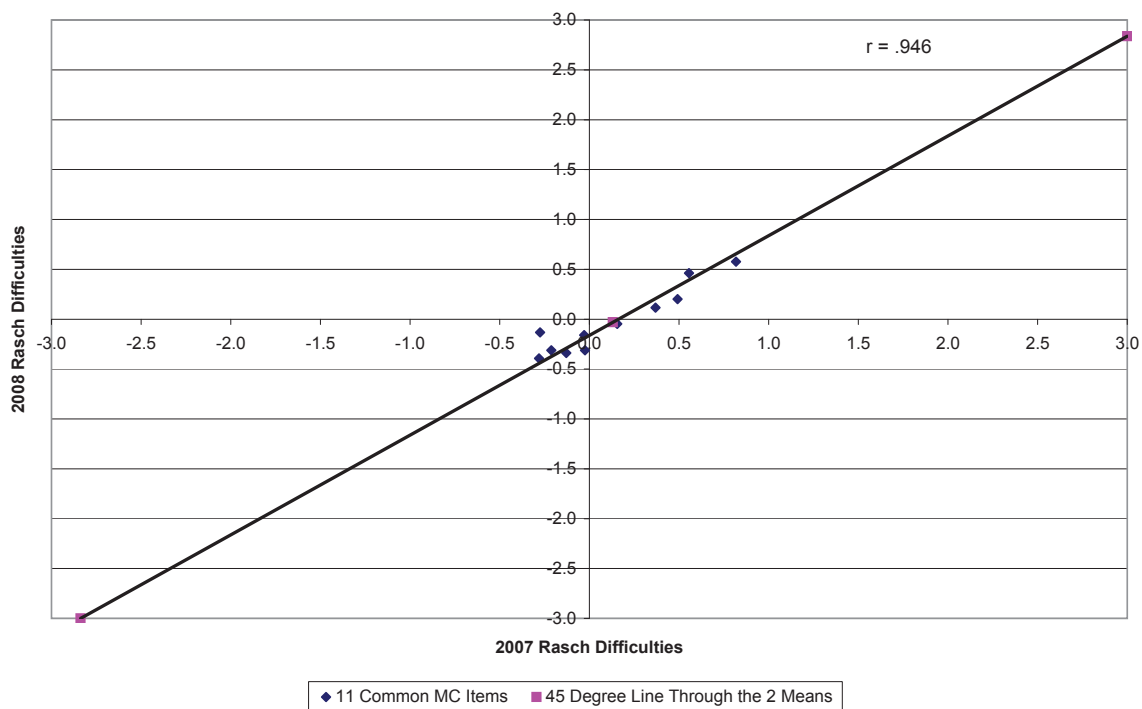
REFERENCES

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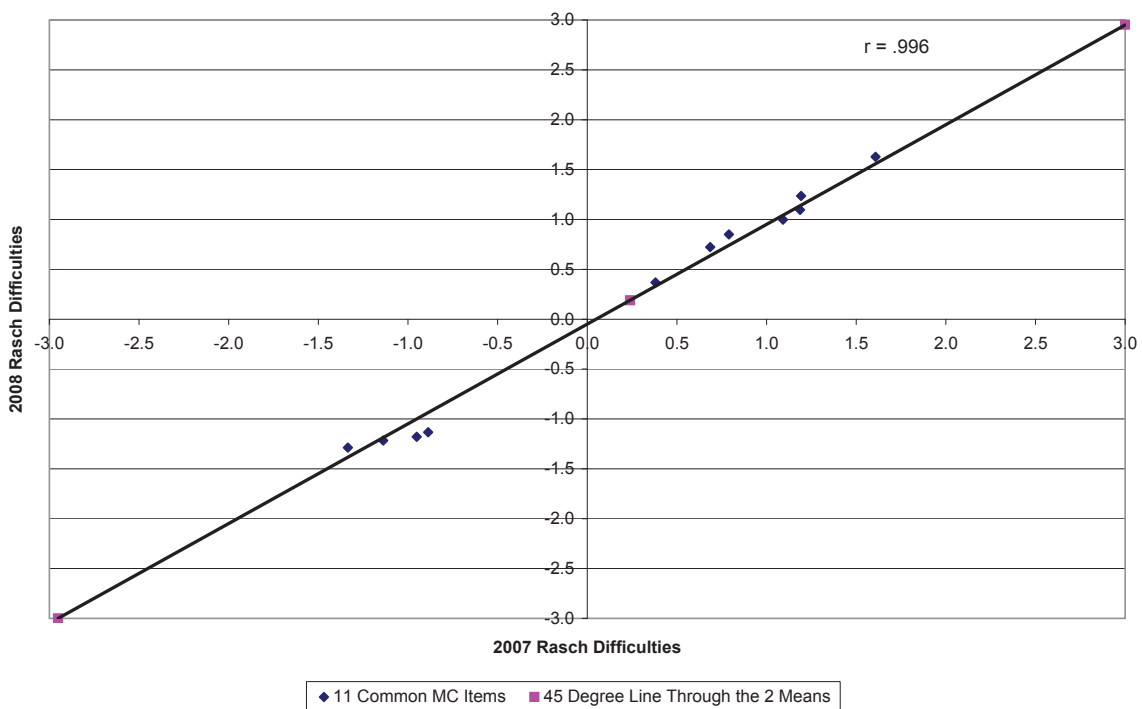
APPENDIX A

ANCHOR ITEM PLOTS

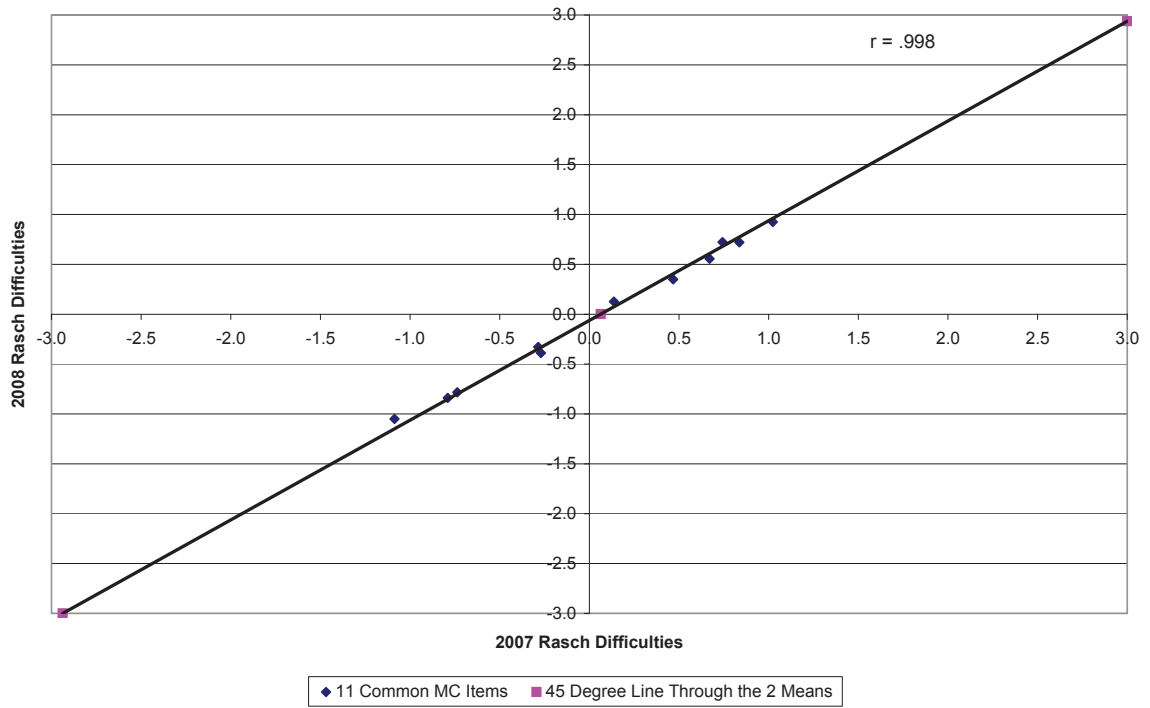
Fall 2008 ELA Grade 3 Anchor Items



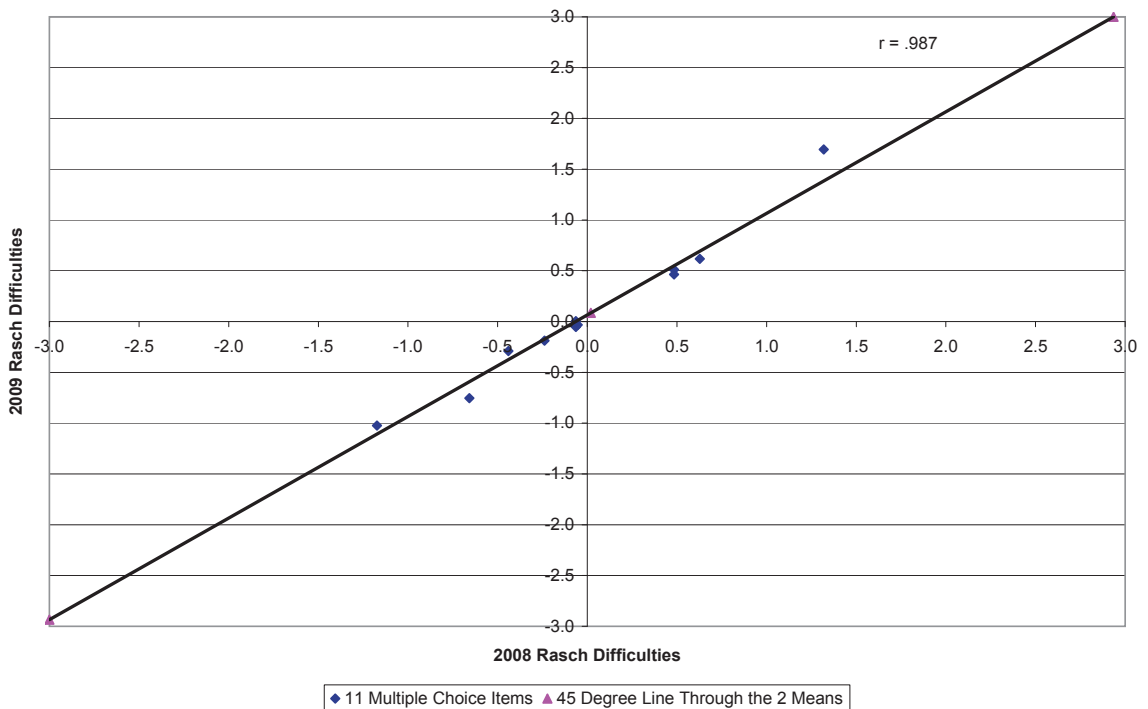
Fall 2008 ELA Grades 4/5 Anchor Items



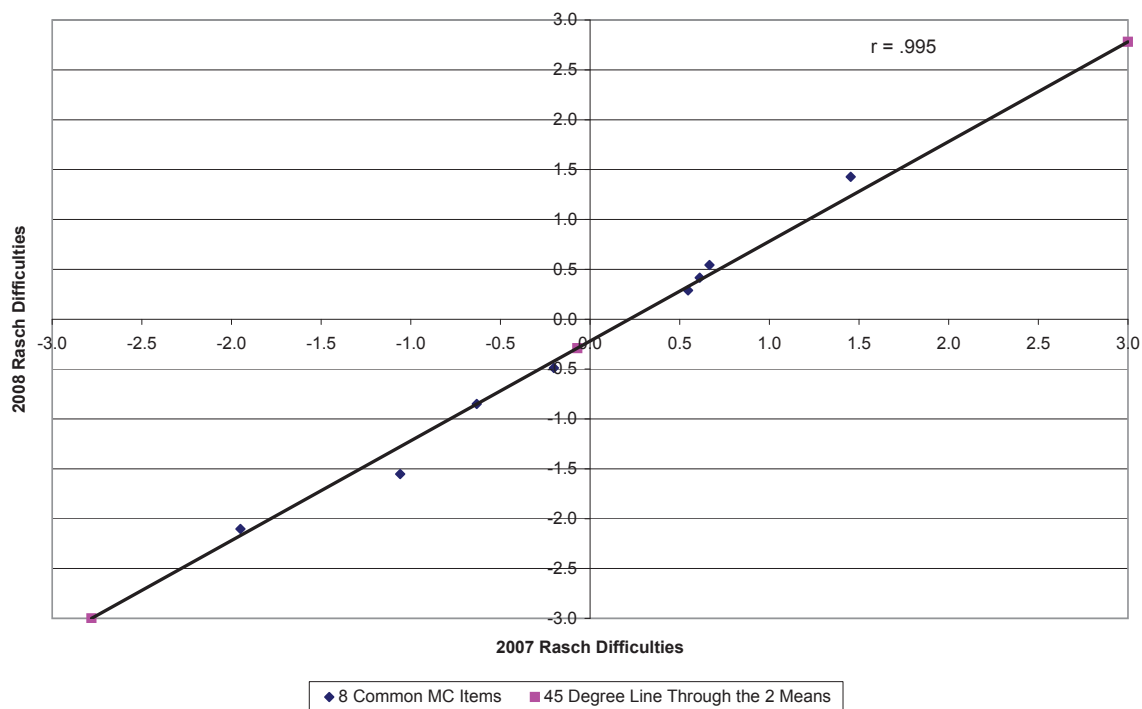
Fall 2008 ELA Grades 6/7/8 Anchor Items



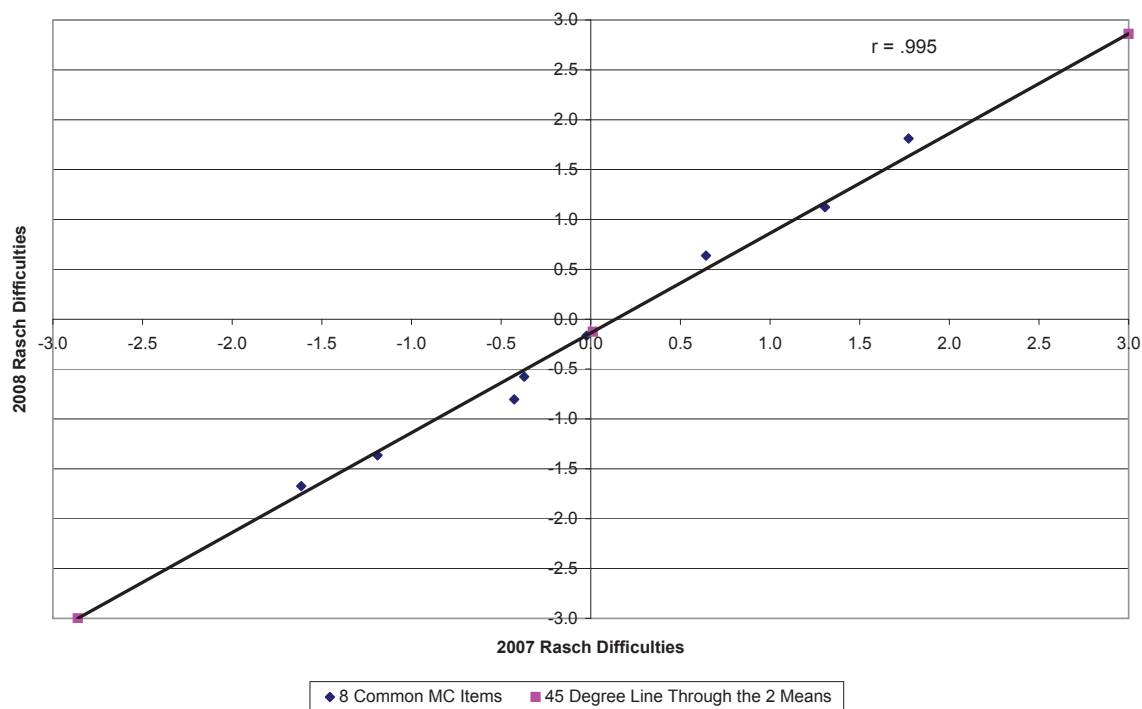
Spring 2009 Grade 11 ELA Anchor Items



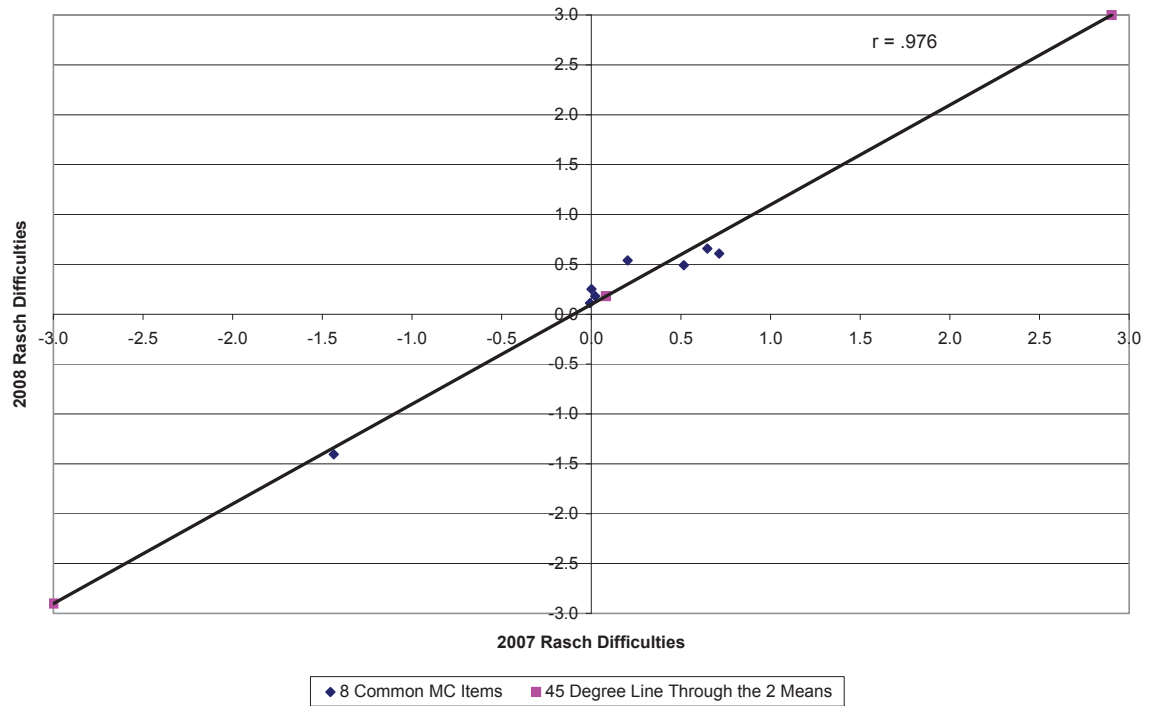
Fall 2008 Mathematics Grade 3 Anchor Items



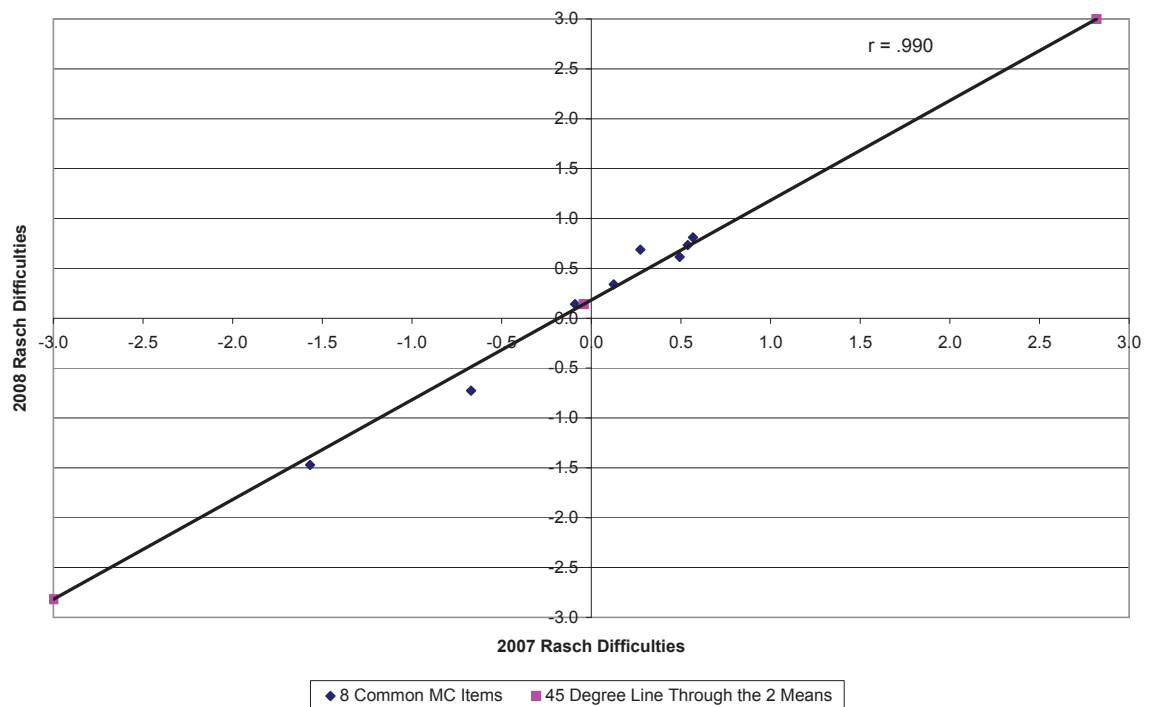
Fall 2008 Mathematics Grade 4 Anchor Items



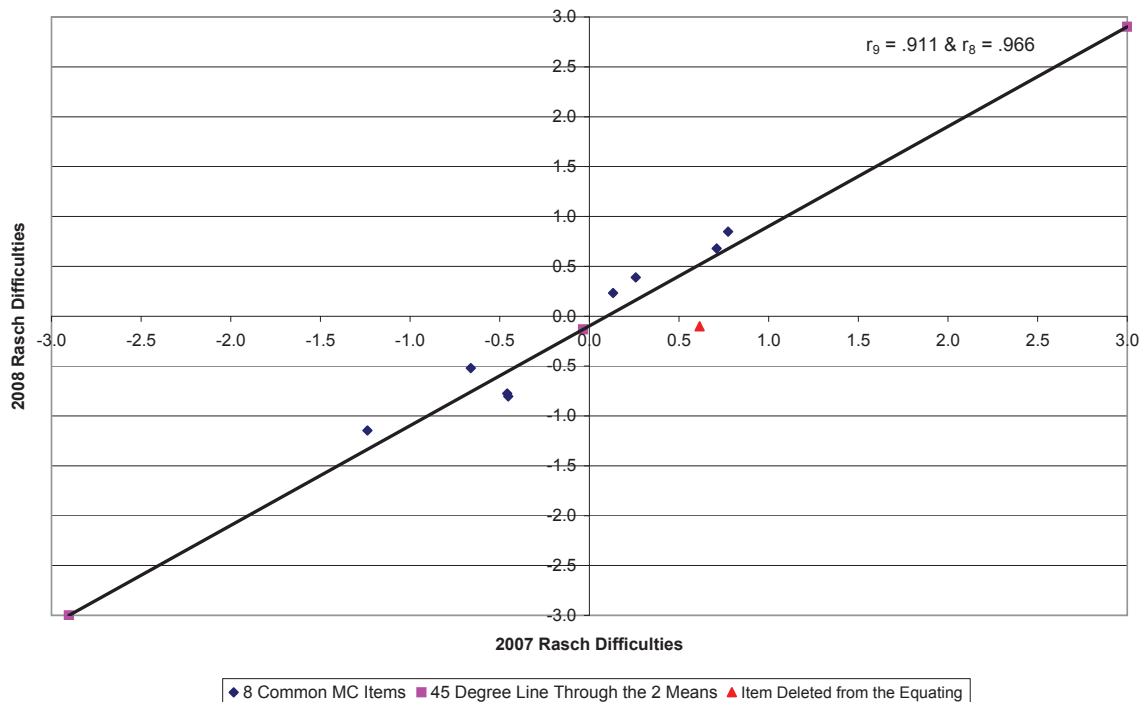
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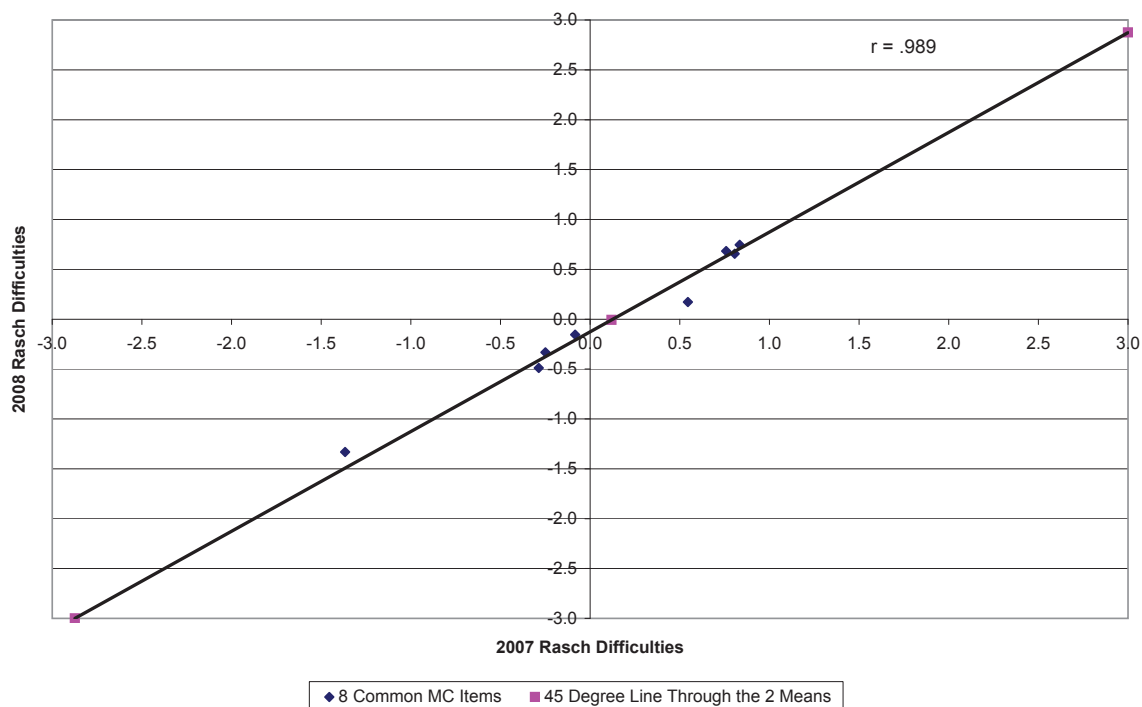
Fall 2008 Mathematics Grade 6 Anchor Items



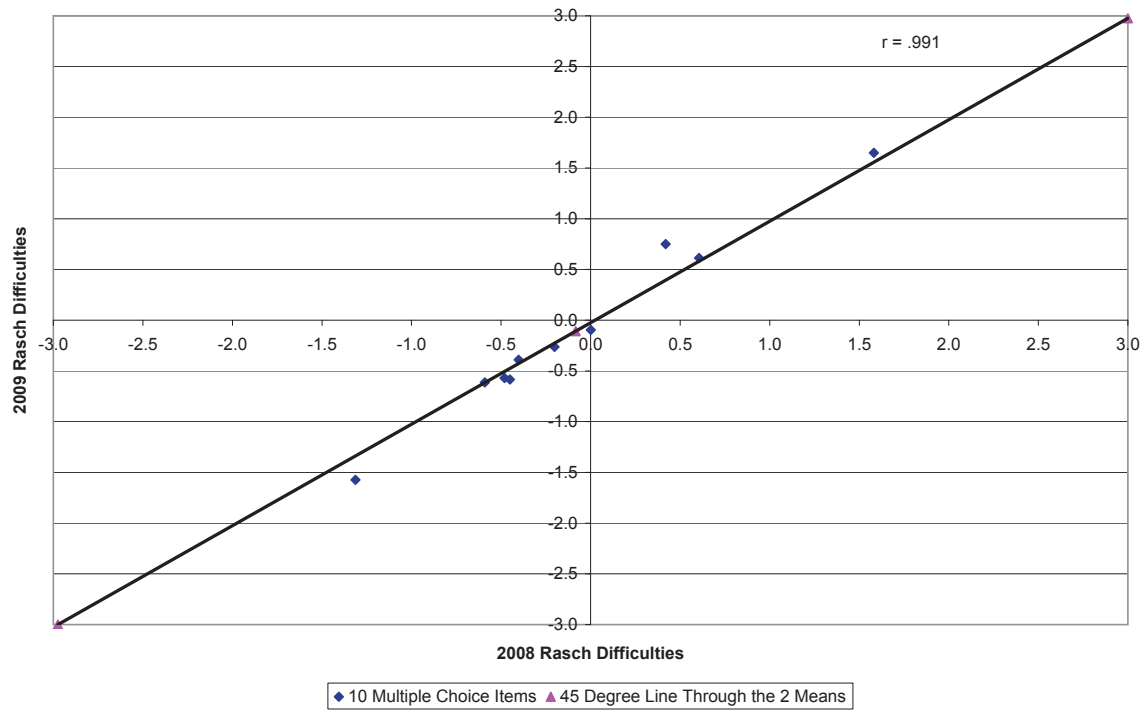
Fall 2008 Mathematics Grade 7 Anchor Items



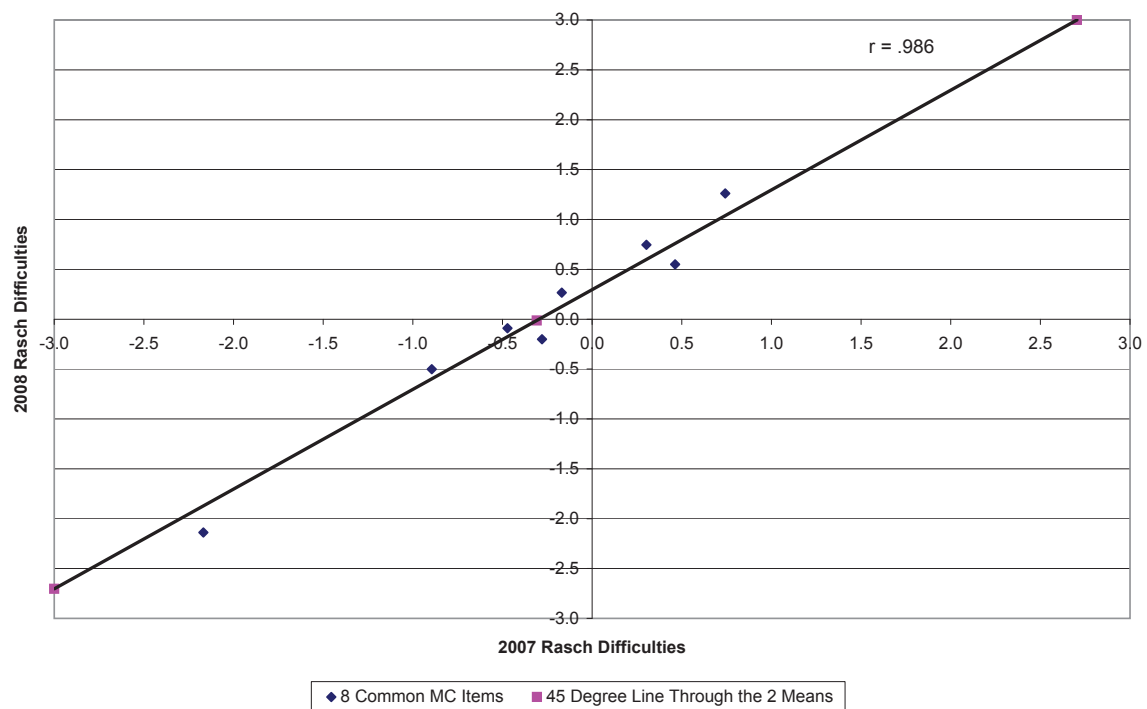
Fall 2008 Mathematics Grade 8 Anchor Items



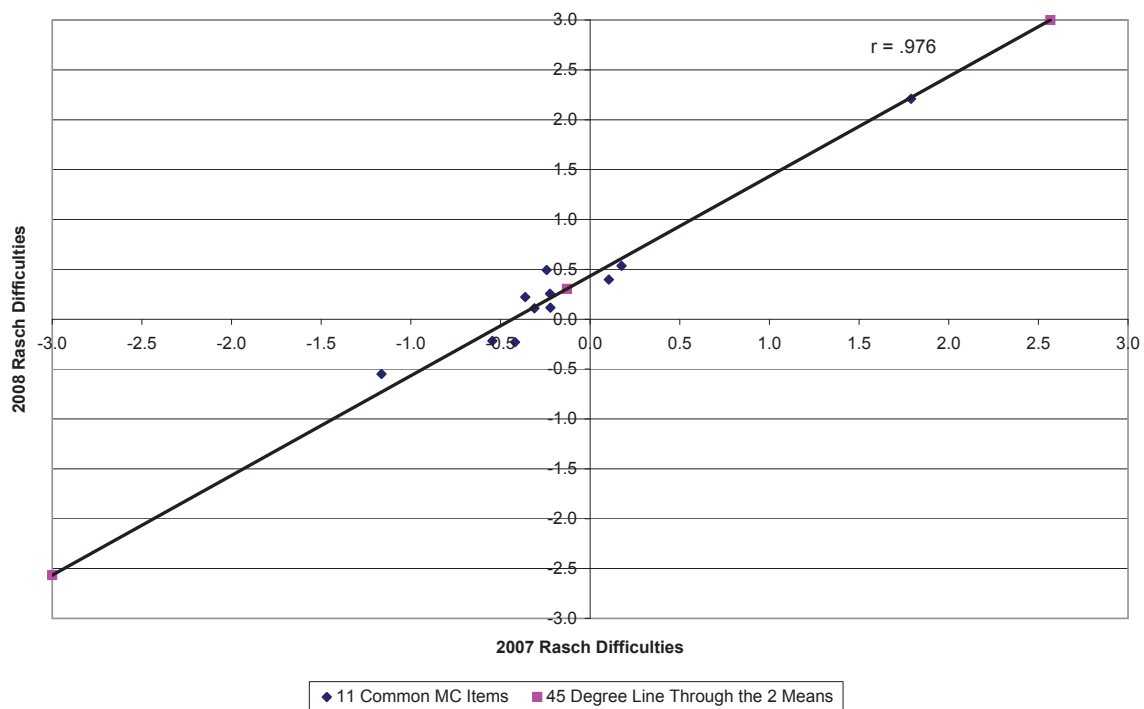
Spring 2009 Grade 11 Mathematics Anchor Items



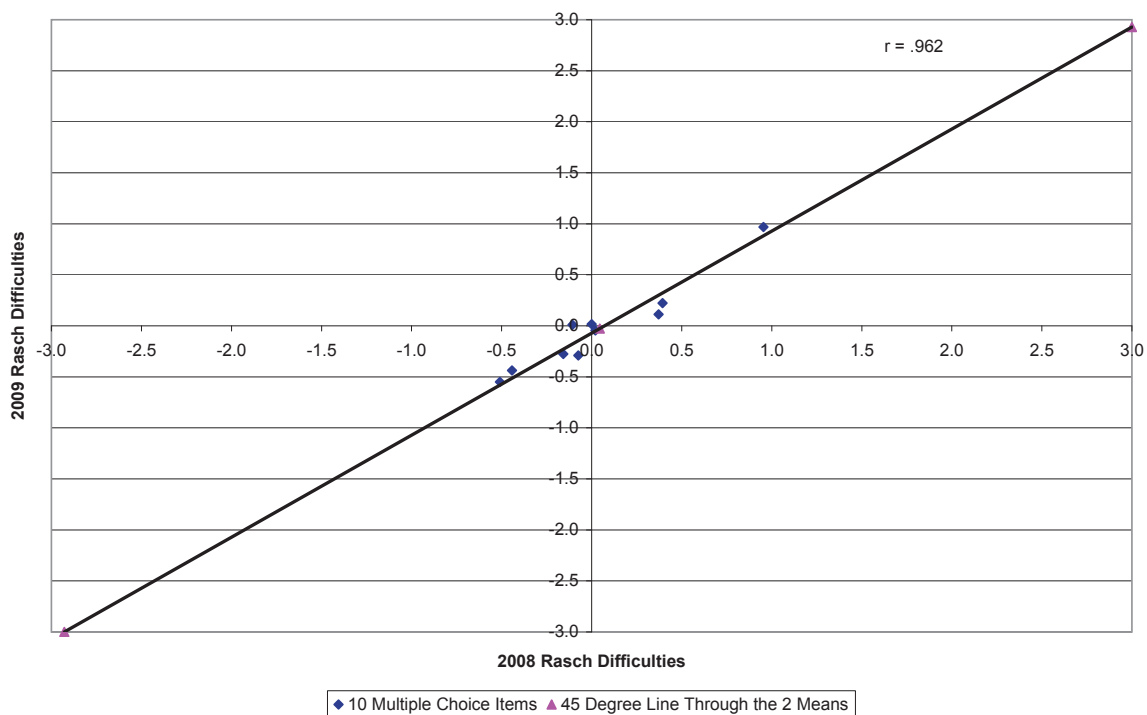
Fall 2008 Science Grade 5 Anchor Items



Fall 2008 Science Grade 8 Anchor Items



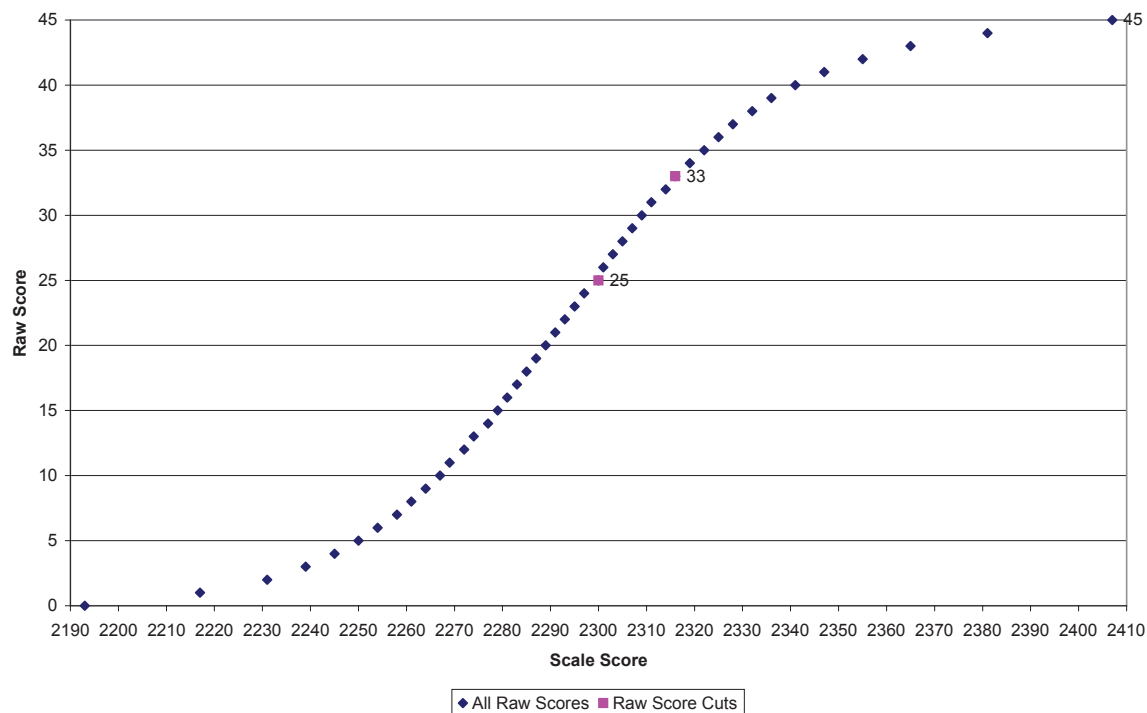
Spring 2009 Grade 11 Science Anchor Items



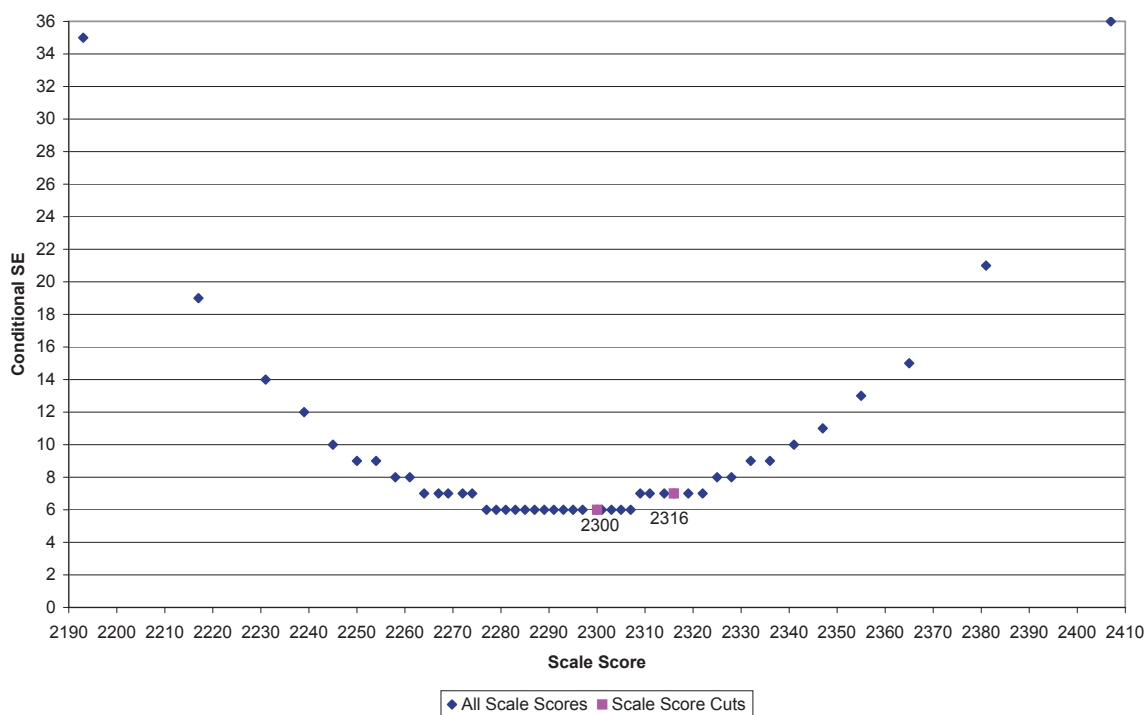
APPENDIX B

TEST CHARACTERISTIC CURVES AND STANDARD ERROR CURVES

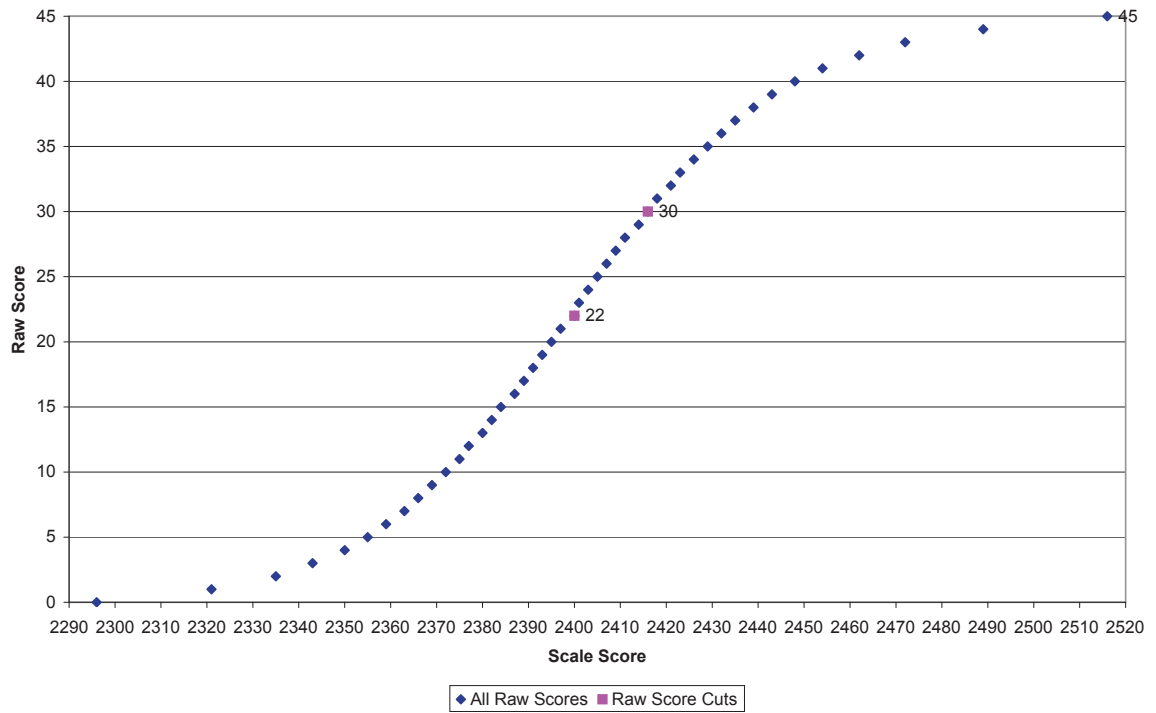
Fall 2008 ELA Grade 3 Test Characteristic Curve



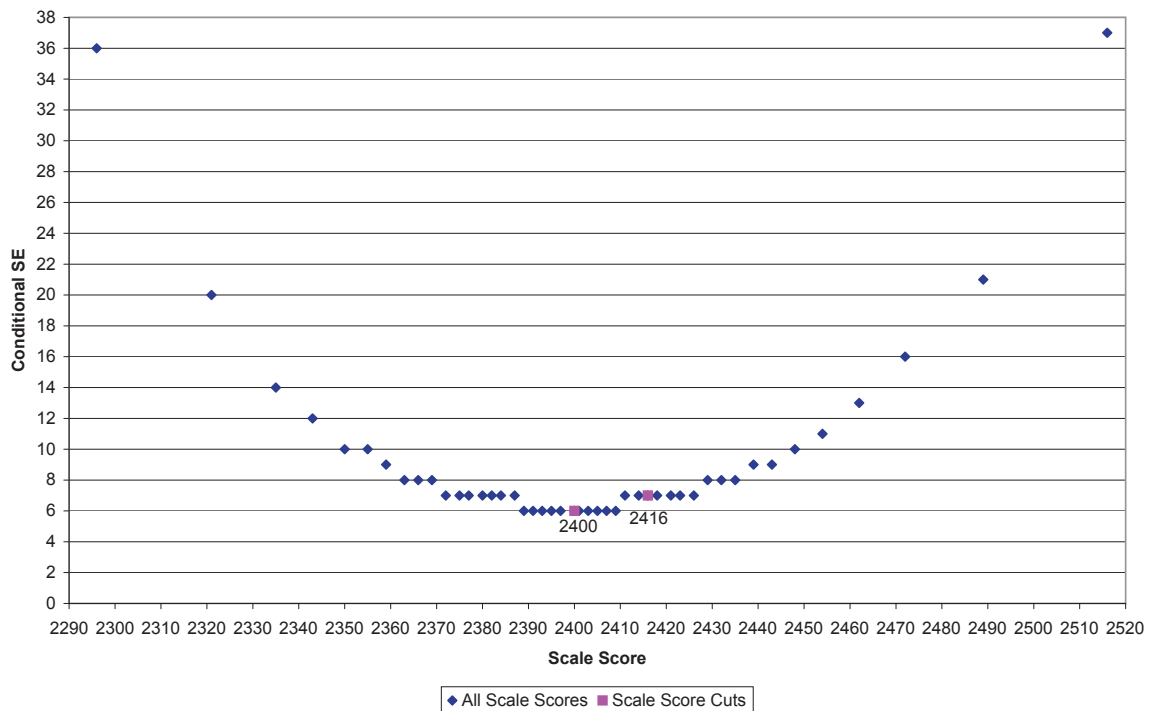
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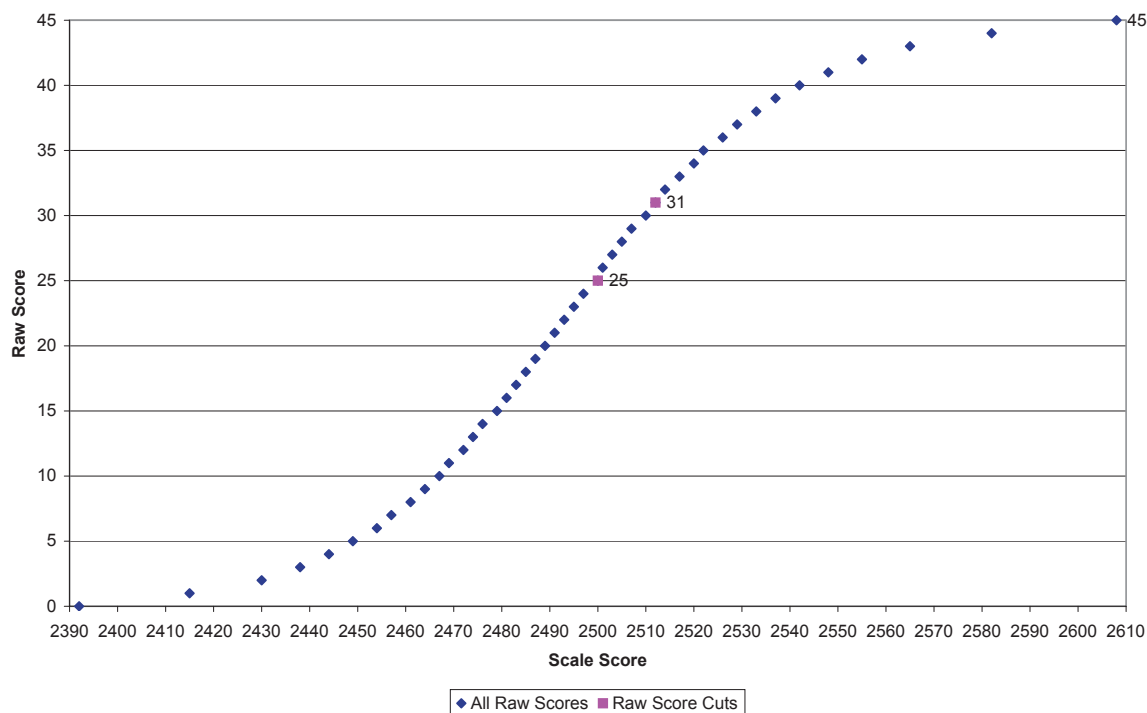
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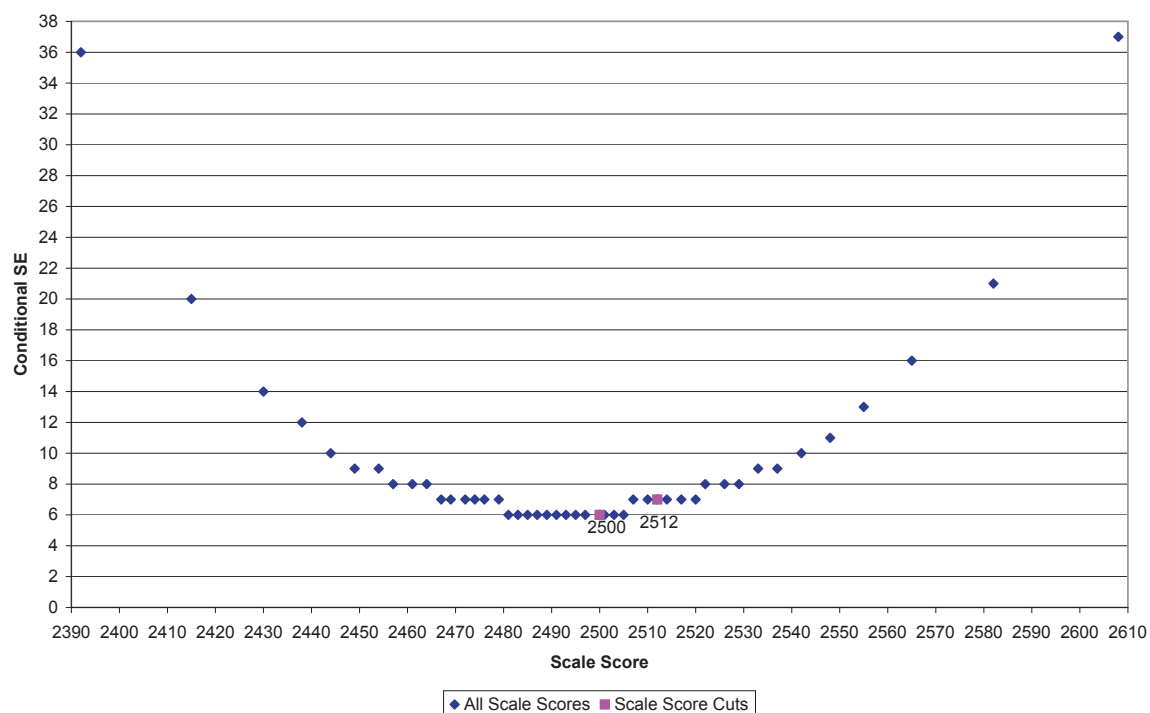
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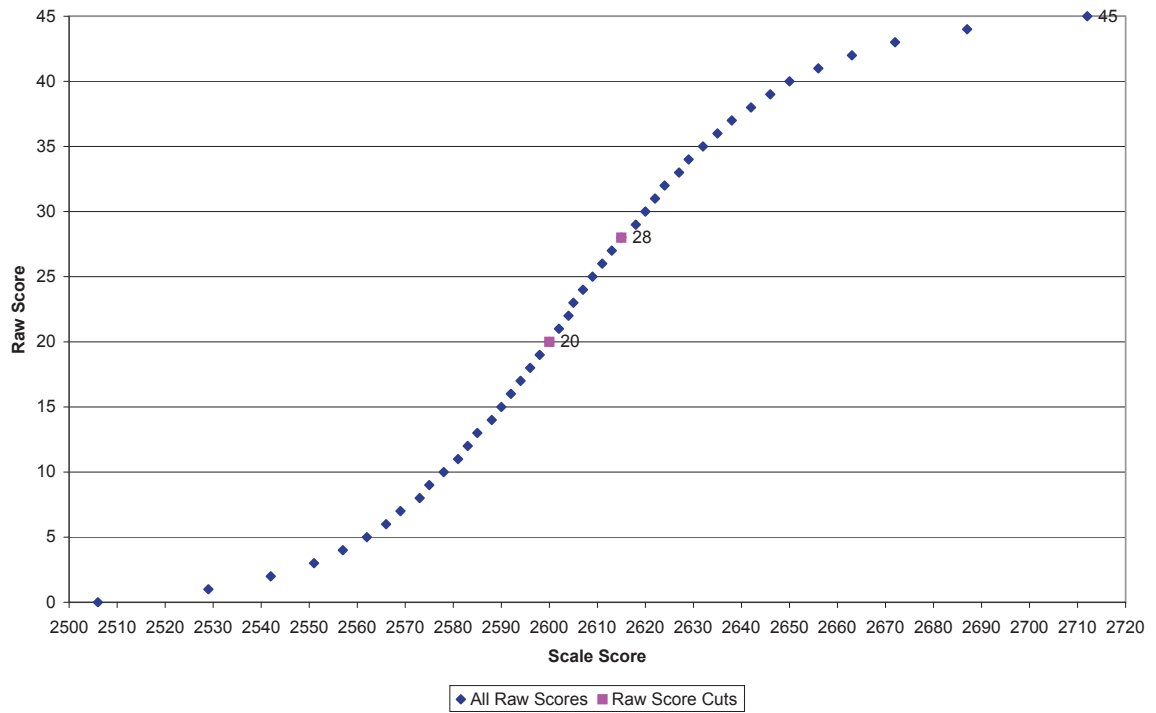
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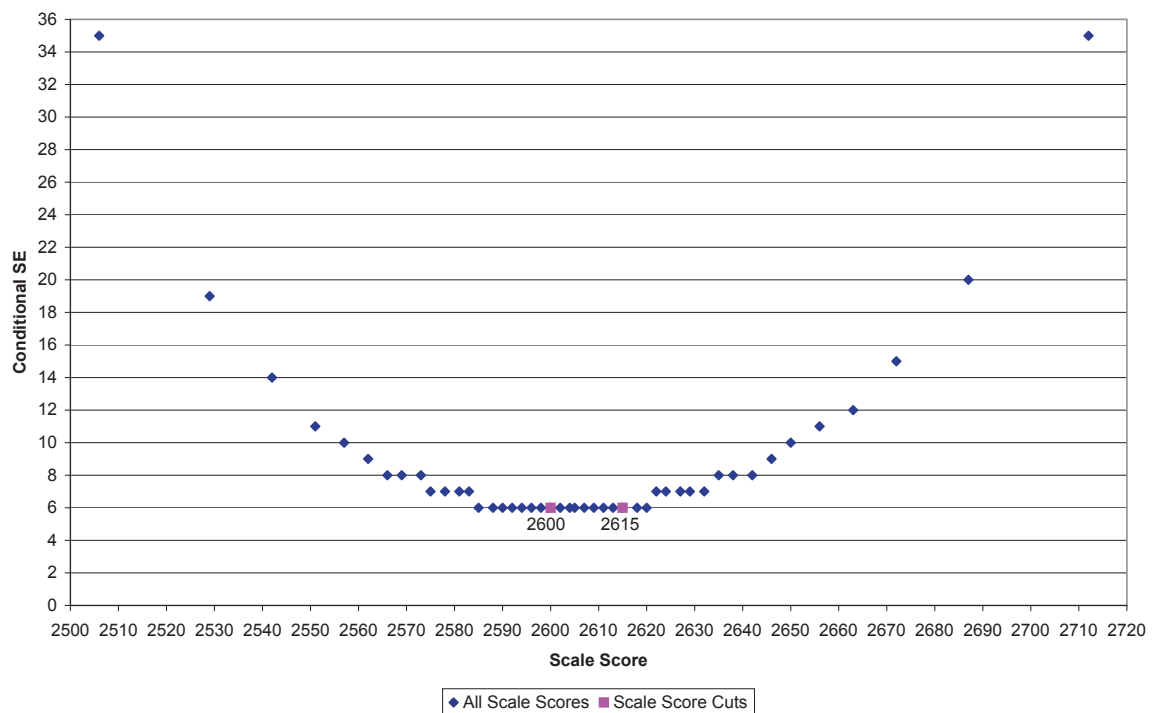
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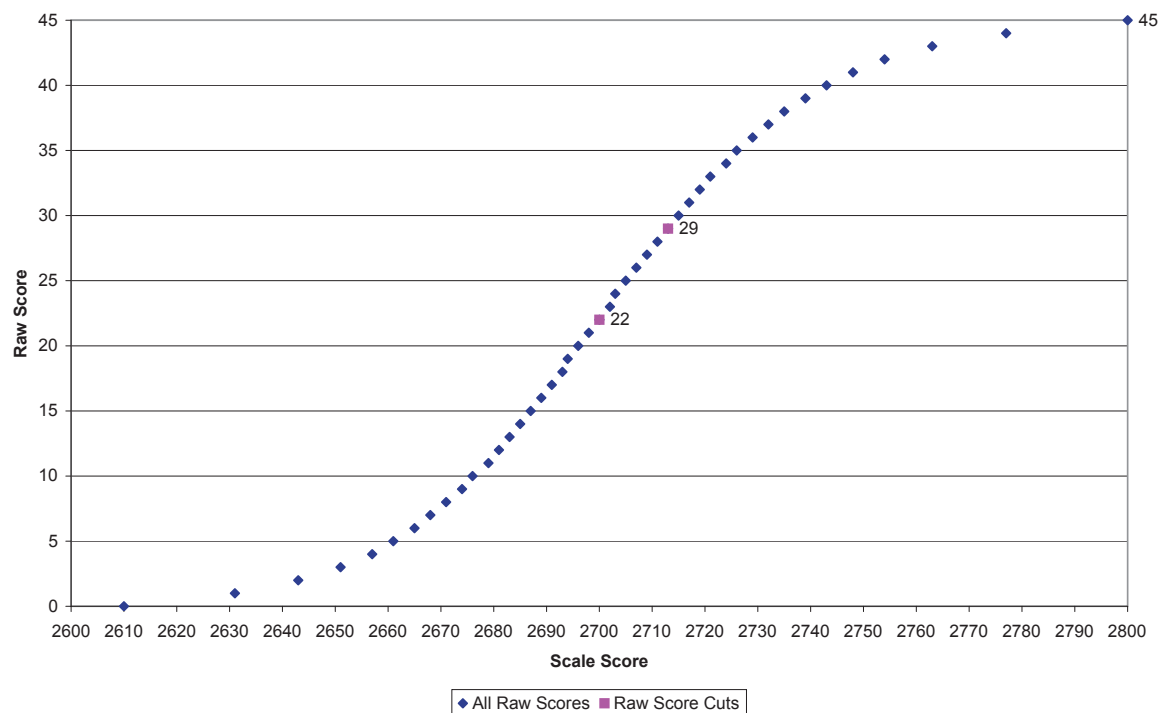
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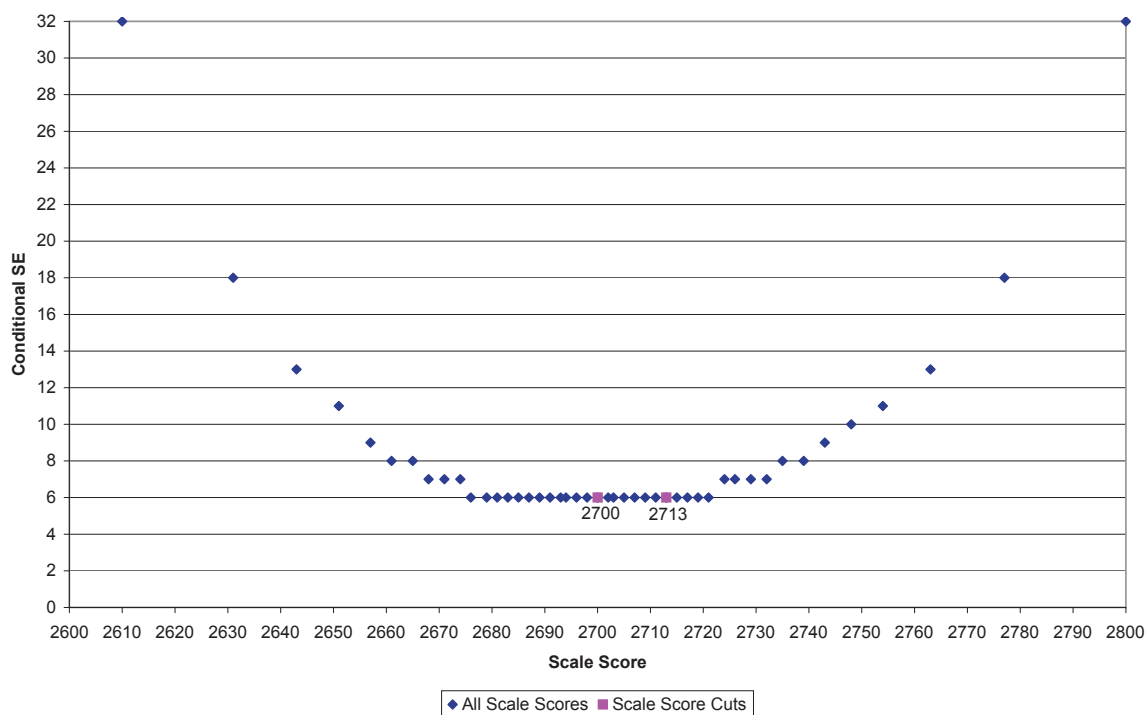
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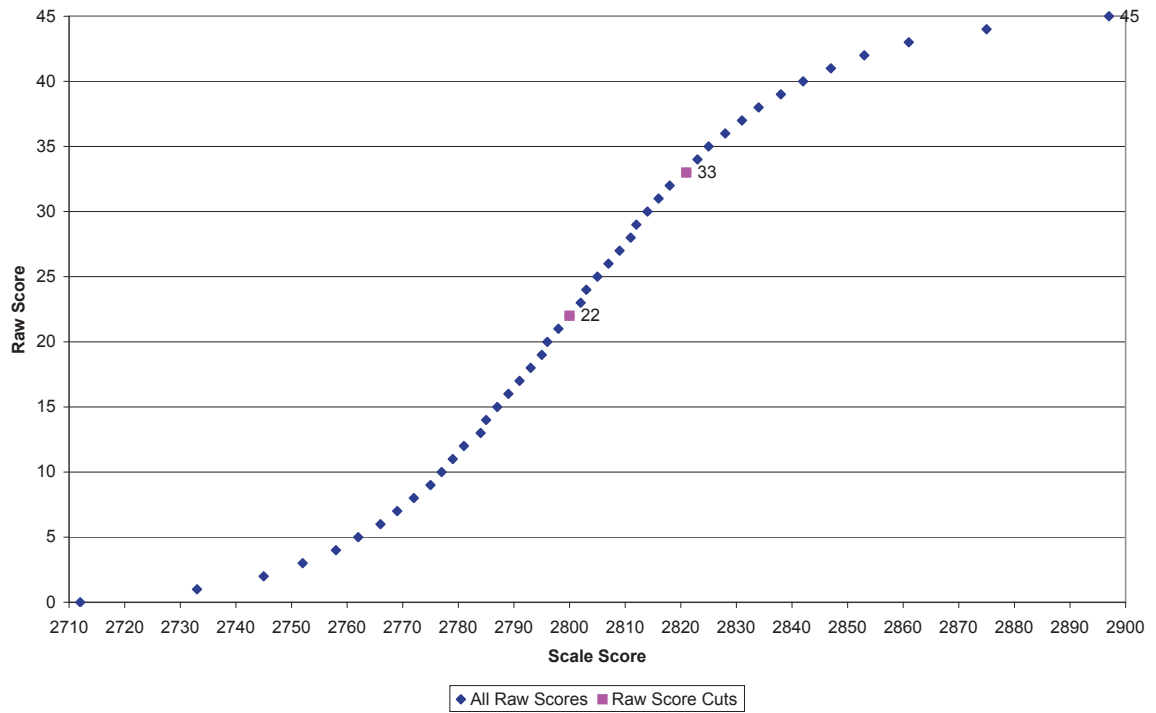
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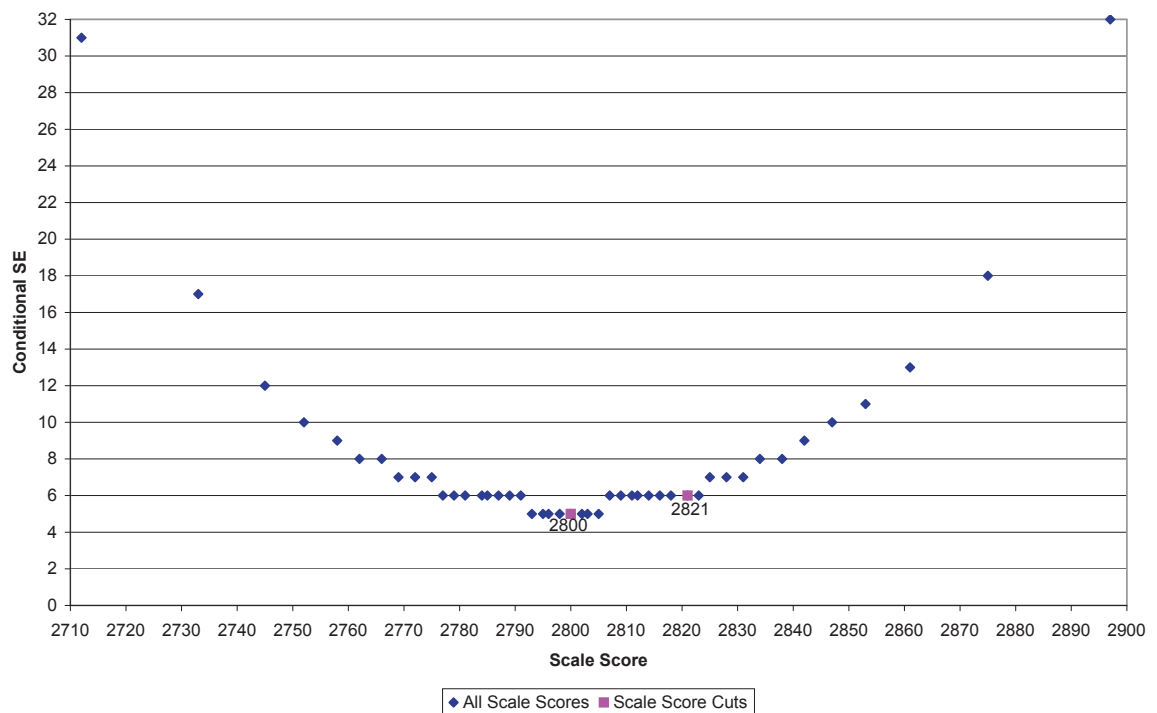
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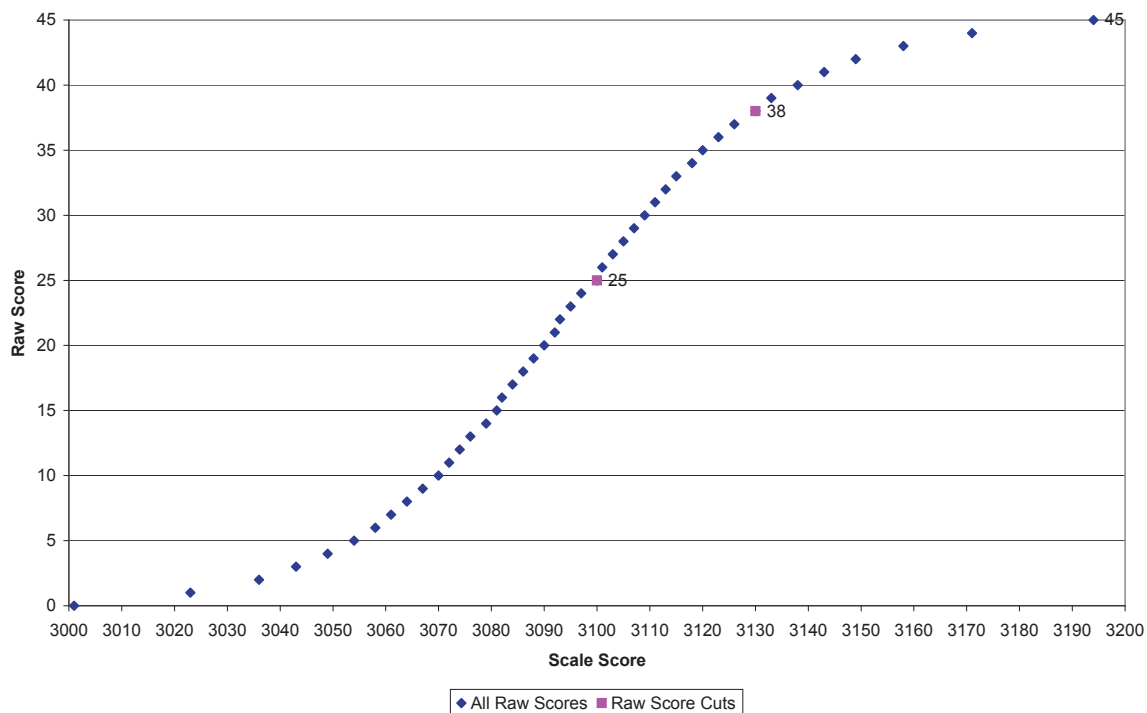
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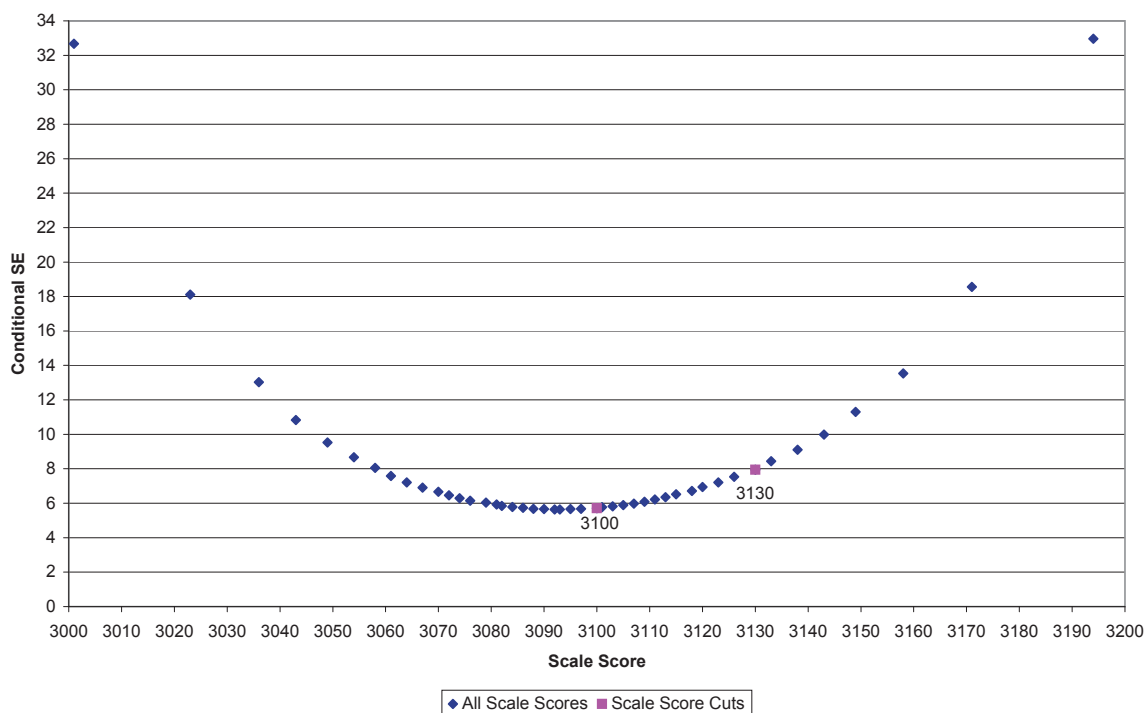
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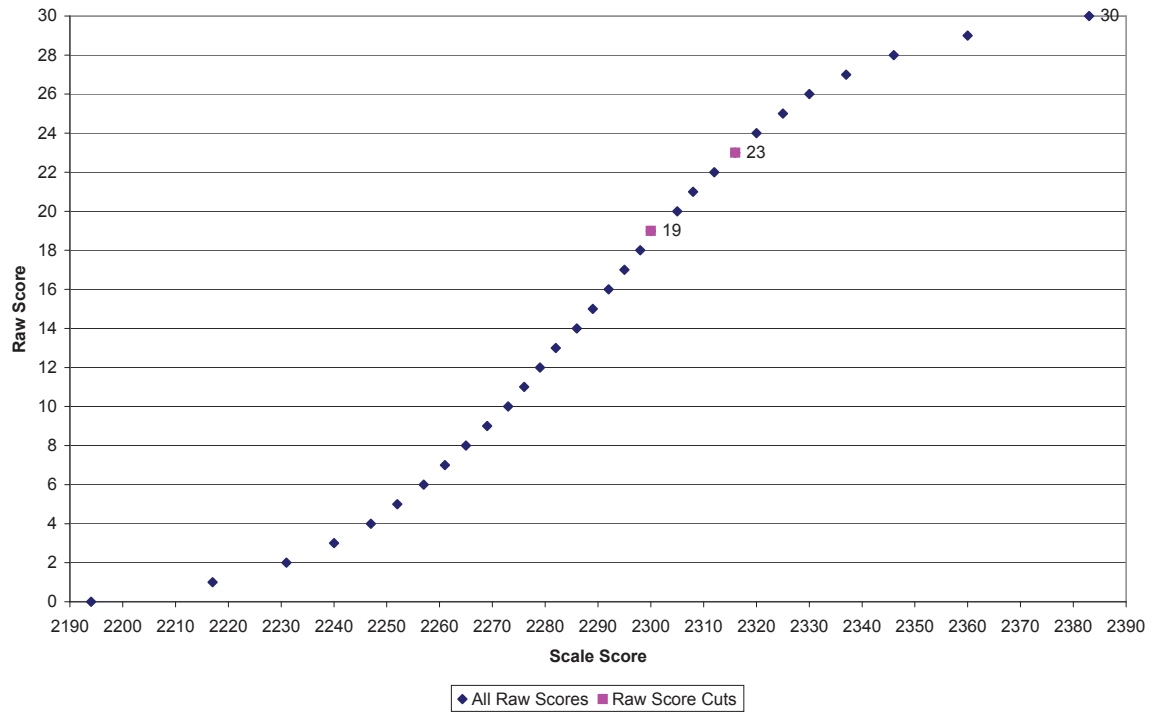
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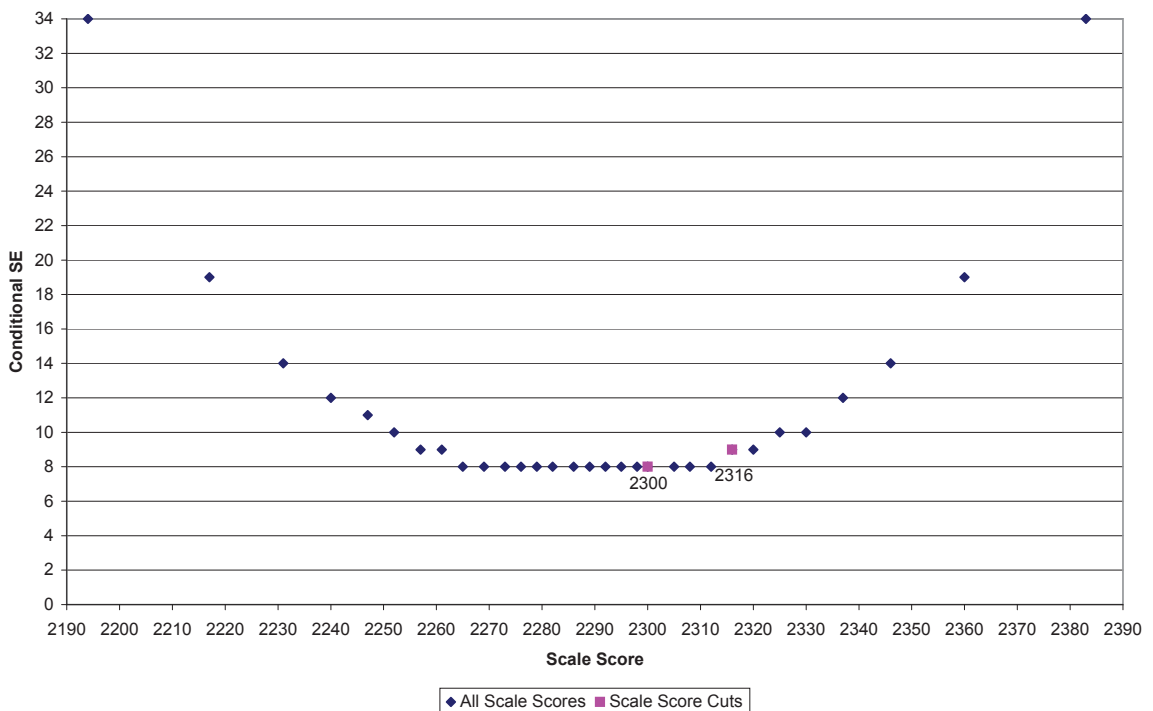
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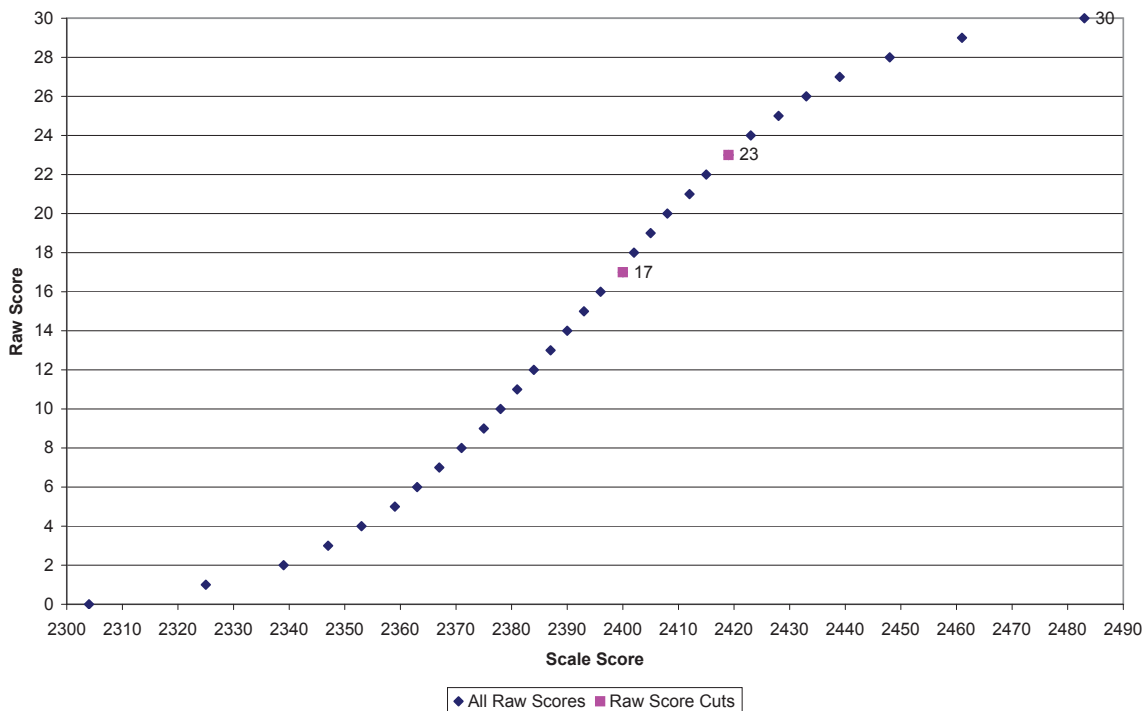
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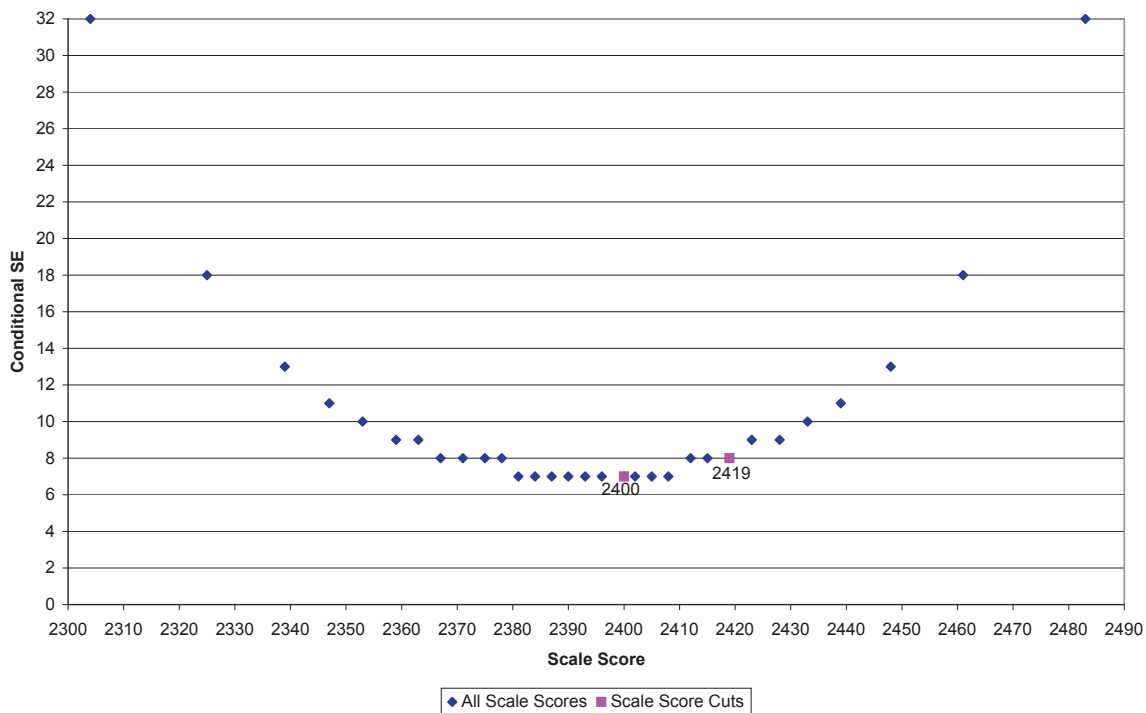
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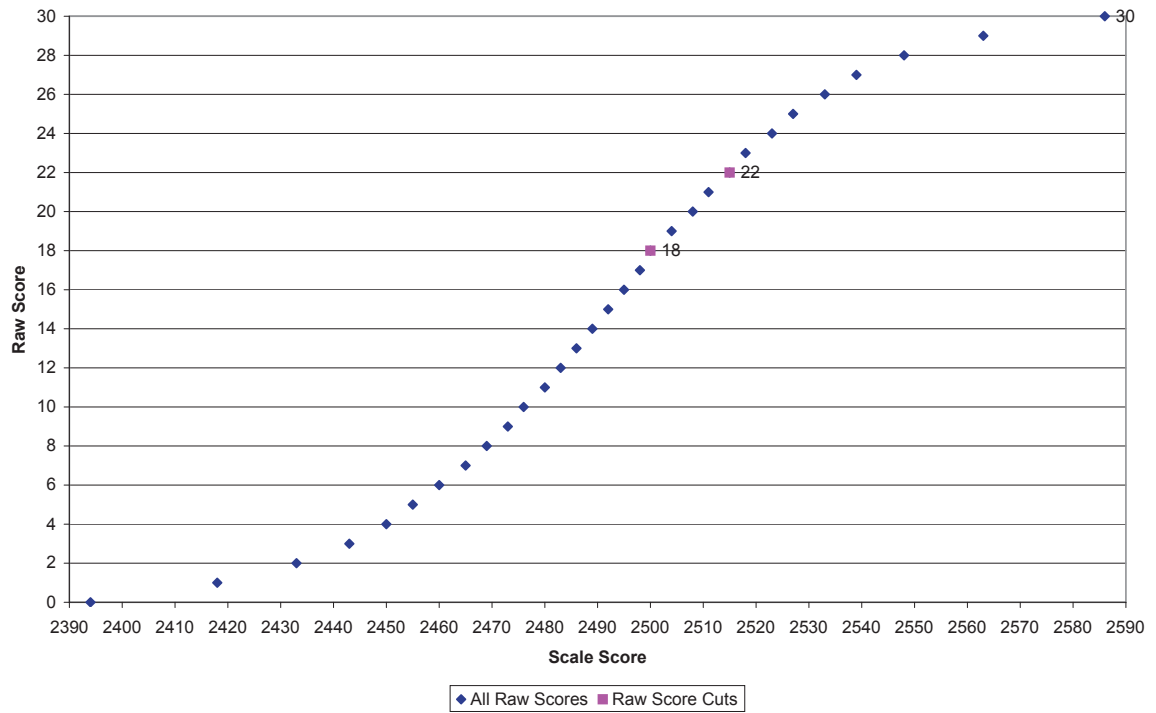
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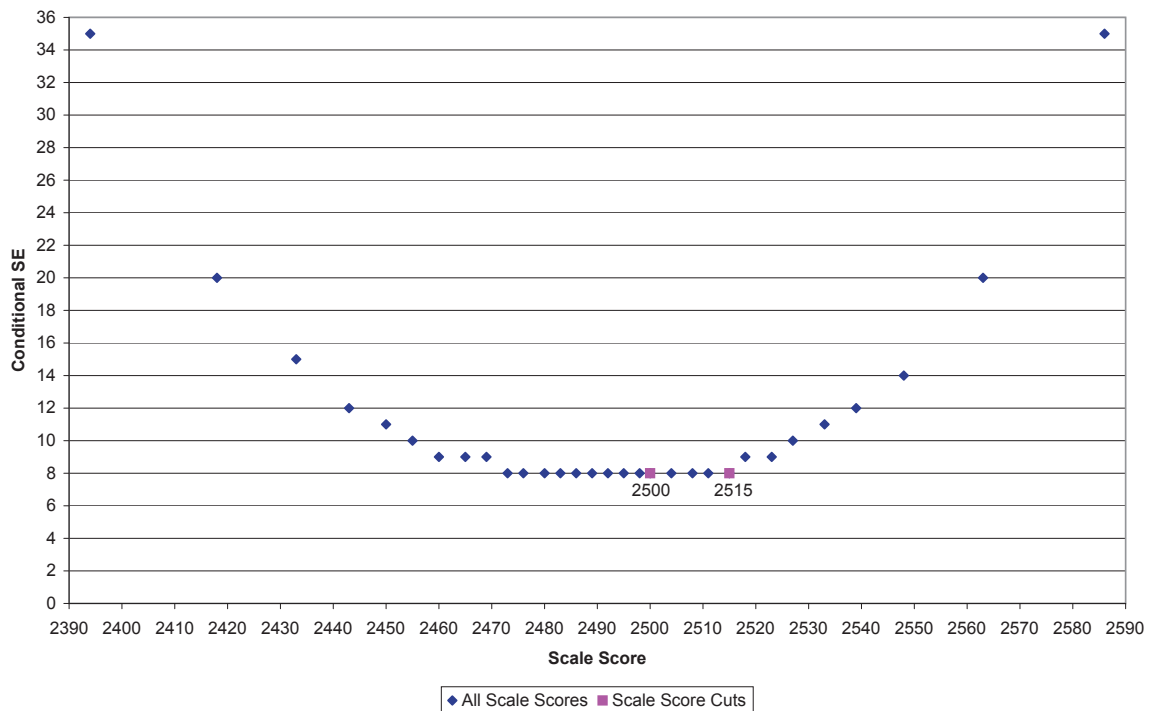
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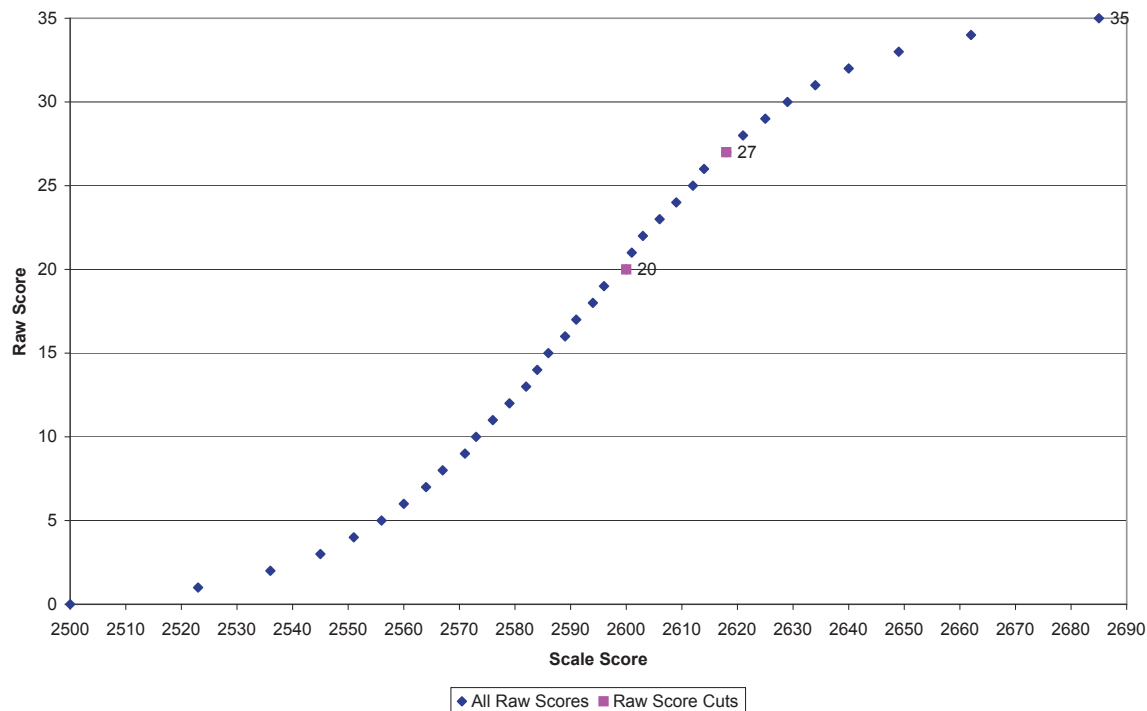
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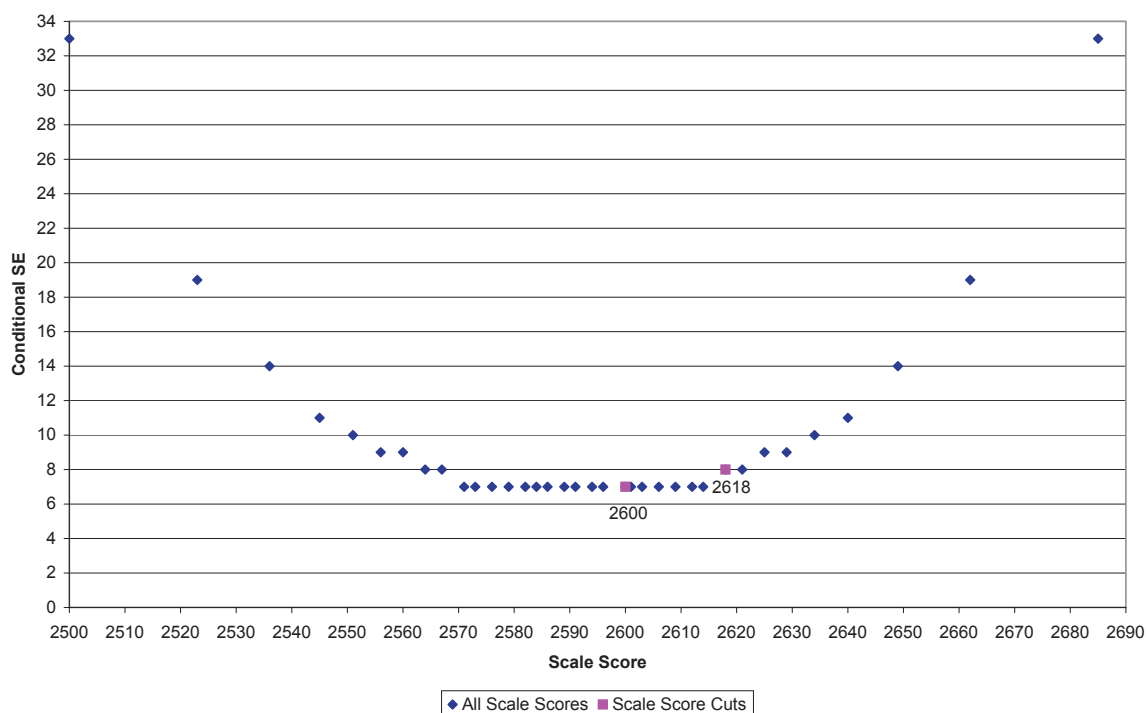
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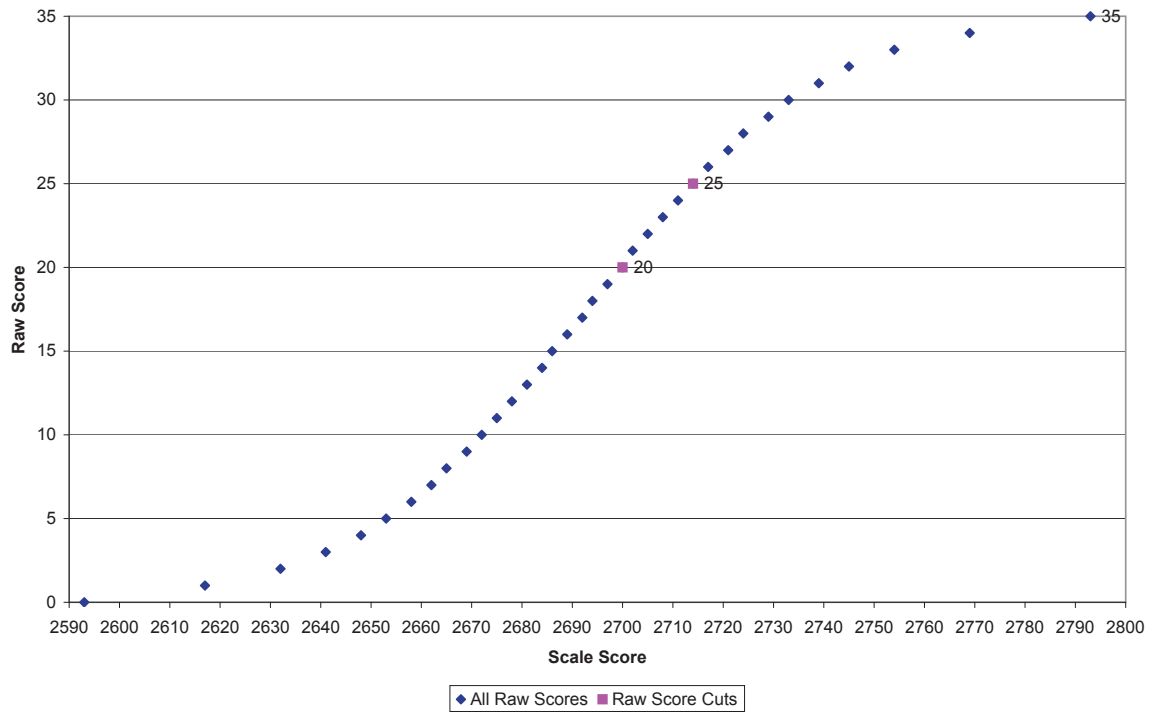
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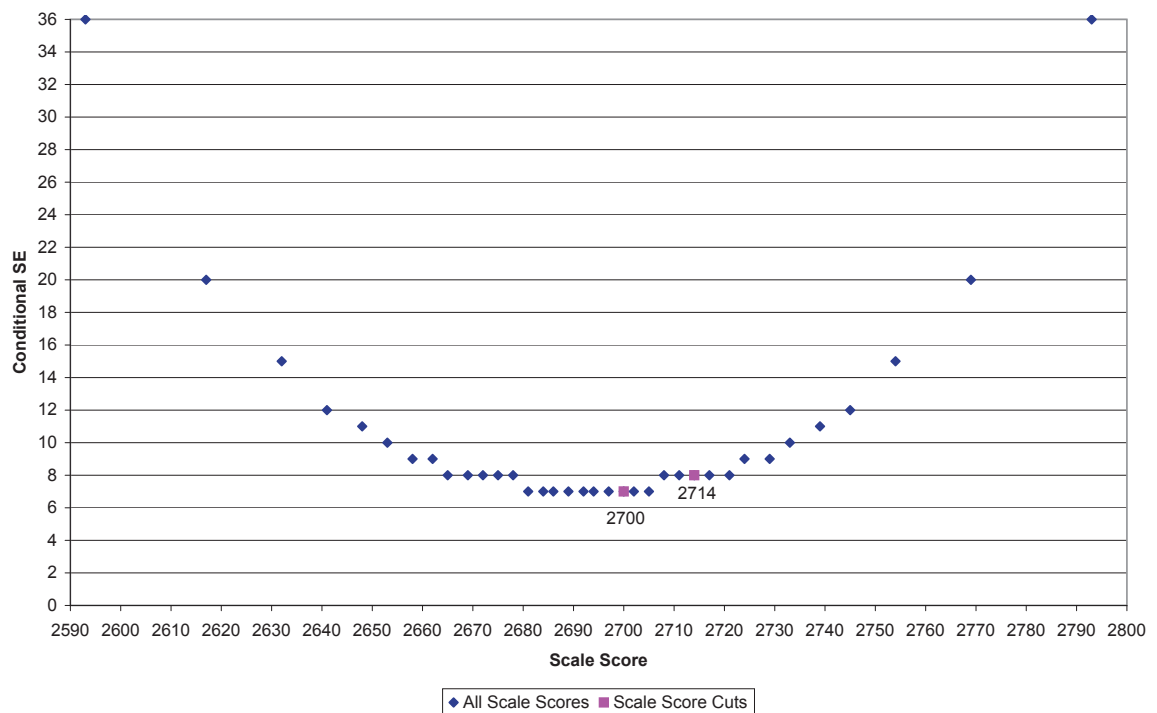
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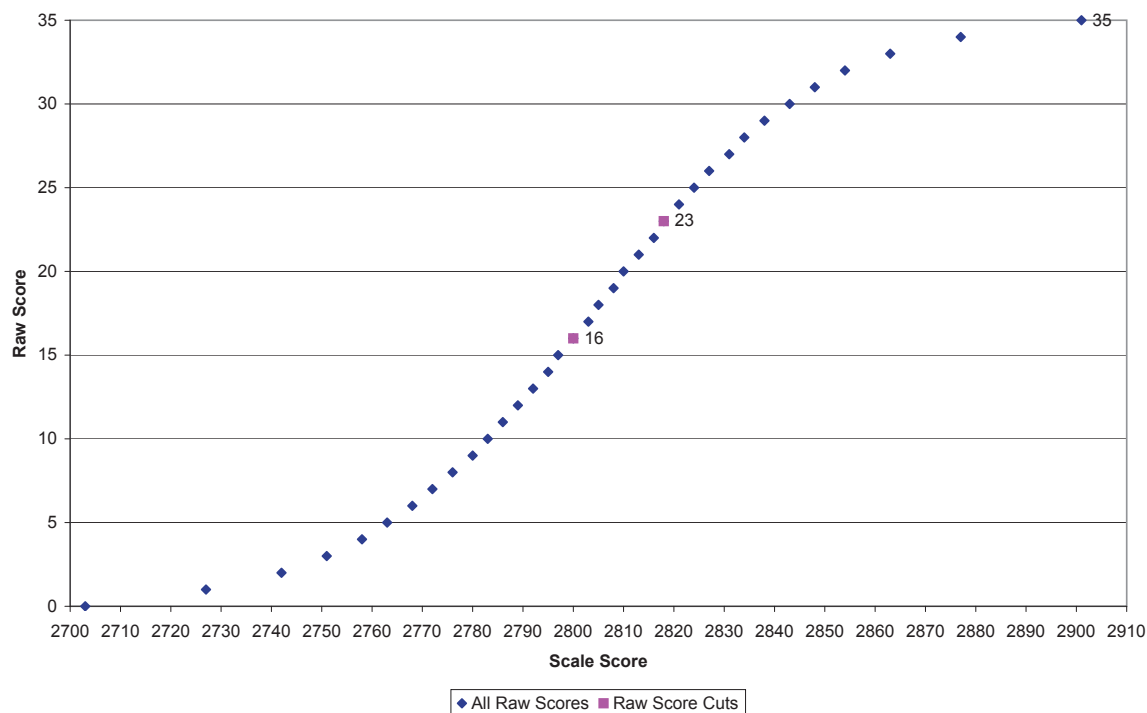
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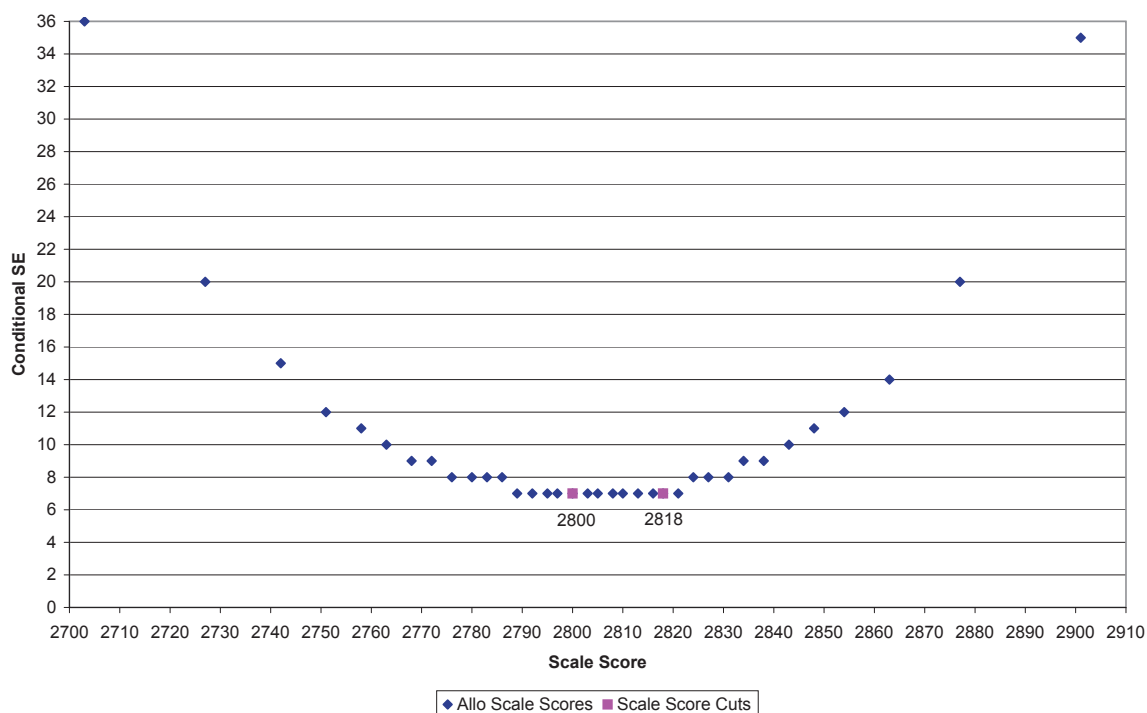
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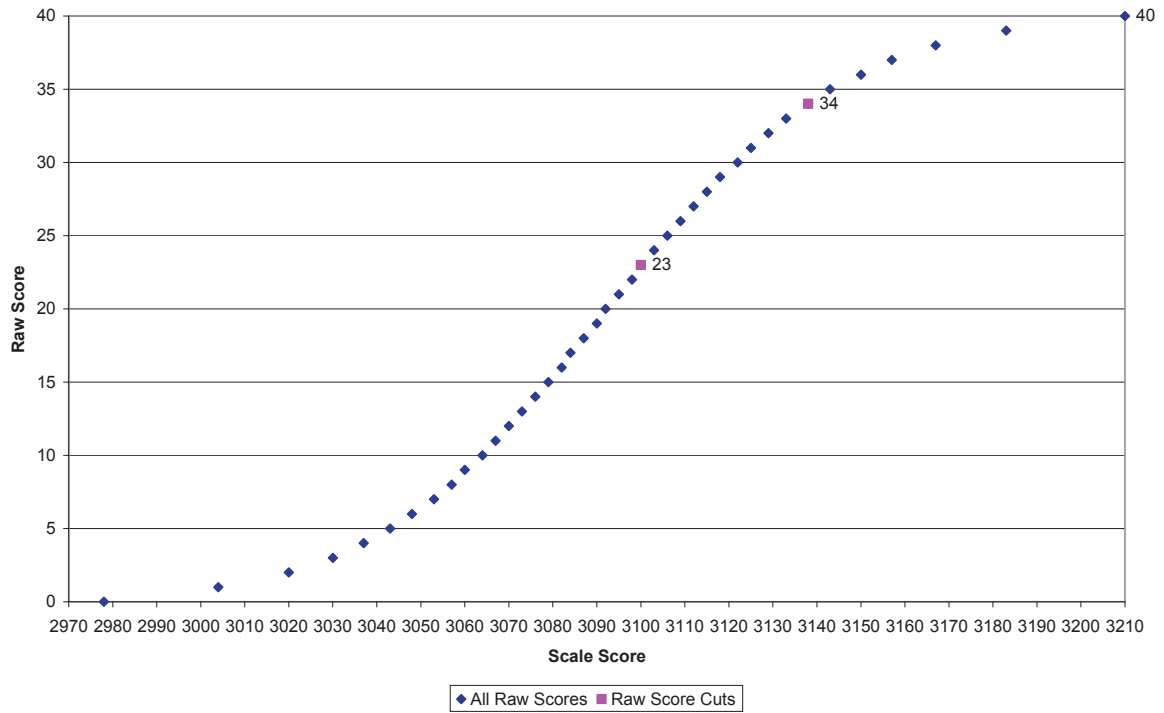
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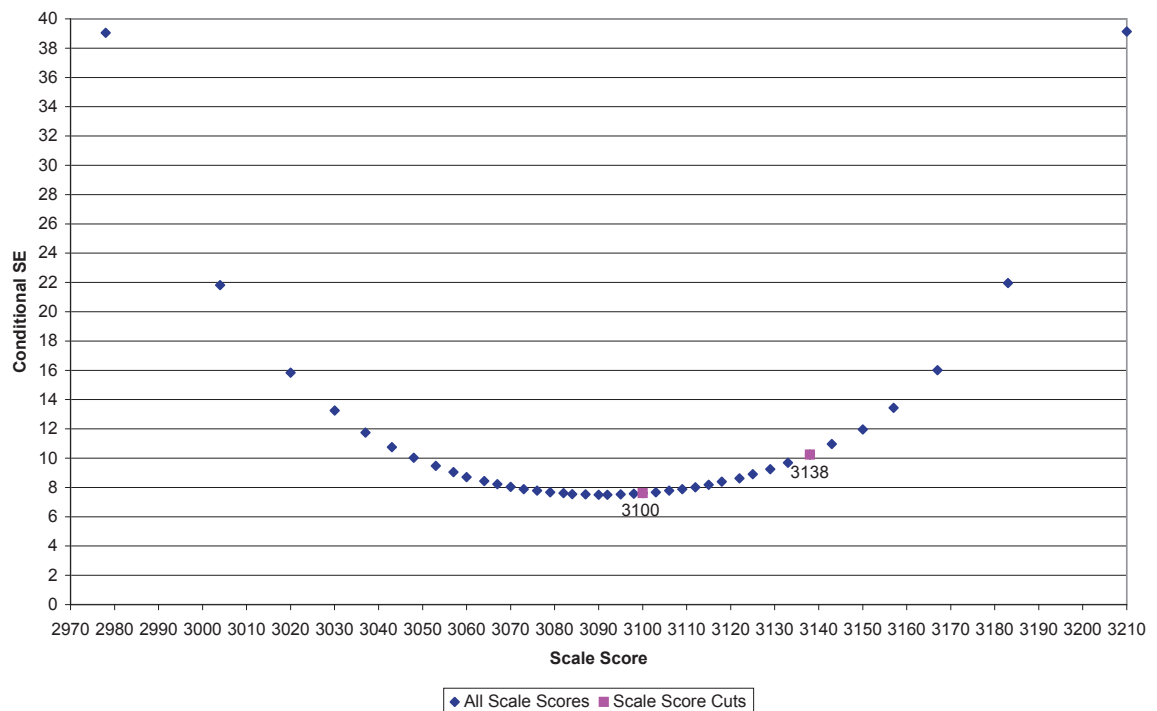
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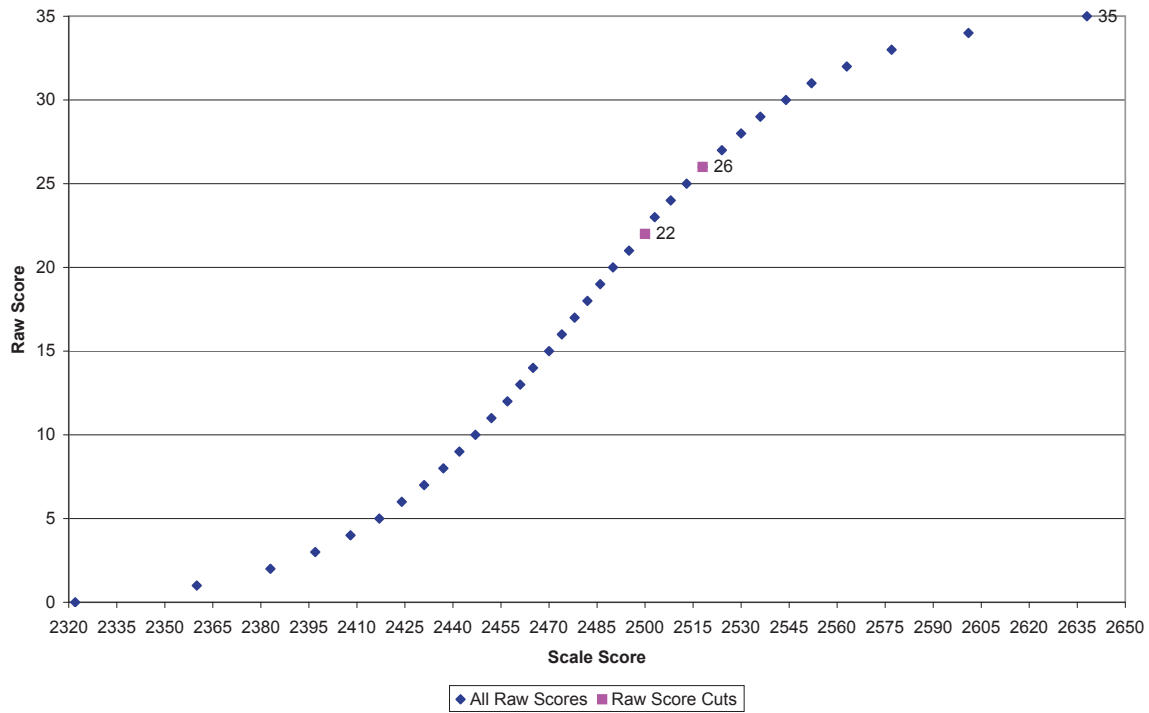
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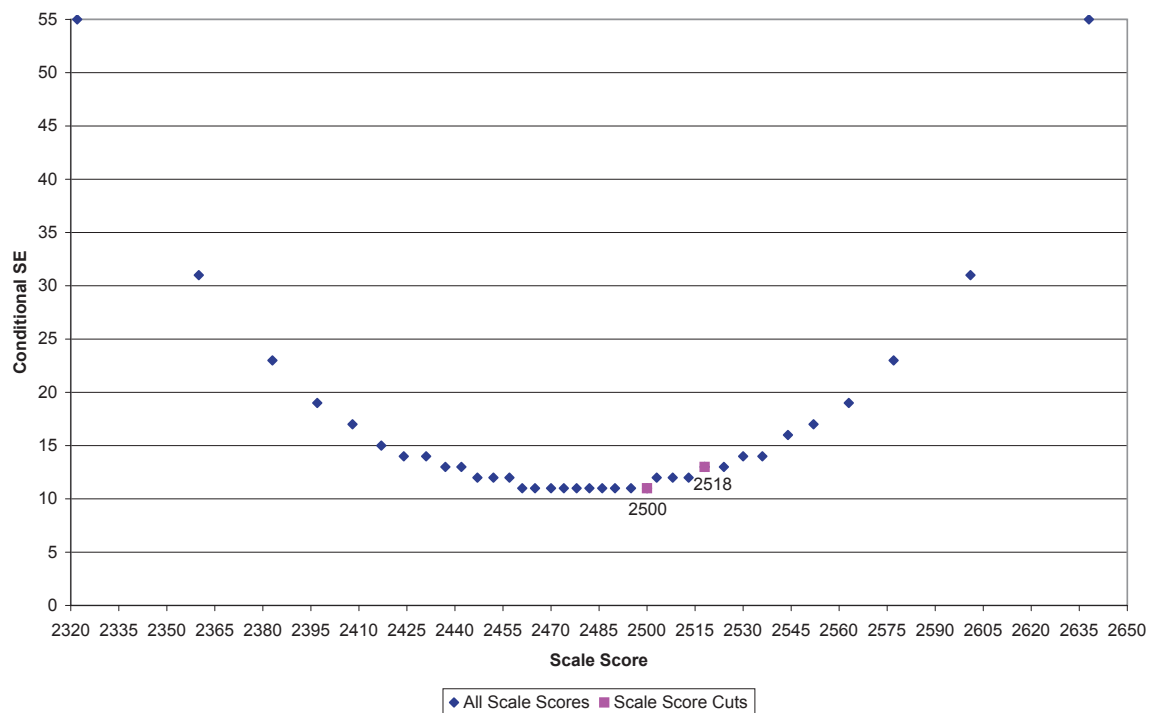
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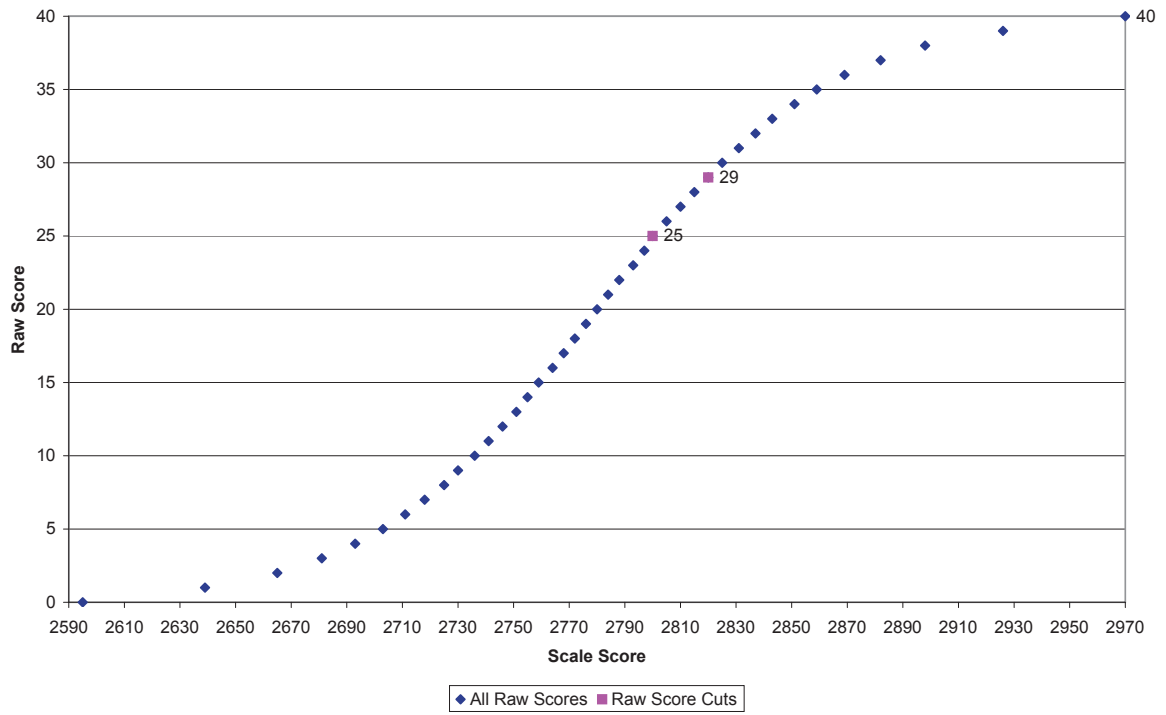
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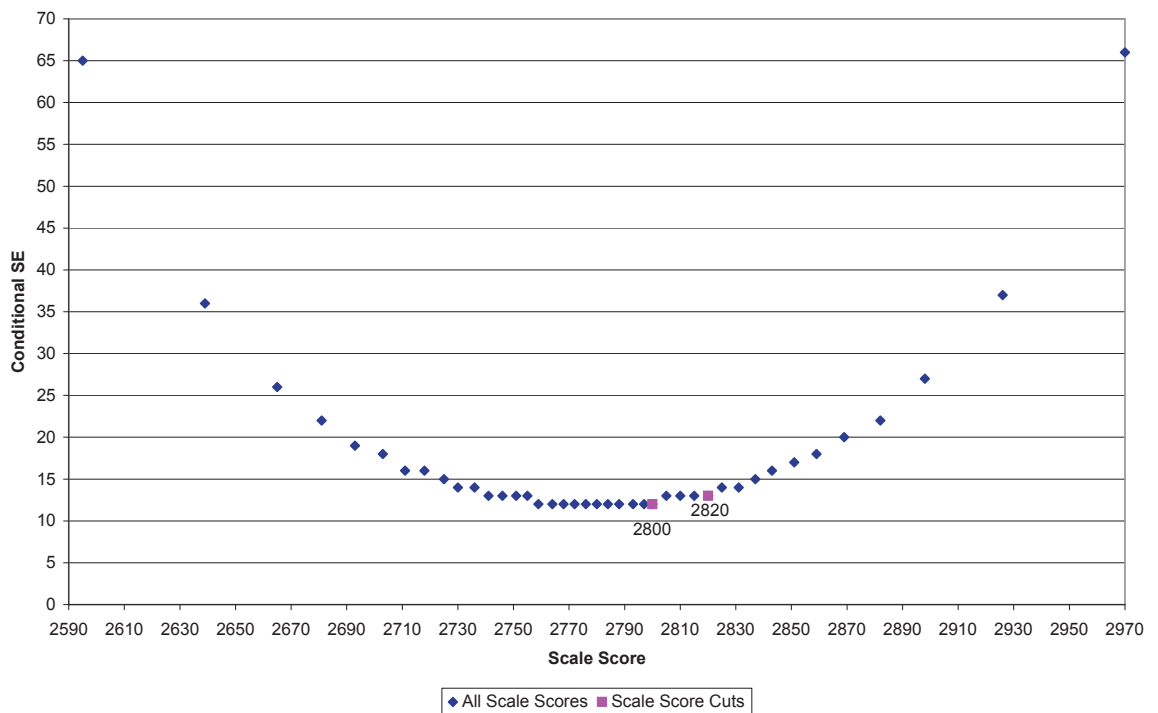
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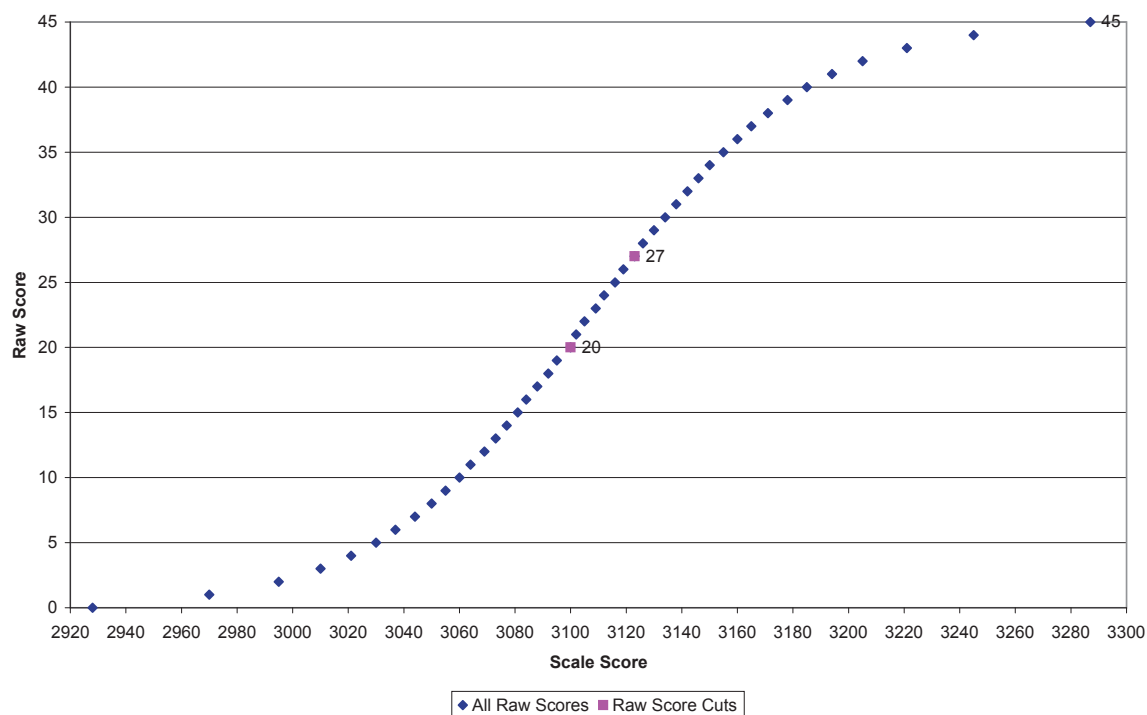
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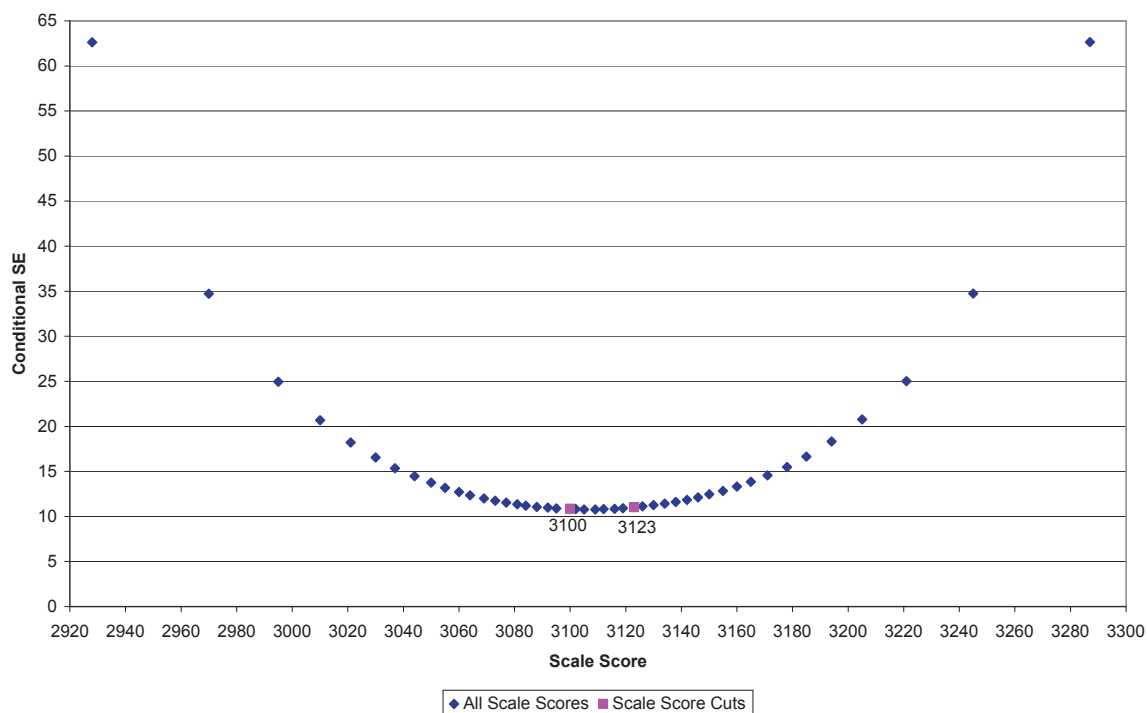
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