# Investigating the Concordance Relationship between the MSA and PARCC Scores Using Propensity Score Matching and Extrapolation Methods

## Executive Summary

The purpose of this study is to obtain the PARCC equivalents of the MSA cut scores. More specifically, the MSA Math cut scores for being proficient and advanced need to be mapped onto the PARCC Math scales, and the MSA Reading cut scores for being proficient and advanced need to be mapped onto the PARCC ELA scales at each grade level from grades 3 to 8. To map the MSA cut scores to the PARCC scales, the MARC team conducted a linking study to investigate the concordance relationship between the PARCC and MSA tests for both math and English/reading at each grade level.

The MARC team explored the following two options to create the concordance tables.

1. Option I: Using the propensity score matching (PSM) method to form matched equivalent groups based on covariates of gender, race, limited English proficiency (LEP), Title I, FARMS and the prior year's MSA score. Subsequently, the equipercentile linking method based on equivalent groups was used to map the MSA cut scores onto the PARCC scales directly. As grade 2 students did not participate in either test, no MSA scores from previous grade were available to be used as a covariate to match the 3rd graders who took MSA in 2014 and the 3rd graders who took PARCC in 2015. Therefore, the PSM between grade 3 tests was conducted based on the five demographic covariates (i.e. gender, race, LEP, Title I and FARMS).

2. Option II: Using data on the percentages of test takers being classified into different performance levels (i.e. basic, proficient and advanced) for MSA math and reading tests from 2004 test administration to 2012 test administration at each grade, extrapolation was conducted to predict the trend for 2015 tests. The projected percentages were mapped onto to the 2015 PARCC scale respectively for each grade in each content area. Essentially, this is to use the impact data to predict the cut points on the PARCC scale. As there is an abnormal downward trend for the percentages of test takers achieving proficient or above in MSA tests starting from 2013 due to the introduction of the common core standards and the PARCC field tests, the percentages for different performance levels were extrapolated for 2013, 2014, and 2015 test administrations.

## Major Findings

The major findings of this study are summarized as follows.

1. The PARCC equivalents of the MSA cut scores for each test in each content area are summarized in the full report. Generally speaking, the PARCC equivalents of MSA cut scores yielded from Option I were higher than those produced by Option II. In Option I, we used data from MSA 2013 and 2014 test administrations to build equivalent groups

between the 2015 PARCC test takers and the 2014 MSA test takers for all tests. As students' performance in the 2014 MSA tests has been impacted by the introduction of the common core standards, new curricula, and the PARCC field tests, the mapped 2015 PARCC cut scores were higher than the mapped PARCC cut scores in Option II where the data from MSA 2004 to 2012 test administrations were used to extrapolate the trend.

2. Given the impact data from Option II followed the historical trend better, we recommend using the PARCC cut scores obtained from Option II. That is, a PARCC scale score of 700 is recommended as an equivalent for the MSA cut score for being basic vs. proficient for grade 3 to grade 8 MATH and ELA tests; and a PARCC scale score of 750 is recommended as an equivalent of the MSA cut score of being proficient vs. advanced for both MATH and ELA tests for all grades.

3. However, if higher performance standards are expected for Maryland students, the cut scores from Option I could be modified to be in better alignment with the PARCC performance level cut scores. That is, a PARCC scale score of 725 is recommended as an equivalent for the MSA cut score for being basic vs. proficient for grade 3 to grade 8 MATH and ELA tests; and a PARCC scale score of 750 is recommended as an equivalent of the MSA cut score of being proficient vs. advanced for both MATH and ELA tests for all grades.

4. The final adoption of cut scores obtained in this study should depend on considerations from psychometric, policy, and practical perspectives.

## Option I

## Using Equivalent Groups Based on Propensity Score Matching to Link MSA and PARCC Tests

### Data Description

To link MSA and PARCC tests, data used in this analysis include, 1) data from grades 3 to 8 PARCC ELA tests and Math tests in 2015 test administrations, and 2) data from grades 3 to 8 MSA Reading and Math tests in 2013 and 2014 test administrations.

Prior to data analysis, data cleaning was conducted for PARCC tests and MSA tests, respectively. For the PARCC tests, cases with missing values on state ID (i.e. *Statewide identifier*), scale score (i.e. *Summative Scale Score*), test code (i.e. *Test Code*) and the covariates (i.e. *Gender, Race Code, LEP, Title I, FARMS*) were removed from the datasets for propensity score matching (PSM; Rosenbaum & Rubin, 1983). In addition, cases for students who were considered as non-participants for performance and accountability proficiency reporting were excluded from the PARCC dataset using variables *LEP Exempt* and *Accountability Participation Flag*. Table 1.1 presents the summary statistics for the twelve PARCC tests after data cleaning.

Table 1.1
*Summary Statistics for 2015 PARCC Tests*

| Test | N | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| MAT03 | 65606 | 736.78 | 34.69 | 650 | 850 |
| MAT04 | 64297 | 733.52 | 31.40 | 650 | 850 |
| MAT05 | 63837 | 733.20 | 30.90 | 650 | 850 |
| MAT06 | 62201 | 732.26 | 30.04 | 650 | 850 |
| MAT07 | 55018 | 728.10 | 26.18 | 650 | 850 |
| MAT08 | 41171 | 723.26 | 38.30 | 650 | 850 |
| ELA03 | 65099 | 736.96 | 41.35 | 650 | 850 |
| ELA04 | 63799 | 740.34 | 34.35 | 650 | 850 |
| ELA05 | 63339 | 739.98 | 32.50 | 650 | 850 |
| ELA06 | 62063 | 737.58 | 30.67 | 650 | 850 |
| ELA07 | 61208 | 737.12 | 36.87 | 650 | 850 |
| ELA08 | 59342 | 738.29 | 38.31 | 650 | 850 |

To clean the 2014 MSA data, cases with missing values on state ID (i.e. *STATEWIDE IDENTIFIER*), scale score (i.e. *MATH_SS* or *RD_SS*), content indicator (i.e. *CONTENT_FLAG*) and the PSM covariates (i.e. *GENDER, NEW RACE DESIGANATION, LEP, TITLE I, FARMS*) were deleted. Further, students who did not take these tests and who were considered as non-participants for performance and accountability proficiency reporting were excluded from the 2014 MSA data using variables *EXCUSED, MSDE_DUP_FLAG, LEP_RDG_EXAMPT/LEP_MATH_EXEMPT, TEST_SECURITY_INVALID_FLAG, MEDICAL_EMERGENCY_FLAG* and *PARTICIPATION _FLAG*. In MSA data, a small number of students (e.g. 1 out of 53520 in 2014 grade 6 MSA Math test) have multiple score entries on the same test administration with different scale scores. These cases were removed from further

analysis. Moreover, only the students who took regular MSA tests (i.e. non-modified tests) were selected for the linking study. Table 1.2 provides the summary statistics for the twelve MSA tests in the 2014 test administration.

Table 1.2
*Summary Statistics for 2014 MSA Tests*

| Test | N | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| Math 3 | 54401 | 405.25 | 40.24 | 240 | 650 |
| Math 4 | 53921 | 412.98 | 43.02 | 240 | 650 |
| Math 5 | 62866 | 418.16 | 39.57 | 240 | 650 |
| Math 6 | 53520 | 416.81 | 36.96 | 240 | 650 |
| Math 7 | 51655 | 414.43 | 40.98 | 240 | 599 |
| Math 8 | 60589 | 420.40 | 37.90 | 240 | 650 |
| Reading 3 | 54404 | 417.71 | 38.93 | 240 | 614 |
| Reading 4 | 53934 | 414.60 | 41.37 | 240 | 634 |
| Reading 5 | 62872 | 427.23 | 37.55 | 240 | 650 |
| Reading 6 | 53530 | 415.97 | 36.14 | 240 | 650 |
| Reading 7 | 51664 | 420.10 | 43.12 | 240 | 650 |
| Reading 8 | 60603 | 417.32 | 35.76 | 240 | 650 |

## Analysis

Given the available data, it is impossible to perform the common person or common item linking design to obtain the PARCC equivalents of the MSA cut scores. This is due to the fact that there are no common students who took the 2015 PARCC and 2014 MSA tests at each grade. For example, the 8$^{th}$ graders who took PARCC MAT08 in 2015 and the 8$^{th}$ graders who took MSA Math 8 in 2014 are different groups of students. In addition, there are no common items between PARCC and MSA tests for the same grade and content.

Propensity score matching is a method utilized to obtain equivalent groups of students taking the PARCC and MSA tests for the same grade and content based on matching variables. The equivalent groups at each grade level formed using PSM are based on covariates including MSA test scores in the same content area from the previous year and five demographic variables i.e. gender, race, LEP, Title I, and FARMS. Note when 2014 MSA test scores and 2013 MSA scores used as covariates in PSM, only cases with missing values on state ID (i.e. *STATEWIDE IDENTIFIER*), scale score (i.e. *MATH_SS* or *RD_SS*), content indicator (i.e. *CONTENT_FLAG*) were excluded. The matching design of the study is summarized in Table 1.3. As there are no MSA tests for grade 2, no previous test scores can be used as a covariate to match grade 3 PARCC tests in 2015 with grade 3 MSA tests in 2014. Therefore, only the five demographic covariates were used to match 2015 PARCC and 2014 MSA grade 3 tests.

Table 1.3
*Option I PSM Design*

| Grade | Matched Group | Math | | Reading/ELA | |
|---|---|---|---|---|---|
| | | Test | MSA Test Score Covariate | Test | MSA Test Score Covariate |
| 3 | Group 1 | 2015 PARCC MAT03 | N/A | 2015 PARCC ELA03 | N/A |
| | Group 2 | 2014 MSA Math 3 | N/A | 2014 MSA Read 3 | N/A |
| 4 | Group 1 | 2015 PARCC MAT04 | 2014 MSA Math 3 | 2015 PARCC ELA04 | 2014 MSA Read 3 |
| | Group 2 | 2014 MSA Math 4 | 2013 MSA Math 3 | 2014 MSA Read 4 | 2013 MSA Read 3 |
| 5 | Group 1 | 2015 PARCC MAT05 | 2014 MSA Math 4 | 2015 PARCC ELA05 | 2014 MSA Read 4 |
| | Group 2 | 2014 MSA Math 5 | 2013 MSA Math 4 | 2014 MSA Read 5 | 2013 MSA Read 4 |
| 6 | Group 1 | 2015 PARCC MAT06 | 2014 MSA Math 5 | 2015 PARCC ELA06 | 2014 MSA Read 5 |
| | Group 2 | 2014 MSA Math 6 | 2013 MSA Math 5 | 2014 MSA Read 6 | 2013 MSA Read 5 |
| 7 | Group 1 | 2015 PARCC MAT07 | 2014 MSA Math 6 | 2015 PARCC ELA07 | 2014 MSA Read 6 |
| | Group 2 | 2014 MSA Math 7 | 2013 MSA Math 6 | 2014 MSA Read 7 | 2013 MSA Read 6 |
| 8 | Group 1 | 2015 PARCC MAT08 | 2014 MSA Math 7 | 2015 PARCC ELA08 | 2014 MSA Read 7 |
| | Group 2 | 2014 MSA Math 8 | 2013 MSA Math 7 | 2014 MSA Read 8 | 2013 MSA Read 7 |

Based on the design, the 2015 PARCC test scores and demographic covariates were merged with the corresponding 2014 MSA test scores, and the 2014 test scores and demographic covariates were merged with the corresponding 2013 MSA test scores by state issued ID (*Statewide Identifier*) for grades 4 to 8 tests. Due to the absence of prior year MSA scores for grade 3, the 2015 PARCC dataset and 2014 MSA dataset without previous year's MSA test scores were used in PSM. Table 1.4 and Table 1.5 present the descriptive statistics for the merged datasets.

Table 1.4

*Summary Statistics for 2015 PARCC Tests and 2014 MSA Tests with Covariates Merged-Math*

| Grade | Test | Sample Size | Mean | SD | Min. | Max. |
|---|---|---|---|---|---|---|
| 3 | Group 1: 2015 PARCC MAT03 | 65606 | 736.78 | 34.69 | 650 | 850 |
| | Group 2: 2014 MSA Math 3 | 54401 | 405.25 | 40.24 | 240 | 650 |
| 4 | Group 1: 2015 PARCC MAT04 & 2014 MSA Math 3 | 51414 | 734.31 | 31.50 | 650 | 850 |
| | Group 2: 2014 MSA Math 4 & 2013 MSA Math 3 | 51302 | 413.47 | 42.99 | 240 | 650 |
| 5 | Group 1: 2015 PARCC MAT05 & 2014 MSA Math 4 | 51057 | 733.83 | 30.78 | 650 | 850 |
| | Group 2: 2014 MSA Math 5 & 2013 MSA Math 4 | 59976 | 418.77 | 39.59 | 240 | 650 |
| 6 | Group 1: 2015 PARCC MAT06 & 2014 MSA Math 5 | 58006 | 733.05 | 29.70 | 650 | 850 |
| | Group 2: 2014 MSA Math 6 & 2013 MSA Math 5 | 50789 | 417.44 | 37.00 | 240 | 650 |
| 7 | Group 1: 2015 PARCC MAT07 & 2014 MSA Math 6 | 43982 | 729.57 | 25.75 | 650 | 850 |
| | Group 2: 2014 MSA Math 7 & 2013 MSA Math 6 | 49035 | 415.35 | 40.85 | 240 | 599 |
| 8 | Group 1: 2015 PARCC MAT08 & 2014 MSA Math 7 | 32277 | 725.78 | 38.74 | 650 | 850 |
| | Group 2: 2014 MSA Math 8 & 2013 MSA Math 7 | 57676 | 421.26 | 37.80 | 240 | 650 |

The merged datasets with six covariates for both PARCC and MSA tests were utilized for PSM (five covariates for grade 3 tests). As stated above, the five demographic covariates are Gender, Race, LEP, Farms and Title I. Gender, Race, LEP, Farms and Title I are variables from the 2015 PARCC test dataset in Group 1 and the 2014 MSA test dataset in Group 2 for both MAT/Math tests and ELA/Reading tests. For the Gender variable, males were coded as 1 and females as 0. For the Race variable, White was coded as 1 and all others as 0. LEP was coded as 1 for students with limited English proficiency and 0 for others. The Farms variable was coded as 1 for students with free and reduced priced meals and 0 for students without. The Title I variable was coded as 1 for students who belong to this category and 0 for students who do not belong to this category. The prior year's MSA scale scores were used as a covariate directly with no recoding.

R studio was used for propensity score matching. The package "MatchIt" developed by Ho, Imai, K. and Imai, M. (2013) was used to match cases in the control group to those in the treatment group. Usually the group with a smaller sample size is treated as the treatment group, and this was the case with the current study. Before the full-scale analysis, a pilot analysis was conducted to match the PARCC grade 8 math test with the MSA grade 8 math test. To match students who took PARCC grade 8 math test in 2015 and students who took MSA grade 8 math test in 2014, this study explored four conditions by using different caliper widths and matching

with or without replacement. Caliper, which is the maximum difference between the matched cases, was set at two levels: 0.1 and 0.25. Replacement was set at two levels: with and without replacement. Replacement means that the cases in the control group can be matched to multiple treatment units. After exploring the four conditions, we found no significant difference for the mapped PARCC equivalents of MSA cut scores. Therefore, the default option in MatchIt, i.e. one to one nearest neighbor without replacement matching with a caliper of 0.25, was used to in the full-scale analyses to match other pairs of tests.

Table 1.5
*Summary Statistics for 2015 PARCC Tests and 2014 MSA Tests with Covariates Merged-English/Reading*

| Grade | Test | Sample Size | Mean | SD | Min. | Max. |
|---|---|---|---|---|---|---|
| 3 | Group 1: 2015 PARCC ELA03 | 65099 | 736.96 | 41.35 | 650 | 850 |
| | Group 2: 2014 MSA Read 3 | 54404 | 417.71 | 38.93 | 240 | 614 |
| 4 | Group 1: 2015 PARCC ELA04 & 2014 MSA Read 3 | 51420 | 740.89 | 34.43 | 650 | 850 |
| | Group 2: 2014 MSA Read 4 & 2013 MSA Read 3 | 51303 | 415.10 | 41.29 | 240 | 634 |
| 5 | Group 1: 2015 PARCC ELA05 & 2014 MSA Read 4 | 51094 | 740.48 | 32.57 | 650 | 850 |
| | Group 2: 2014 MSA Read 5 & 2013 MSA Read 4 | 59975 | 427.73 | 37.45 | 240 | 650 |
| 6 | Group 1: 2015 PARCC ELA06 & 2014 MSA Read 5 | 58495 | 737.95 | 30.52 | 650 | 850 |
| | Group 2: 2014 MSA Read 6 & 2013 MSA Read 5 | 50796 | 416.42 | 36.08 | 240 | 650 |
| 7 | Group 1: 2015 PARCC ELA07 &2014 MSA Read 6 | 50199 | 738.90 | 36.61 | 650 | 850 |
| | Group 2: 2014 MSA Read 7 & 2013 MSA Read 6 | 49036 | 420.95 | 43.02 | 240 | 650 |
| 8 | Group 1: 2015 PARCC ELA08 &2014 MSA Read 7 | 48310 | 740.17 | 38.17 | 650 | 850 |
| | Group 2: 2014 MSA Read 8 & 2013 MSA Read 7 | 57693 | 417.98 | 35.58 | 240 | 650 |

To compare the similarity of the treated and control subjects in the matched sample, the standardized mean difference is commonly used as an indicator for what is called a balance check. It can be used to compare the mean of continuous and binary variables between the treatment and control groups. For a continuous covariate, the standardized mean difference is defined as

$$d = \frac{\bar{x}_{treatment} - \bar{x}_{control}}{\sqrt{\frac{s^2_{treatment} + s^2_{control}}{2}}}$$

where $\bar{x}_{treatment}$ and $\bar{x}_{control}$ denote the sample mean of the covariate in the treated and control groups, respectively, whereas $s^2_{treatment}$ and $s^2_{control}$ denote the sample variance of the covariate in the treated and control groups, respectively.

The standardized mean difference compares the difference in means in units of the pooled standard deviation. Furthermore, it is not influenced by sample size and allows for the comparison of the relative balance of variables measured in different units. Although there is no universally agreed upon criterion as to what threshold of the standardized difference can be used to indicate important imbalance, an absolute value of standardized mean difference that is less than 0.25 has been suggested to indicate a negligible difference in the mean of a covariate between the treatment and control group (Stuart, 2010).

Table 1.6
*Absolute Standardized Mean Differences for Math after Propensity Score Matching*

| Covariates | Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 |
|---|---|---|---|---|---|---|
| Gender | 0.0022 | 0.0002 | 0.0031 | 0.0015 | 0.0024 | 0.0084 |
| Race | 0.0000 | 0.0004 | 0.0020 | 0.0030 | 0.0030 | 0.0221 |
| LEP | 0.0170 | 0.0040 | 0.0027 | 0.0025 | 0.0052 | 0.0097 |
| Title 1 | 0.0075 | 0.0016 | 0.0017 | 0.0036 | 0.0038 | 0.0035 |
| FARMS | 0.0105 | 0.0012 | 0.0036 | 0.0024 | 0.0021 | 0.0102 |
| MSA | NA | 0.0223 | 0.0210 | 0.0151 | 0.0260 | 0.0175 |
| Treatment | 2014 MSA | 2014 MSA | 2015 PARCC | 2014 MSA | 2015 PARCC | 2015 PARCC |

Table 1.7
*Absolute Standardized Mean Differences for Reading/ELA Based after Propensity Score Matching*

| Covariates | Grade 3 | Grade 4 | Grade 5 | Grade 6 | Grade 7 | Grade 8 |
|---|---|---|---|---|---|---|
| Gender | 0.0070 | 0.0038 | 0.0029 | 0.0023 | 0.0007 | 0.0048 |
| Race | 0.0099 | 0.0019 | 0.0044 | 0.0026 | 0.0099 | 0.0068 |
| LEP | 0.0142 | 0.0002 | 0.0001 | 0.0005 | 0.0000 | 0.0131 |
| Title 1 | 0.0057 | 0.0032 | 0.0017 | 0.0134 | 0.0285 | 0.0079 |
| FARMS | 0.0076 | 0.0029 | 0.0011 | 0.0029 | 0.0145 | 0.0084 |
| MSA | NA | 0.0144 | 0.0023 | 0.0083 | 0.0090 | 0.0020 |
| Treatment | 2014 MSA | 2014 MSA | 2015 PARCC | 2014 MSA | 2014 MSA | 2015 PARCC |

Tables 1.6 presents the absolute standardized mean differences in the propensity scores for each covariate in each matched pair of math tests. Table 1.7 presents the same information for the Reading/ELA tests. The bottom part in both tables indicates the groups that were used as the treatment groups in matching. In this study, the group with fewer cases (the sample sizes presented in Table 1.4 and 1.5) was chosen as the treatment group and the other group as the control group to maximize the sample size of the matched cases. Therefore, in each design, either Group 1(i.e. 2015 PARCC+2014 MSA) or Group 2 (i.e. 2014 MSA+ 2013 MSA) was chosen as a treatment group based on the sample size of the matched cases in Table 1.4 and 1.5. The values

of the absolute standardized mean differences in Tables 1.6 to 1.7 were checked against the criteria suggested in literature. The results indicated that for all matched pairs of tests, the covariate balance was achieved after matching for each covariate.

The descriptive statistics for the MSA and PARCC test scores for the matched samples for each pair of tests are summarized in Tables 1.8 to 1.9 for math and ELA respectively. As we used one to one without replacement PSM, all control units have weights of one, and the after-matching sample sizes for the treatment group and the control group are the same within each pair of tests.

Table 1.8
*Descriptive Statistics for MSA and PARCC Test Scores in the Matched Samples for Math*

| Grade | Test Name | N | Mean | SD | Min | Max |
|---|---|---|---|---|---|---|
| 3 | MSA | 54341 | 405.26 | 40.24 | 240 | 650 |
| | PARCC | 54341 | 737.49 | 34.86 | 650 | 850 |
| 4 | MSA | 44919 | 408.66 | 41.00 | 240 | 650 |
| | PARCC | 44919 | 737.28 | 31.45 | 650 | 850 |
| 5 | MSA | 46735 | 410.71 | 36.91 | 240 | 650 |
| | PARCC | 46735 | 735.91 | 30.66 | 650 | 850 |
| 6 | MSA | 47925 | 415.23 | 36.05 | 240 | 650 |
| | PARCC | 47925 | 737.61 | 29.20 | 650 | 850 |
| 7 | MSA | 37971 | 404.51 | 35.81 | 240 | 599 |
| | PARCC | 37971 | 732.13 | 25.60 | 650 | 850 |
| 8 | MSA | 31046 | 408.72 | 36.19 | 240 | 650 |
| | PARCC | 31046 | 727.31 | 38.47 | 650 | 850 |

Table 1.9
*Descriptive Statistics for MSA and PARCC Test Scores in the Matched Sample for ELA*

| Grade | Test Name | N | Mean | SD | Min | Max |
|---|---|---|---|---|---|---|
| 3 | MSA | 53716 | 418.05 | 38.95 | 240 | 614 |
| | PARCC | 53716 | 737.34 | 41.48 | 650 | 850 |
| 4 | MSA | 46329 | 411.64 | 39.91 | 240 | 616 |
| | PARCC | 46329 | 743.31 | 34.18 | 650 | 850 |
| 5 | MSA | 51061 | 426.90 | 37.62 | 240 | 646 |
| | PARCC | 51061 | 740.50 | 32.56 | 650 | 850 |
| 6 | MSA | 50026 | 415.83 | 35.81 | 240 | 650 |
| | PARCC | 50026 | 740.11 | 30.64 | 650 | 850 |
| 7 | MSA | 48616 | 421.26 | 42.99 | 240 | 650 |
| | PARCC | 48616 | 738.99 | 36.60 | 650 | 850 |
| 8 | MSA | 48119 | 417.42 | 35.95 | 240 | 650 |
| | PARCC | 48119 | 740.21 | 38.06 | 650 | 850 |

After propensity score matching, the equipercentile linking based on equivalent groups was conducted based on the matched samples of 2015 PARCC tests and 2014 MSA tests for grades 3 to 8 Math and Reading/ELA tests. The Linking with Equivalent Group or the Single

Group Design (LEGS) program developed by Kolen and Brennan (2004) was used to link the 12 pairs of matched samples. After specifying the input data format related to test scores and their respective frequencies, subgroup information (no subgroup in this study), smoothing parameters and score truncation in the original scale score units, the LEGS program reported the results for the equipercentile linking based on the equivalent group design to map the MSA scores onto the PARCC score scale for each grade and subject.

In Appendix A, a screenshot capturing the input window for linking PARCC MAT08 and MSA 8th grade Math was shown. Two smoothing values were compared in post- linking: 0.3 and 1. The choice of using smoothing parameters is supported by simulation studies that the smoothed results outperform the non-smoothed results in reducing linking errors (Cui & Kolen, 2009; Hanson et al., 1994). The results using smoothing value of 1 were reported due to the fact that after rounding there was little difference between the results based on the two smoothing parameters.

The PARCC equivalents of the MSA cut scores are summarized in Table 1.10 for each grade and content. In total, 12 concordance tables (Table 1.11-Table 1.22) were created based on PSM. The cut points presented in Table 1.10 are marked in red in each concordance table.

Table 1.10
*MSA Cut Scores and PARCC Equivalent Scores Using PSM*

| Grade | Math | | | | Reading/ELA | | | |
|---|---|---|---|---|---|---|---|---|
| | Scale Score for Proficient | | Scale Score for Advanced | | Scale Score for Proficient | | Scale Score for Advanced | |
| | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
| 3 | 379 | 713 | 441 | 770 | 388 | 703 | 456 | 781 |
| 4 | 374 | 710 | 433 | 757 | 371 | 707 | 437 | 765 |
| 5 | 392 | 720 | 453 | 772 | 384 | 701 | 425 | 739 |
| 6 | 396 | 723 | 447 | 765 | 381 | 709 | 421 | 746 |
| 7 | 396 | 729 | 451 | 764 | 385 | 706 | 425 | 745 |
| 8 | 407 | 730 | 444 | 768 | 391 | 711 | 425 | 751 |

Table 1.11

*Concordance Table for MSA Grade 3 Math and PARCC MAT03*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 652 | 344 | 686 | 396 | 728 | 448 | 776 | 500 | 818 | 552 | 832 | 604 | 842 |
| 241 | 650 | 293 | 652 | 345 | 687 | 397 | 729 | 449 | 777 | 501 | 820 | 553 | 833 | 605 | 842 |
| 242 | 650 | 294 | 652 | 346 | 688 | 398 | 730 | 450 | 778 | 502 | 823 | 554 | 833 | 606 | 842 |
| 243 | 650 | 295 | 652 | 347 | 689 | 399 | 730 | 451 | 779 | 503 | 824 | 555 | 833 | 607 | 843 |
| 244 | 650 | 296 | 652 | 348 | 689 | 400 | 731 | 452 | 780 | 504 | 824 | 556 | 833 | 608 | 843 |
| 245 | 650 | 297 | 652 | 349 | 690 | 401 | 733 | 453 | 781 | 505 | 824 | 557 | 833 | 609 | 843 |
| 246 | 650 | 298 | 652 | 350 | 691 | 402 | 734 | 454 | 782 | 506 | 825 | 558 | 833 | 610 | 843 |
| 247 | 650 | 299 | 653 | 351 | 692 | 403 | 734 | 455 | 782 | 507 | 825 | 559 | 834 | 611 | 843 |
| 248 | 650 | 300 | 653 | 352 | 693 | 404 | 735 | 456 | 783 | 508 | 825 | 560 | 834 | 612 | 843 |
| 249 | 650 | 301 | 653 | 353 | 693 | 405 | 736 | 457 | 784 | 509 | 825 | 561 | 834 | 613 | 844 |
| 250 | 650 | 302 | 653 | 354 | 694 | 406 | 737 | 458 | 785 | 510 | 825 | 562 | 834 | 614 | 844 |
| 251 | 650 | 303 | 653 | 355 | 695 | 407 | 737 | 459 | 785 | 511 | 825 | 563 | 834 | 615 | 844 |
| 252 | 650 | 304 | 653 | 356 | 695 | 408 | 739 | 460 | 786 | 512 | 825 | 564 | 835 | 616 | 844 |
| 253 | 650 | 305 | 653 | 357 | 696 | 409 | 739 | 461 | 787 | 513 | 825 | 565 | 835 | 617 | 844 |
| 254 | 650 | 306 | 653 | 358 | 697 | 410 | 740 | 462 | 788 | 514 | 825 | 566 | 835 | 618 | 845 |
| 255 | 650 | 307 | 653 | 359 | 698 | 411 | 741 | 463 | 789 | 515 | 826 | 567 | 835 | 619 | 845 |
| 256 | 650 | 308 | 653 | 360 | 698 | 412 | 742 | 464 | 790 | 516 | 826 | 568 | 835 | 620 | 845 |
| 257 | 650 | 309 | 653 | 361 | 699 | 413 | 743 | 465 | 792 | 517 | 826 | 569 | 836 | 621 | 845 |
| 258 | 650 | 310 | 653 | 362 | 700 | 414 | 744 | 466 | 793 | 518 | 826 | 570 | 836 | 622 | 845 |
| 259 | 650 | 311 | 654 | 363 | 701 | 415 | 745 | 467 | 794 | 519 | 826 | 571 | 836 | 623 | 845 |
| 260 | 651 | 312 | 655 | 364 | 702 | 416 | 746 | 468 | 794 | 520 | 827 | 572 | 836 | 624 | 846 |
| 261 | 651 | 313 | 656 | 365 | 702 | 417 | 747 | 469 | 794 | 521 | 827 | 573 | 836 | 625 | 846 |
| 262 | 651 | 314 | 659 | 366 | 703 | 418 | 748 | 470 | 794 | 522 | 827 | 574 | 836 | 626 | 846 |
| 263 | 651 | 315 | 660 | 367 | 704 | 419 | 749 | 471 | 795 | 523 | 827 | 575 | 837 | 627 | 846 |
| 264 | 651 | 316 | 660 | 368 | 705 | 420 | 750 | 472 | 796 | 524 | 827 | 576 | 837 | 628 | 846 |
| 265 | 651 | 317 | 661 | 369 | 706 | 421 | 751 | 473 | 798 | 525 | 827 | 577 | 837 | 629 | 847 |
| 266 | 651 | 318 | 663 | 370 | 707 | 422 | 751 | 474 | 800 | 526 | 828 | 578 | 837 | 630 | 847 |
| 267 | 651 | 319 | 664 | 371 | 707 | 423 | 753 | 475 | 800 | 527 | 828 | 579 | 837 | 631 | 847 |
| 268 | 651 | 320 | 665 | 372 | 708 | 424 | 754 | 476 | 800 | 528 | 828 | 580 | 838 | 632 | 847 |
| 269 | 651 | 321 | 666 | 373 | 709 | 425 | 755 | 477 | 800 | 529 | 828 | 581 | 838 | 633 | 847 |
| 270 | 651 | 322 | 667 | 374 | 710 | 426 | 756 | 478 | 801 | 530 | 828 | 582 | 838 | 634 | 847 |
| 271 | 651 | 323 | 668 | 375 | 710 | 427 | 757 | 479 | 801 | 531 | 829 | 583 | 838 | 635 | 848 |
| 272 | 651 | 324 | 669 | 376 | 711 | 428 | 758 | 480 | 804 | 532 | 829 | 584 | 838 | 636 | 848 |
| 273 | 651 | 325 | 670 | 377 | 712 | 429 | 758 | 481 | 806 | 533 | 829 | 585 | 838 | 637 | 848 |
| 274 | 651 | 326 | 671 | 378 | 713 | 430 | 759 | 482 | 807 | 534 | 829 | 586 | 839 | 638 | 848 |
| 275 | 651 | 327 | 671 | 379 | 713 | 431 | 761 | 483 | 807 | 535 | 829 | 587 | 839 | 639 | 848 |
| 276 | 651 | 328 | 672 | 380 | 714 | 432 | 762 | 484 | 808 | 536 | 829 | 588 | 839 | 640 | 849 |
| 277 | 651 | 329 | 673 | 381 | 715 | 433 | 762 | 485 | 808 | 537 | 830 | 589 | 839 | 641 | 849 |
| 278 | 651 | 330 | 675 | 382 | 716 | 434 | 764 | 486 | 808 | 538 | 830 | 590 | 839 | 642 | 849 |
| 279 | 652 | 331 | 676 | 383 | 717 | 435 | 764 | 487 | 808 | 539 | 830 | 591 | 840 | 643 | 849 |
| 280 | 652 | 332 | 676 | 384 | 718 | 436 | 765 | 488 | 808 | 540 | 830 | 592 | 840 | 644 | 849 |
| 281 | 652 | 333 | 677 | 385 | 718 | 437 | 766 | 489 | 810 | 541 | 830 | 593 | 840 | 645 | 849 |
| 282 | 652 | 334 | 678 | 386 | 719 | 438 | 768 | 490 | 813 | 542 | 831 | 594 | 840 | 646 | 850 |
| 283 | 652 | 335 | 679 | 387 | 720 | 439 | 768 | 491 | 814 | 543 | 831 | 595 | 840 | 647 | 850 |
| 284 | 652 | 336 | 680 | 388 | 721 | 440 | 769 | 492 | 814 | 544 | 831 | 596 | 840 | 648 | 850 |
| 285 | 652 | 337 | 680 | 389 | 722 | 441 | 770 | 493 | 814 | 545 | 831 | 597 | 841 | 649 | 850 |
| 286 | 652 | 338 | 681 | 390 | 722 | 442 | 771 | 494 | 814 | 546 | 831 | 598 | 841 | 650 | 850 |
| 287 | 652 | 339 | 682 | 391 | 723 | 443 | 772 | 495 | 814 | 547 | 831 | 599 | 841 | | |
| 288 | 652 | 340 | 683 | 392 | 725 | 444 | 773 | 496 | 815 | 548 | 832 | 600 | 841 | | |
| 289 | 652 | 341 | 684 | 393 | 726 | 445 | 773 | 497 | 815 | 549 | 832 | 601 | 841 | | |
| 290 | 652 | 342 | 685 | 394 | 726 | 446 | 774 | 498 | 816 | 550 | 832 | 602 | 842 | | |
| 291 | 652 | 343 | 685 | 395 | 727 | 447 | 775 | 499 | 817 | 551 | 832 | 603 | 842 | | |

Table 1.12

*Concordance Table for MSA Grade 4 Math and PARCC MAT04*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 662 | 344 | 688 | 396 | 727 | 448 | 770 | 500 | 804 | 552 | 823 | 604 | 838 |
| 241 | 650 | 293 | 662 | 345 | 689 | 397 | 727 | 449 | 771 | 501 | 805 | 553 | 824 | 605 | 838 |
| 242 | 650 | 294 | 662 | 346 | 690 | 398 | 728 | 450 | 771 | 502 | 806 | 554 | 824 | 606 | 838 |
| 243 | 650 | 295 | 662 | 347 | 691 | 399 | 729 | 451 | 772 | 503 | 806 | 555 | 824 | 607 | 838 |
| 244 | 651 | 296 | 663 | 348 | 691 | 400 | 730 | 452 | 772 | 504 | 806 | 556 | 824 | 608 | 839 |
| 245 | 651 | 297 | 663 | 349 | 693 | 401 | 731 | 453 | 774 | 505 | 807 | 557 | 825 | 609 | 839 |
| 246 | 651 | 298 | 663 | 350 | 693 | 402 | 731 | 454 | 775 | 506 | 807 | 558 | 825 | 610 | 839 |
| 247 | 651 | 299 | 663 | 351 | 694 | 403 | 732 | 455 | 775 | 507 | 807 | 559 | 825 | 611 | 840 |
| 248 | 651 | 300 | 664 | 352 | 694 | 404 | 733 | 456 | 776 | 508 | 807 | 560 | 825 | 612 | 840 |
| 249 | 652 | 301 | 664 | 353 | 695 | 405 | 733 | 457 | 776 | 509 | 807 | 561 | 826 | 613 | 840 |
| 250 | 652 | 302 | 664 | 354 | 696 | 406 | 734 | 458 | 778 | 510 | 808 | 562 | 826 | 614 | 840 |
| 251 | 652 | 303 | 664 | 355 | 697 | 407 | 735 | 459 | 778 | 511 | 810 | 563 | 826 | 615 | 841 |
| 252 | 652 | 304 | 664 | 356 | 698 | 408 | 736 | 460 | 779 | 512 | 813 | 564 | 827 | 616 | 841 |
| 253 | 653 | 305 | 665 | 357 | 699 | 409 | 737 | 461 | 779 | 513 | 813 | 565 | 827 | 617 | 841 |
| 254 | 653 | 306 | 665 | 358 | 699 | 410 | 738 | 462 | 780 | 514 | 814 | 566 | 827 | 618 | 842 |
| 255 | 653 | 307 | 665 | 359 | 700 | 411 | 738 | 463 | 781 | 515 | 814 | 567 | 827 | 619 | 842 |
| 256 | 653 | 308 | 665 | 360 | 700 | 412 | 739 | 464 | 782 | 516 | 814 | 568 | 828 | 620 | 842 |
| 257 | 654 | 309 | 666 | 361 | 701 | 413 | 740 | 465 | 782 | 517 | 815 | 569 | 828 | 621 | 842 |
| 258 | 654 | 310 | 666 | 362 | 702 | 414 | 741 | 466 | 783 | 518 | 815 | 570 | 828 | 622 | 843 |
| 259 | 654 | 311 | 666 | 363 | 703 | 415 | 742 | 467 | 783 | 519 | 815 | 571 | 829 | 623 | 843 |
| 260 | 654 | 312 | 666 | 364 | 703 | 416 | 742 | 468 | 785 | 520 | 815 | 572 | 829 | 624 | 843 |
| 261 | 654 | 313 | 667 | 365 | 704 | 417 | 743 | 469 | 785 | 521 | 815 | 573 | 829 | 625 | 843 |
| 262 | 655 | 314 | 667 | 366 | 704 | 418 | 744 | 470 | 786 | 522 | 815 | 574 | 829 | 626 | 844 |
| 263 | 655 | 315 | 667 | 367 | 705 | 419 | 745 | 471 | 786 | 523 | 815 | 575 | 830 | 627 | 844 |
| 264 | 655 | 316 | 667 | 368 | 706 | 420 | 746 | 472 | 787 | 524 | 816 | 576 | 830 | 628 | 844 |
| 265 | 655 | 317 | 667 | 369 | 706 | 421 | 746 | 473 | 788 | 525 | 816 | 577 | 830 | 629 | 845 |
| 266 | 656 | 318 | 668 | 370 | 707 | 422 | 748 | 474 | 789 | 526 | 816 | 578 | 830 | 630 | 845 |
| 267 | 656 | 319 | 668 | 371 | 708 | 423 | 748 | 475 | 789 | 527 | 816 | 579 | 831 | 631 | 845 |
| 268 | 656 | 320 | 668 | 372 | 709 | 424 | 749 | 476 | 790 | 528 | 817 | 580 | 831 | 632 | 845 |
| 269 | 656 | 321 | 669 | 373 | 709 | 425 | 750 | 477 | 790 | 529 | 817 | 581 | 831 | 633 | 846 |
| 270 | 657 | 322 | 670 | 374 | 710 | 426 | 751 | 478 | 791 | 530 | 817 | 582 | 832 | 634 | 846 |
| 271 | 657 | 323 | 670 | 375 | 711 | 427 | 752 | 479 | 791 | 531 | 817 | 583 | 832 | 635 | 846 |
| 272 | 657 | 324 | 671 | 376 | 712 | 428 | 753 | 480 | 792 | 532 | 818 | 584 | 832 | 636 | 846 |
| 273 | 657 | 325 | 672 | 377 | 713 | 429 | 754 | 481 | 793 | 533 | 818 | 585 | 832 | 637 | 847 |
| 274 | 657 | 326 | 673 | 378 | 713 | 430 | 755 | 482 | 793 | 534 | 818 | 586 | 833 | 638 | 847 |
| 275 | 658 | 327 | 674 | 379 | 714 | 431 | 756 | 483 | 794 | 535 | 819 | 587 | 833 | 639 | 847 |
| 276 | 658 | 328 | 676 | 380 | 715 | 432 | 757 | 484 | 794 | 536 | 819 | 588 | 833 | 640 | 848 |
| 277 | 658 | 329 | 676 | 381 | 715 | 433 | 757 | 485 | 795 | 537 | 819 | 589 | 834 | 641 | 848 |
| 278 | 658 | 330 | 677 | 382 | 716 | 434 | 758 | 486 | 796 | 538 | 819 | 590 | 834 | 642 | 848 |
| 279 | 659 | 331 | 677 | 383 | 716 | 435 | 759 | 487 | 796 | 539 | 820 | 591 | 834 | 643 | 848 |
| 280 | 659 | 332 | 679 | 384 | 717 | 436 | 760 | 488 | 797 | 540 | 820 | 592 | 834 | 644 | 849 |
| 281 | 659 | 333 | 679 | 385 | 718 | 437 | 760 | 489 | 798 | 541 | 820 | 593 | 835 | 645 | 849 |
| 282 | 659 | 334 | 680 | 386 | 719 | 438 | 761 | 490 | 799 | 542 | 821 | 594 | 835 | 646 | 849 |
| 283 | 660 | 335 | 681 | 387 | 720 | 439 | 762 | 491 | 799 | 543 | 821 | 595 | 835 | 647 | 850 |
| 284 | 660 | 336 | 682 | 388 | 720 | 440 | 763 | 492 | 800 | 544 | 821 | 596 | 835 | 648 | 850 |
| 285 | 660 | 337 | 683 | 389 | 721 | 441 | 764 | 493 | 800 | 545 | 821 | 597 | 836 | 649 | 850 |
| 286 | 660 | 338 | 684 | 390 | 722 | 442 | 765 | 494 | 801 | 546 | 822 | 598 | 836 | 650 | 850 |
| 287 | 661 | 339 | 685 | 391 | 722 | 443 | 766 | 495 | 801 | 547 | 822 | 599 | 836 | | |
| 288 | 661 | 340 | 685 | 392 | 723 | 444 | 766 | 496 | 802 | 548 | 822 | 600 | 837 | | |
| 289 | 661 | 341 | 686 | 393 | 724 | 445 | 768 | 497 | 802 | 549 | 822 | 601 | 837 | | |
| 290 | 661 | 342 | 687 | 394 | 725 | 446 | 768 | 498 | 802 | 550 | 823 | 602 | 837 | | |
| 291 | 661 | 343 | 688 | 395 | 726 | 447 | 769 | 499 | 803 | 551 | 823 | 603 | 837 | | |

Table 1.13

*Concordance Table for MSA Grade 5 Math and PARCC MAT05*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 659 | 344 | 678 | 396 | 724 | 448 | 768 | 500 | 805 | 552 | 824 | 604 | 838 |
| 241 | 650 | 293 | 659 | 345 | 679 | 397 | 725 | 449 | 769 | 501 | 806 | 553 | 824 | 605 | 838 |
| 242 | 650 | 294 | 659 | 346 | 680 | 398 | 725 | 450 | 770 | 502 | 807 | 554 | 825 | 606 | 839 |
| 243 | 650 | 295 | 659 | 347 | 681 | 399 | 726 | 451 | 770 | 503 | 807 | 555 | 825 | 607 | 839 |
| 244 | 650 | 296 | 659 | 348 | 682 | 400 | 727 | 452 | 771 | 504 | 808 | 556 | 825 | 608 | 839 |
| 245 | 650 | 297 | 660 | 349 | 683 | 401 | 728 | 453 | 772 | 505 | 808 | 557 | 825 | 609 | 839 |
| 246 | 651 | 298 | 660 | 350 | 684 | 402 | 729 | 454 | 772 | 506 | 810 | 558 | 826 | 610 | 840 |
| 247 | 651 | 299 | 660 | 351 | 685 | 403 | 730 | 455 | 773 | 507 | 811 | 559 | 826 | 611 | 840 |
| 248 | 651 | 300 | 660 | 352 | 686 | 404 | 730 | 456 | 774 | 508 | 811 | 560 | 826 | 612 | 840 |
| 249 | 651 | 301 | 660 | 353 | 687 | 405 | 731 | 457 | 775 | 509 | 812 | 561 | 827 | 613 | 840 |
| 250 | 651 | 302 | 660 | 354 | 688 | 406 | 732 | 458 | 775 | 510 | 812 | 562 | 827 | 614 | 841 |
| 251 | 652 | 303 | 661 | 355 | 689 | 407 | 733 | 459 | 776 | 511 | 813 | 563 | 827 | 615 | 841 |
| 252 | 652 | 304 | 661 | 356 | 690 | 408 | 734 | 460 | 777 | 512 | 813 | 564 | 827 | 616 | 841 |
| 253 | 652 | 305 | 661 | 357 | 691 | 409 | 735 | 461 | 778 | 513 | 813 | 565 | 828 | 617 | 842 |
| 254 | 652 | 306 | 661 | 358 | 692 | 410 | 736 | 462 | 779 | 514 | 814 | 566 | 828 | 618 | 842 |
| 255 | 652 | 307 | 661 | 359 | 693 | 411 | 737 | 463 | 779 | 515 | 814 | 567 | 828 | 619 | 842 |
| 256 | 652 | 308 | 662 | 360 | 693 | 412 | 738 | 464 | 780 | 516 | 815 | 568 | 828 | 620 | 842 |
| 257 | 653 | 309 | 662 | 361 | 694 | 413 | 738 | 465 | 781 | 517 | 815 | 569 | 829 | 621 | 843 |
| 258 | 653 | 310 | 662 | 362 | 695 | 414 | 739 | 466 | 782 | 518 | 815 | 570 | 829 | 622 | 843 |
| 259 | 653 | 311 | 662 | 363 | 696 | 415 | 740 | 467 | 782 | 519 | 815 | 571 | 829 | 623 | 843 |
| 260 | 653 | 312 | 662 | 364 | 697 | 416 | 741 | 468 | 783 | 520 | 816 | 572 | 829 | 624 | 843 |
| 261 | 653 | 313 | 662 | 365 | 698 | 417 | 742 | 469 | 784 | 521 | 816 | 573 | 830 | 625 | 844 |
| 262 | 653 | 314 | 663 | 366 | 699 | 418 | 743 | 470 | 784 | 522 | 816 | 574 | 830 | 626 | 844 |
| 263 | 654 | 315 | 663 | 367 | 700 | 419 | 744 | 471 | 785 | 523 | 816 | 575 | 830 | 627 | 844 |
| 264 | 654 | 316 | 663 | 368 | 700 | 420 | 745 | 472 | 786 | 524 | 817 | 576 | 831 | 628 | 844 |
| 265 | 654 | 317 | 663 | 369 | 701 | 421 | 746 | 473 | 787 | 525 | 817 | 577 | 831 | 629 | 845 |
| 266 | 654 | 318 | 663 | 370 | 702 | 422 | 747 | 474 | 787 | 526 | 817 | 578 | 831 | 630 | 845 |
| 267 | 654 | 319 | 663 | 371 | 703 | 423 | 747 | 475 | 788 | 527 | 817 | 579 | 831 | 631 | 845 |
| 268 | 655 | 320 | 664 | 372 | 704 | 424 | 748 | 476 | 789 | 528 | 818 | 580 | 832 | 632 | 846 |
| 269 | 655 | 321 | 664 | 373 | 704 | 425 | 749 | 477 | 789 | 529 | 818 | 581 | 832 | 633 | 846 |
| 270 | 655 | 322 | 664 | 374 | 705 | 426 | 750 | 478 | 790 | 530 | 818 | 582 | 832 | 634 | 846 |
| 271 | 655 | 323 | 664 | 375 | 706 | 427 | 751 | 479 | 791 | 531 | 819 | 583 | 832 | 635 | 846 |
| 272 | 655 | 324 | 664 | 376 | 707 | 428 | 752 | 480 | 792 | 532 | 819 | 584 | 833 | 636 | 847 |
| 273 | 655 | 325 | 665 | 377 | 708 | 429 | 753 | 481 | 792 | 533 | 819 | 585 | 833 | 637 | 847 |
| 274 | 656 | 326 | 665 | 378 | 708 | 430 | 754 | 482 | 793 | 534 | 819 | 586 | 833 | 638 | 847 |
| 275 | 656 | 327 | 665 | 379 | 709 | 431 | 754 | 483 | 794 | 535 | 820 | 587 | 834 | 639 | 847 |
| 276 | 656 | 328 | 665 | 380 | 710 | 432 | 755 | 484 | 794 | 536 | 820 | 588 | 834 | 640 | 848 |
| 277 | 656 | 329 | 665 | 381 | 711 | 433 | 756 | 485 | 795 | 537 | 820 | 589 | 834 | 641 | 848 |
| 278 | 656 | 330 | 665 | 382 | 712 | 434 | 757 | 486 | 796 | 538 | 820 | 590 | 834 | 642 | 848 |
| 279 | 656 | 331 | 666 | 383 | 712 | 435 | 758 | 487 | 796 | 539 | 821 | 591 | 835 | 643 | 848 |
| 280 | 657 | 332 | 666 | 384 | 713 | 436 | 758 | 488 | 797 | 540 | 821 | 592 | 835 | 644 | 849 |
| 281 | 657 | 333 | 666 | 385 | 714 | 437 | 759 | 489 | 798 | 541 | 821 | 593 | 835 | 645 | 849 |
| 282 | 657 | 334 | 667 | 386 | 715 | 438 | 760 | 490 | 798 | 542 | 821 | 594 | 835 | 646 | 849 |
| 283 | 657 | 335 | 668 | 387 | 716 | 439 | 761 | 491 | 799 | 543 | 822 | 595 | 836 | 647 | 850 |
| 284 | 657 | 336 | 669 | 388 | 717 | 440 | 762 | 492 | 800 | 544 | 822 | 596 | 836 | 648 | 850 |
| 285 | 658 | 337 | 671 | 389 | 718 | 441 | 762 | 493 | 801 | 545 | 822 | 597 | 836 | 649 | 850 |
| 286 | 658 | 338 | 672 | 390 | 718 | 442 | 763 | 494 | 801 | 546 | 823 | 598 | 836 | 650 | 850 |
| 287 | 658 | 339 | 673 | 391 | 719 | 443 | 764 | 495 | 802 | 547 | 823 | 599 | 837 | | |
| 288 | 658 | 340 | 674 | 392 | 720 | 444 | 765 | 496 | 802 | 548 | 823 | 600 | 837 | | |
| 289 | 658 | 341 | 675 | 393 | 721 | 445 | 766 | 497 | 803 | 549 | 823 | 601 | 837 | | |
| 290 | 658 | 342 | 676 | 394 | 722 | 446 | 766 | 498 | 804 | 550 | 824 | 602 | 838 | | |
| 291 | 659 | 343 | 677 | 395 | 723 | 447 | 767 | 499 | 804 | 551 | 824 | 603 | 838 | | |

Table 1.14

*Concordance Table for MSA Grade 6 Math and PARCC MAT06*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 658 | 344 | 669 | 396 | 723 | 448 | 765 | 500 | 797 | 552 | 818 | 604 | 835 |
| 241 | 650 | 293 | 658 | 345 | 670 | 397 | 724 | 449 | 766 | 501 | 799 | 553 | 818 | 605 | 835 |
| 242 | 650 | 294 | 658 | 346 | 671 | 398 | 725 | 450 | 767 | 502 | 801 | 554 | 818 | 606 | 836 |
| 243 | 650 | 295 | 658 | 347 | 673 | 399 | 726 | 451 | 767 | 503 | 801 | 555 | 819 | 607 | 836 |
| 244 | 650 | 296 | 659 | 348 | 675 | 400 | 727 | 452 | 768 | 504 | 801 | 556 | 819 | 608 | 836 |
| 245 | 650 | 297 | 659 | 349 | 676 | 401 | 728 | 453 | 768 | 505 | 801 | 557 | 819 | 609 | 837 |
| 246 | 651 | 298 | 659 | 350 | 677 | 402 | 729 | 454 | 769 | 506 | 801 | 558 | 820 | 610 | 837 |
| 247 | 651 | 299 | 659 | 351 | 678 | 403 | 730 | 455 | 770 | 507 | 802 | 559 | 820 | 611 | 837 |
| 248 | 651 | 300 | 659 | 352 | 679 | 404 | 731 | 456 | 770 | 508 | 802 | 560 | 820 | 612 | 838 |
| 249 | 651 | 301 | 659 | 353 | 681 | 405 | 732 | 457 | 771 | 509 | 802 | 561 | 821 | 613 | 838 |
| 250 | 651 | 302 | 660 | 354 | 682 | 406 | 733 | 458 | 771 | 510 | 802 | 562 | 821 | 614 | 838 |
| 251 | 651 | 303 | 660 | 355 | 683 | 407 | 733 | 459 | 772 | 511 | 804 | 563 | 821 | 615 | 839 |
| 252 | 652 | 304 | 660 | 356 | 684 | 408 | 734 | 460 | 773 | 512 | 804 | 564 | 822 | 616 | 839 |
| 253 | 652 | 305 | 660 | 357 | 685 | 409 | 735 | 461 | 773 | 513 | 805 | 565 | 822 | 617 | 839 |
| 254 | 652 | 306 | 660 | 358 | 685 | 410 | 736 | 462 | 774 | 514 | 805 | 566 | 822 | 618 | 840 |
| 255 | 652 | 307 | 660 | 359 | 686 | 411 | 737 | 463 | 774 | 515 | 805 | 567 | 823 | 619 | 840 |
| 256 | 652 | 308 | 660 | 360 | 687 | 412 | 738 | 464 | 775 | 516 | 806 | 568 | 823 | 620 | 840 |
| 257 | 652 | 309 | 661 | 361 | 688 | 413 | 739 | 465 | 776 | 517 | 806 | 569 | 823 | 621 | 841 |
| 258 | 652 | 310 | 661 | 362 | 690 | 414 | 740 | 466 | 777 | 518 | 806 | 570 | 824 | 622 | 841 |
| 259 | 653 | 311 | 661 | 363 | 691 | 415 | 741 | 467 | 777 | 519 | 807 | 571 | 824 | 623 | 841 |
| 260 | 653 | 312 | 661 | 364 | 692 | 416 | 742 | 468 | 778 | 520 | 807 | 572 | 824 | 624 | 842 |
| 261 | 653 | 313 | 661 | 365 | 693 | 417 | 743 | 469 | 779 | 521 | 807 | 573 | 825 | 625 | 842 |
| 262 | 653 | 314 | 661 | 366 | 694 | 418 | 743 | 470 | 779 | 522 | 808 | 574 | 825 | 626 | 842 |
| 263 | 653 | 315 | 662 | 367 | 695 | 419 | 744 | 471 | 779 | 523 | 808 | 575 | 825 | 627 | 843 |
| 264 | 653 | 316 | 662 | 368 | 696 | 420 | 744 | 472 | 780 | 524 | 808 | 576 | 826 | 628 | 843 |
| 265 | 654 | 317 | 662 | 369 | 697 | 421 | 745 | 473 | 781 | 525 | 809 | 577 | 826 | 629 | 843 |
| 266 | 654 | 318 | 662 | 370 | 698 | 422 | 746 | 474 | 781 | 526 | 809 | 578 | 826 | 630 | 844 |
| 267 | 654 | 319 | 662 | 371 | 699 | 423 | 747 | 475 | 782 | 527 | 809 | 579 | 827 | 631 | 844 |
| 268 | 654 | 320 | 662 | 372 | 700 | 424 | 748 | 476 | 783 | 528 | 810 | 580 | 827 | 632 | 844 |
| 269 | 654 | 321 | 663 | 373 | 701 | 425 | 749 | 477 | 784 | 529 | 810 | 581 | 827 | 633 | 845 |
| 270 | 654 | 322 | 663 | 374 | 702 | 426 | 750 | 478 | 784 | 530 | 810 | 582 | 828 | 634 | 845 |
| 271 | 655 | 323 | 663 | 375 | 703 | 427 | 750 | 479 | 785 | 531 | 811 | 583 | 828 | 635 | 845 |
| 272 | 655 | 324 | 663 | 376 | 704 | 428 | 751 | 480 | 785 | 532 | 811 | 584 | 828 | 636 | 846 |
| 273 | 655 | 325 | 663 | 377 | 705 | 429 | 752 | 481 | 786 | 533 | 811 | 585 | 829 | 637 | 846 |
| 274 | 655 | 326 | 663 | 378 | 706 | 430 | 753 | 482 | 787 | 534 | 812 | 586 | 829 | 638 | 846 |
| 275 | 655 | 327 | 664 | 379 | 707 | 431 | 753 | 483 | 787 | 535 | 812 | 587 | 829 | 639 | 847 |
| 276 | 655 | 328 | 664 | 380 | 708 | 432 | 754 | 484 | 788 | 536 | 812 | 588 | 830 | 640 | 847 |
| 277 | 656 | 329 | 664 | 381 | 709 | 433 | 755 | 485 | 788 | 537 | 813 | 589 | 830 | 641 | 847 |
| 278 | 656 | 330 | 664 | 382 | 710 | 434 | 756 | 486 | 788 | 538 | 813 | 590 | 830 | 642 | 848 |
| 279 | 656 | 331 | 664 | 383 | 711 | 435 | 756 | 487 | 790 | 539 | 813 | 591 | 831 | 643 | 848 |
| 280 | 656 | 332 | 664 | 384 | 711 | 436 | 757 | 488 | 791 | 540 | 814 | 592 | 831 | 644 | 848 |
| 281 | 656 | 333 | 664 | 385 | 712 | 437 | 757 | 489 | 791 | 541 | 814 | 593 | 831 | 645 | 849 |
| 282 | 656 | 334 | 665 | 386 | 714 | 438 | 758 | 490 | 792 | 542 | 814 | 594 | 832 | 646 | 849 |
| 283 | 656 | 335 | 665 | 387 | 715 | 439 | 759 | 491 | 792 | 543 | 815 | 595 | 832 | 647 | 849 |
| 284 | 657 | 336 | 665 | 388 | 716 | 440 | 760 | 492 | 792 | 544 | 815 | 596 | 832 | 648 | 850 |
| 285 | 657 | 337 | 665 | 389 | 717 | 441 | 760 | 493 | 794 | 545 | 815 | 597 | 833 | 649 | 850 |
| 286 | 657 | 338 | 665 | 390 | 718 | 442 | 761 | 494 | 795 | 546 | 816 | 598 | 833 | 650 | 850 |
| 287 | 657 | 339 | 665 | 391 | 719 | 443 | 762 | 495 | 795 | 547 | 816 | 599 | 833 | | |
| 288 | 657 | 340 | 666 | 392 | 720 | 444 | 763 | 496 | 795 | 548 | 816 | 600 | 834 | | |
| 289 | 657 | 341 | 666 | 393 | 721 | 445 | 763 | 497 | 796 | 549 | 817 | 601 | 834 | | |
| 290 | 658 | 342 | 667 | 394 | 721 | 446 | 764 | 498 | 796 | 550 | 817 | 602 | 834 | | |
| 291 | 658 | 343 | 668 | 395 | 722 | 447 | 765 | 499 | 796 | 551 | 817 | 603 | 835 | | |

Table 1.15

*Concordance Table for MSA Grade 7 Math and PARCC MAT07*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 657 | 344 | 681 | 396 | 729 | 448 | 762 | 500 | 791 | 552 | 822 | 604 | 850 |
| 241 | 650 | 293 | 657 | 345 | 683 | 397 | 729 | 449 | 762 | 501 | 791 | 553 | 823 | 605 | 850 |
| 242 | 650 | 294 | 657 | 346 | 684 | 398 | 730 | 450 | 763 | 502 | 792 | 554 | 823 | 606 | 850 |
| 243 | 650 | 295 | 658 | 347 | 685 | 399 | 731 | 451 | 764 | 503 | 794 | 555 | 824 | 607 | 850 |
| 244 | 650 | 296 | 658 | 348 | 685 | 400 | 731 | 452 | 764 | 504 | 794 | 556 | 825 | 608 | 850 |
| 245 | 650 | 297 | 658 | 349 | 687 | 401 | 732 | 453 | 765 | 505 | 795 | 557 | 825 | 609 | 850 |
| 246 | 650 | 298 | 658 | 350 | 689 | 402 | 733 | 454 | 765 | 506 | 795 | 558 | 826 | 610 | 850 |
| 247 | 651 | 299 | 658 | 351 | 689 | 403 | 734 | 455 | 766 | 507 | 795 | 559 | 826 | 611 | 850 |
| 248 | 651 | 300 | 658 | 352 | 690 | 404 | 734 | 456 | 767 | 508 | 796 | 560 | 827 | 612 | 850 |
| 249 | 651 | 301 | 658 | 353 | 690 | 405 | 735 | 457 | 767 | 509 | 796 | 561 | 828 | 613 | 850 |
| 250 | 651 | 302 | 659 | 354 | 692 | 406 | 736 | 458 | 768 | 510 | 797 | 562 | 828 | 614 | 850 |
| 251 | 651 | 303 | 659 | 355 | 693 | 407 | 737 | 459 | 768 | 511 | 798 | 563 | 829 | 615 | 850 |
| 252 | 651 | 304 | 659 | 356 | 694 | 408 | 737 | 460 | 769 | 512 | 798 | 564 | 829 | 616 | 850 |
| 253 | 651 | 305 | 659 | 357 | 695 | 409 | 738 | 461 | 770 | 513 | 799 | 565 | 830 | 617 | 850 |
| 254 | 652 | 306 | 659 | 358 | 696 | 410 | 739 | 462 | 770 | 514 | 799 | 566 | 830 | 618 | 850 |
| 255 | 652 | 307 | 659 | 359 | 697 | 411 | 739 | 463 | 771 | 515 | 800 | 567 | 831 | 619 | 850 |
| 256 | 652 | 308 | 659 | 360 | 698 | 412 | 740 | 464 | 771 | 516 | 801 | 568 | 832 | 620 | 850 |
| 257 | 652 | 309 | 660 | 361 | 699 | 413 | 741 | 465 | 772 | 517 | 801 | 569 | 832 | 621 | 850 |
| 258 | 652 | 310 | 660 | 362 | 700 | 414 | 741 | 466 | 772 | 518 | 802 | 570 | 833 | 622 | 850 |
| 259 | 652 | 311 | 660 | 363 | 701 | 415 | 742 | 467 | 773 | 519 | 802 | 571 | 833 | 623 | 850 |
| 260 | 652 | 312 | 660 | 364 | 702 | 416 | 743 | 468 | 774 | 520 | 803 | 572 | 834 | 624 | 850 |
| 261 | 653 | 313 | 660 | 365 | 703 | 417 | 743 | 469 | 774 | 521 | 804 | 573 | 835 | 625 | 850 |
| 262 | 653 | 314 | 660 | 366 | 704 | 418 | 744 | 470 | 775 | 522 | 804 | 574 | 835 | 626 | 850 |
| 263 | 653 | 315 | 660 | 367 | 705 | 419 | 745 | 471 | 775 | 523 | 805 | 575 | 836 | 627 | 850 |
| 264 | 653 | 316 | 661 | 368 | 706 | 420 | 745 | 472 | 776 | 524 | 805 | 576 | 836 | 628 | 850 |
| 265 | 653 | 317 | 661 | 369 | 707 | 421 | 746 | 473 | 776 | 525 | 806 | 577 | 837 | 629 | 850 |
| 266 | 653 | 318 | 661 | 370 | 707 | 422 | 747 | 474 | 777 | 526 | 807 | 578 | 838 | 630 | 850 |
| 267 | 653 | 319 | 661 | 371 | 708 | 423 | 747 | 475 | 778 | 527 | 807 | 579 | 838 | 631 | 850 |
| 268 | 654 | 320 | 661 | 372 | 709 | 424 | 748 | 476 | 778 | 528 | 808 | 580 | 839 | 632 | 850 |
| 269 | 654 | 321 | 661 | 373 | 710 | 425 | 748 | 477 | 779 | 529 | 808 | 581 | 839 | 633 | 850 |
| 270 | 654 | 322 | 661 | 374 | 711 | 426 | 749 | 478 | 779 | 530 | 809 | 582 | 840 | 634 | 850 |
| 271 | 654 | 323 | 662 | 375 | 712 | 427 | 750 | 479 | 779 | 531 | 810 | 583 | 841 | 635 | 850 |
| 272 | 654 | 324 | 662 | 376 | 713 | 428 | 750 | 480 | 780 | 532 | 810 | 584 | 841 | 636 | 850 |
| 273 | 654 | 325 | 662 | 377 | 714 | 429 | 751 | 481 | 780 | 533 | 811 | 585 | 842 | 637 | 850 |
| 274 | 655 | 326 | 662 | 378 | 715 | 430 | 751 | 482 | 781 | 534 | 811 | 586 | 842 | 638 | 850 |
| 275 | 655 | 327 | 662 | 379 | 715 | 431 | 752 | 483 | 782 | 535 | 812 | 587 | 843 | 639 | 850 |
| 276 | 655 | 328 | 662 | 380 | 716 | 432 | 752 | 484 | 782 | 536 | 813 | 588 | 844 | 640 | 850 |
| 277 | 655 | 329 | 663 | 381 | 717 | 433 | 753 | 485 | 783 | 537 | 813 | 589 | 844 | 641 | 850 |
| 278 | 655 | 330 | 663 | 382 | 718 | 434 | 753 | 486 | 783 | 538 | 814 | 590 | 845 | 642 | 850 |
| 279 | 655 | 331 | 664 | 383 | 718 | 435 | 754 | 487 | 784 | 539 | 814 | 591 | 845 | 643 | 850 |
| 280 | 655 | 332 | 665 | 384 | 719 | 436 | 755 | 488 | 784 | 540 | 815 | 592 | 846 | 644 | 850 |
| 281 | 656 | 333 | 666 | 385 | 720 | 437 | 755 | 489 | 785 | 541 | 816 | 593 | 847 | 645 | 850 |
| 282 | 656 | 334 | 667 | 386 | 721 | 438 | 756 | 490 | 786 | 542 | 816 | 594 | 847 | 646 | 850 |
| 283 | 656 | 335 | 669 | 387 | 721 | 439 | 757 | 491 | 786 | 543 | 817 | 595 | 848 | 647 | 850 |
| 284 | 656 | 336 | 670 | 388 | 722 | 440 | 757 | 492 | 787 | 544 | 817 | 596 | 848 | 648 | 850 |
| 285 | 656 | 337 | 671 | 389 | 723 | 441 | 758 | 493 | 787 | 545 | 818 | 597 | 849 | 649 | 850 |
| 286 | 656 | 338 | 673 | 390 | 724 | 442 | 758 | 494 | 787 | 546 | 819 | 598 | 850 | 650 | 850 |
| 287 | 656 | 339 | 675 | 391 | 725 | 443 | 759 | 495 | 788 | 547 | 819 | 599 | 850 | | |
| 288 | 657 | 340 | 676 | 392 | 725 | 444 | 760 | 496 | 789 | 548 | 820 | 600 | 850 | | |
| 289 | 657 | 341 | 677 | 393 | 726 | 445 | 760 | 497 | 790 | 549 | 820 | 601 | 850 | | |
| 290 | 657 | 342 | 679 | 394 | 727 | 446 | 761 | 498 | 790 | 550 | 821 | 602 | 850 | | |
| 291 | 657 | 343 | 680 | 395 | 728 | 447 | 761 | 499 | 791 | 551 | 822 | 603 | 850 | | |

Table 1.16

*Concordance Table for MSA Grade 8 Math and PARCC MAT08*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 650 | 344 | 650 | 396 | 716 | 448 | 772 | 500 | 813 | 552 | 837 | 604 | 844 |
| 241 | 650 | 293 | 650 | 345 | 650 | 397 | 717 | 449 | 773 | 501 | 814 | 553 | 837 | 605 | 844 |
| 242 | 650 | 294 | 650 | 346 | 650 | 398 | 718 | 450 | 774 | 502 | 814 | 554 | 837 | 606 | 844 |
| 243 | 650 | 295 | 650 | 347 | 650 | 399 | 720 | 451 | 774 | 503 | 815 | 555 | 838 | 607 | 845 |
| 244 | 650 | 296 | 650 | 348 | 650 | 400 | 721 | 452 | 775 | 504 | 816 | 556 | 838 | 608 | 845 |
| 245 | 650 | 297 | 650 | 349 | 650 | 401 | 722 | 453 | 776 | 505 | 817 | 557 | 838 | 609 | 845 |
| 246 | 650 | 298 | 650 | 350 | 650 | 402 | 724 | 454 | 777 | 506 | 817 | 558 | 838 | 610 | 845 |
| 247 | 650 | 299 | 650 | 351 | 650 | 403 | 725 | 455 | 778 | 507 | 818 | 559 | 838 | 611 | 845 |
| 248 | 650 | 300 | 650 | 352 | 651 | 404 | 726 | 456 | 778 | 508 | 819 | 560 | 838 | 612 | 845 |
| 249 | 650 | 301 | 650 | 353 | 652 | 405 | 728 | 457 | 779 | 509 | 819 | 561 | 838 | 613 | 845 |
| 250 | 650 | 302 | 650 | 354 | 655 | 406 | 729 | 458 | 780 | 510 | 820 | 562 | 838 | 614 | 846 |
| 251 | 650 | 303 | 650 | 355 | 656 | 407 | 730 | 459 | 781 | 511 | 821 | 563 | 839 | 615 | 846 |
| 252 | 650 | 304 | 650 | 356 | 658 | 408 | 731 | 460 | 782 | 512 | 822 | 564 | 839 | 616 | 846 |
| 253 | 650 | 305 | 650 | 357 | 660 | 409 | 732 | 461 | 783 | 513 | 823 | 565 | 839 | 617 | 846 |
| 254 | 650 | 306 | 650 | 358 | 663 | 410 | 733 | 462 | 784 | 514 | 824 | 566 | 839 | 618 | 846 |
| 255 | 650 | 307 | 650 | 359 | 664 | 411 | 734 | 463 | 785 | 515 | 825 | 567 | 839 | 619 | 846 |
| 256 | 650 | 308 | 650 | 360 | 666 | 412 | 736 | 464 | 785 | 516 | 826 | 568 | 839 | 620 | 846 |
| 257 | 650 | 309 | 650 | 361 | 667 | 413 | 737 | 465 | 786 | 517 | 827 | 569 | 839 | 621 | 846 |
| 258 | 650 | 310 | 650 | 362 | 669 | 414 | 738 | 466 | 787 | 518 | 828 | 570 | 840 | 622 | 847 |
| 259 | 650 | 311 | 650 | 363 | 670 | 415 | 739 | 467 | 788 | 519 | 828 | 571 | 840 | 623 | 847 |
| 260 | 650 | 312 | 650 | 364 | 671 | 416 | 740 | 468 | 789 | 520 | 829 | 572 | 840 | 624 | 847 |
| 261 | 650 | 313 | 650 | 365 | 674 | 417 | 741 | 469 | 790 | 521 | 830 | 573 | 840 | 625 | 847 |
| 262 | 650 | 314 | 650 | 366 | 676 | 418 | 742 | 470 | 791 | 522 | 830 | 574 | 840 | 626 | 847 |
| 263 | 650 | 315 | 650 | 367 | 677 | 419 | 743 | 471 | 791 | 523 | 831 | 575 | 840 | 627 | 847 |
| 264 | 650 | 316 | 650 | 368 | 678 | 420 | 744 | 472 | 792 | 524 | 832 | 576 | 840 | 628 | 847 |
| 265 | 650 | 317 | 650 | 369 | 680 | 421 | 745 | 473 | 793 | 525 | 833 | 577 | 841 | 629 | 848 |
| 266 | 650 | 318 | 650 | 370 | 681 | 422 | 746 | 474 | 794 | 526 | 834 | 578 | 841 | 630 | 848 |
| 267 | 650 | 319 | 650 | 371 | 682 | 423 | 747 | 475 | 794 | 527 | 834 | 579 | 841 | 631 | 848 |
| 268 | 650 | 320 | 650 | 372 | 683 | 424 | 748 | 476 | 795 | 528 | 834 | 580 | 841 | 632 | 848 |
| 269 | 650 | 321 | 650 | 373 | 685 | 425 | 749 | 477 | 796 | 529 | 834 | 581 | 841 | 633 | 848 |
| 270 | 650 | 322 | 650 | 374 | 686 | 426 | 750 | 478 | 797 | 530 | 834 | 582 | 841 | 634 | 848 |
| 271 | 650 | 323 | 650 | 375 | 688 | 427 | 751 | 479 | 798 | 531 | 834 | 583 | 841 | 635 | 848 |
| 272 | 650 | 324 | 650 | 376 | 689 | 428 | 752 | 480 | 798 | 532 | 834 | 584 | 841 | 636 | 849 |
| 273 | 650 | 325 | 650 | 377 | 690 | 429 | 753 | 481 | 799 | 533 | 835 | 585 | 842 | 637 | 849 |
| 274 | 650 | 326 | 650 | 378 | 692 | 430 | 754 | 482 | 800 | 534 | 835 | 586 | 842 | 638 | 849 |
| 275 | 650 | 327 | 650 | 379 | 693 | 431 | 756 | 483 | 800 | 535 | 835 | 587 | 842 | 639 | 849 |
| 276 | 650 | 328 | 650 | 380 | 695 | 432 | 757 | 484 | 801 | 536 | 835 | 588 | 842 | 640 | 849 |
| 277 | 650 | 329 | 650 | 381 | 696 | 433 | 758 | 485 | 802 | 537 | 835 | 589 | 842 | 641 | 849 |
| 278 | 650 | 330 | 650 | 382 | 697 | 434 | 759 | 486 | 803 | 538 | 835 | 590 | 842 | 642 | 849 |
| 279 | 650 | 331 | 650 | 383 | 699 | 435 | 760 | 487 | 803 | 539 | 835 | 591 | 842 | 643 | 849 |
| 280 | 650 | 332 | 650 | 384 | 700 | 436 | 761 | 488 | 804 | 540 | 835 | 592 | 843 | 644 | 850 |
| 281 | 650 | 333 | 650 | 385 | 701 | 437 | 762 | 489 | 805 | 541 | 836 | 593 | 843 | 645 | 850 |
| 282 | 650 | 334 | 650 | 386 | 703 | 438 | 763 | 490 | 805 | 542 | 836 | 594 | 843 | 646 | 850 |
| 283 | 650 | 335 | 650 | 387 | 704 | 439 | 763 | 491 | 806 | 543 | 836 | 595 | 843 | 647 | 850 |
| 284 | 650 | 336 | 650 | 388 | 705 | 440 | 764 | 492 | 807 | 544 | 836 | 596 | 843 | 648 | 850 |
| 285 | 650 | 337 | 650 | 389 | 707 | 441 | 765 | 493 | 807 | 545 | 836 | 597 | 843 | 649 | 850 |
| 286 | 650 | 338 | 650 | 390 | 708 | 442 | 766 | 494 | 808 | 546 | 836 | 598 | 843 | 650 | 850 |
| 287 | 650 | 339 | 650 | 391 | 710 | 443 | 767 | 495 | 808 | 547 | 836 | 599 | 843 | | |
| 288 | 650 | 340 | 650 | 392 | 711 | 444 | 768 | 496 | 809 | 548 | 837 | 600 | 844 | | |
| 289 | 650 | 341 | 650 | 393 | 712 | 445 | 769 | 497 | 810 | 549 | 837 | 601 | 844 | | |
| 290 | 650 | 342 | 650 | 394 | 713 | 446 | 770 | 498 | 811 | 550 | 837 | 602 | 844 | | |
| 291 | 650 | 343 | 650 | 395 | 715 | 447 | 771 | 499 | 812 | 551 | 837 | 603 | 844 | | |

Table 1.17

*Concordance Table for MSA Grade 3 Reading and PARCC ELA03*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 650 | 344 | 662 | 396 | 712 | 448 | 771 | 500 | 832 | 552 | 848 | 604 | 850 |
| 241 | 650 | 293 | 650 | 345 | 663 | 397 | 713 | 449 | 773 | 501 | 832 | 553 | 848 | 605 | 850 |
| 242 | 650 | 294 | 650 | 346 | 664 | 398 | 714 | 450 | 773 | 502 | 833 | 554 | 849 | 606 | 850 |
| 243 | 650 | 295 | 650 | 347 | 665 | 399 | 715 | 451 | 774 | 503 | 833 | 555 | 849 | 607 | 850 |
| 244 | 650 | 296 | 650 | 348 | 665 | 400 | 716 | 452 | 775 | 504 | 833 | 556 | 849 | 608 | 850 |
| 245 | 650 | 297 | 650 | 349 | 666 | 401 | 717 | 453 | 777 | 505 | 833 | 557 | 849 | 609 | 850 |
| 246 | 650 | 298 | 650 | 350 | 667 | 402 | 718 | 454 | 778 | 506 | 833 | 558 | 849 | 610 | 850 |
| 247 | 650 | 299 | 650 | 351 | 668 | 403 | 719 | 455 | 780 | 507 | 833 | 559 | 849 | 611 | 850 |
| 248 | 650 | 300 | 650 | 352 | 670 | 404 | 721 | 456 | 781 | 508 | 833 | 560 | 849 | 612 | 850 |
| 249 | 650 | 301 | 650 | 353 | 671 | 405 | 721 | 457 | 781 | 509 | 833 | 561 | 849 | 613 | 850 |
| 250 | 650 | 302 | 650 | 354 | 671 | 406 | 722 | 458 | 782 | 510 | 832 | 562 | 849 | 614 | 850 |
| 251 | 650 | 303 | 650 | 355 | 672 | 407 | 723 | 459 | 782 | 511 | 833 | 563 | 849 | 615 | 850 |
| 252 | 650 | 304 | 650 | 356 | 673 | 408 | 726 | 460 | 784 | 512 | 833 | 564 | 849 | 616 | 850 |
| 253 | 650 | 305 | 650 | 357 | 674 | 409 | 727 | 461 | 785 | 513 | 833 | 565 | 849 | 617 | 850 |
| 254 | 650 | 306 | 650 | 358 | 675 | 410 | 727 | 462 | 786 | 514 | 834 | 566 | 849 | 618 | 850 |
| 255 | 650 | 307 | 650 | 359 | 676 | 411 | 728 | 463 | 789 | 515 | 836 | 567 | 849 | 619 | 850 |
| 256 | 650 | 308 | 650 | 360 | 677 | 412 | 729 | 464 | 791 | 516 | 841 | 568 | 849 | 620 | 850 |
| 257 | 650 | 309 | 650 | 361 | 677 | 413 | 731 | 465 | 791 | 517 | 843 | 569 | 849 | 621 | 850 |
| 258 | 650 | 310 | 650 | 362 | 678 | 414 | 732 | 466 | 791 | 518 | 847 | 570 | 849 | 622 | 850 |
| 259 | 650 | 311 | 650 | 363 | 679 | 415 | 732 | 467 | 791 | 519 | 847 | 571 | 849 | 623 | 850 |
| 260 | 650 | 312 | 650 | 364 | 680 | 416 | 733 | 468 | 792 | 520 | 847 | 572 | 849 | 624 | 850 |
| 261 | 650 | 313 | 650 | 365 | 680 | 417 | 736 | 469 | 792 | 521 | 847 | 573 | 849 | 625 | 850 |
| 262 | 650 | 314 | 650 | 366 | 681 | 418 | 737 | 470 | 794 | 522 | 847 | 574 | 849 | 626 | 850 |
| 263 | 650 | 315 | 650 | 367 | 682 | 419 | 738 | 471 | 796 | 523 | 847 | 575 | 849 | 627 | 850 |
| 264 | 650 | 316 | 650 | 368 | 683 | 420 | 738 | 472 | 797 | 524 | 848 | 576 | 849 | 628 | 850 |
| 265 | 650 | 317 | 650 | 369 | 684 | 421 | 740 | 473 | 800 | 525 | 848 | 577 | 849 | 629 | 850 |
| 266 | 650 | 318 | 650 | 370 | 685 | 422 | 741 | 474 | 802 | 526 | 848 | 578 | 849 | 630 | 850 |
| 267 | 650 | 319 | 650 | 371 | 686 | 423 | 742 | 475 | 802 | 527 | 848 | 579 | 849 | 631 | 850 |
| 268 | 650 | 320 | 650 | 372 | 687 | 424 | 743 | 476 | 803 | 528 | 848 | 580 | 849 | 632 | 850 |
| 269 | 650 | 321 | 650 | 373 | 688 | 425 | 744 | 477 | 803 | 529 | 848 | 581 | 849 | 633 | 850 |
| 270 | 650 | 322 | 650 | 374 | 688 | 426 | 746 | 478 | 803 | 530 | 848 | 582 | 849 | 634 | 850 |
| 271 | 650 | 323 | 650 | 375 | 690 | 427 | 747 | 479 | 803 | 531 | 848 | 583 | 849 | 635 | 850 |
| 272 | 650 | 324 | 650 | 376 | 691 | 428 | 748 | 480 | 803 | 532 | 848 | 584 | 849 | 636 | 850 |
| 273 | 650 | 325 | 651 | 377 | 692 | 429 | 749 | 481 | 805 | 533 | 848 | 585 | 850 | 637 | 850 |
| 274 | 650 | 326 | 651 | 378 | 692 | 430 | 749 | 482 | 808 | 534 | 848 | 586 | 850 | 638 | 850 |
| 275 | 650 | 327 | 651 | 379 | 694 | 431 | 750 | 483 | 809 | 535 | 848 | 587 | 850 | 639 | 850 |
| 276 | 650 | 328 | 651 | 380 | 695 | 432 | 752 | 484 | 812 | 536 | 848 | 588 | 850 | 640 | 850 |
| 277 | 650 | 329 | 651 | 381 | 696 | 433 | 753 | 485 | 814 | 537 | 848 | 589 | 850 | 641 | 850 |
| 278 | 650 | 330 | 651 | 382 | 696 | 434 | 755 | 486 | 815 | 538 | 848 | 590 | 850 | 642 | 850 |
| 279 | 650 | 331 | 651 | 383 | 698 | 435 | 756 | 487 | 815 | 539 | 848 | 591 | 850 | 643 | 850 |
| 280 | 650 | 332 | 652 | 384 | 699 | 436 | 756 | 488 | 815 | 540 | 848 | 592 | 850 | 644 | 850 |
| 281 | 650 | 333 | 653 | 385 | 700 | 437 | 758 | 489 | 815 | 541 | 848 | 593 | 850 | 645 | 850 |
| 282 | 650 | 334 | 654 | 386 | 701 | 438 | 759 | 490 | 815 | 542 | 848 | 594 | 850 | 646 | 850 |
| 283 | 650 | 335 | 655 | 387 | 702 | 439 | 760 | 491 | 815 | 543 | 848 | 595 | 850 | 647 | 850 |
| 284 | 650 | 336 | 656 | 388 | 703 | 440 | 761 | 492 | 815 | 544 | 848 | 596 | 850 | 648 | 850 |
| 285 | 650 | 337 | 657 | 389 | 704 | 441 | 762 | 493 | 816 | 545 | 848 | 597 | 850 | 649 | 850 |
| 286 | 650 | 338 | 657 | 390 | 705 | 442 | 764 | 494 | 816 | 546 | 848 | 598 | 850 | 650 | 850 |
| 287 | 650 | 339 | 658 | 391 | 707 | 443 | 765 | 495 | 819 | 547 | 848 | 599 | 850 | | |
| 288 | 650 | 340 | 658 | 392 | 707 | 444 | 766 | 496 | 822 | 548 | 848 | 600 | 850 | | |
| 289 | 650 | 341 | 659 | 393 | 708 | 445 | 767 | 497 | 823 | 549 | 848 | 601 | 850 | | |
| 290 | 650 | 342 | 660 | 394 | 709 | 446 | 769 | 498 | 827 | 550 | 848 | 602 | 850 | | |
| 291 | 650 | 343 | 661 | 395 | 711 | 447 | 770 | 499 | 831 | 551 | 848 | 603 | 850 | | |

Table 1.18

*Concordance Table for MSA Grade 4 Reading and PARCC ELA04*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 657 | 344 | 684 | 396 | 729 | 448 | 777 | 500 | 814 | 552 | 831 | 604 | 847 |
| 241 | 650 | 293 | 657 | 345 | 684 | 397 | 731 | 449 | 777 | 501 | 814 | 553 | 831 | 605 | 847 |
| 242 | 650 | 294 | 657 | 346 | 685 | 398 | 732 | 450 | 777 | 502 | 814 | 554 | 832 | 606 | 847 |
| 243 | 650 | 295 | 657 | 347 | 686 | 399 | 732 | 451 | 777 | 503 | 814 | 555 | 832 | 607 | 848 |
| 244 | 650 | 296 | 657 | 348 | 686 | 400 | 733 | 452 | 778 | 504 | 814 | 556 | 832 | 608 | 848 |
| 245 | 650 | 297 | 657 | 349 | 688 | 401 | 734 | 453 | 779 | 505 | 814 | 557 | 833 | 609 | 848 |
| 246 | 650 | 298 | 658 | 350 | 689 | 402 | 736 | 454 | 782 | 506 | 814 | 558 | 833 | 610 | 849 |
| 247 | 651 | 299 | 658 | 351 | 690 | 403 | 736 | 455 | 784 | 507 | 814 | 559 | 833 | 611 | 849 |
| 248 | 651 | 300 | 658 | 352 | 691 | 404 | 737 | 456 | 784 | 508 | 815 | 560 | 833 | 612 | 849 |
| 249 | 651 | 301 | 658 | 353 | 692 | 405 | 737 | 457 | 784 | 509 | 815 | 561 | 834 | 613 | 849 |
| 250 | 651 | 302 | 658 | 354 | 693 | 406 | 739 | 458 | 784 | 510 | 818 | 562 | 834 | 614 | 850 |
| 251 | 651 | 303 | 658 | 355 | 693 | 407 | 740 | 459 | 784 | 511 | 819 | 563 | 834 | 615 | 850 |
| 252 | 651 | 304 | 658 | 356 | 694 | 408 | 740 | 460 | 784 | 512 | 819 | 564 | 835 | 616 | 850 |
| 253 | 651 | 305 | 659 | 357 | 695 | 409 | 741 | 461 | 785 | 513 | 819 | 565 | 835 | 617 | 850 |
| 254 | 652 | 306 | 659 | 358 | 695 | 410 | 743 | 462 | 786 | 514 | 820 | 566 | 835 | 618 | 850 |
| 255 | 652 | 307 | 659 | 359 | 696 | 411 | 744 | 463 | 790 | 515 | 820 | 567 | 836 | 619 | 850 |
| 256 | 652 | 308 | 659 | 360 | 697 | 412 | 745 | 464 | 792 | 516 | 820 | 568 | 836 | 620 | 850 |
| 257 | 652 | 309 | 659 | 361 | 698 | 413 | 745 | 465 | 792 | 517 | 820 | 569 | 836 | 621 | 850 |
| 258 | 652 | 310 | 659 | 362 | 699 | 414 | 745 | 466 | 792 | 518 | 821 | 570 | 836 | 622 | 850 |
| 259 | 652 | 311 | 659 | 363 | 700 | 415 | 747 | 467 | 792 | 519 | 821 | 571 | 837 | 623 | 850 |
| 260 | 652 | 312 | 660 | 364 | 701 | 416 | 749 | 468 | 792 | 520 | 821 | 572 | 837 | 624 | 850 |
| 261 | 652 | 313 | 660 | 365 | 702 | 417 | 749 | 469 | 792 | 521 | 822 | 573 | 837 | 625 | 850 |
| 262 | 653 | 314 | 660 | 366 | 703 | 418 | 750 | 470 | 792 | 522 | 822 | 574 | 838 | 626 | 850 |
| 263 | 653 | 315 | 661 | 367 | 703 | 419 | 750 | 471 | 792 | 523 | 822 | 575 | 838 | 627 | 850 |
| 264 | 653 | 316 | 662 | 368 | 705 | 420 | 751 | 472 | 792 | 524 | 823 | 576 | 838 | 628 | 850 |
| 265 | 653 | 317 | 662 | 369 | 706 | 421 | 753 | 473 | 793 | 525 | 823 | 577 | 839 | 629 | 850 |
| 266 | 653 | 318 | 663 | 370 | 706 | 422 | 754 | 474 | 795 | 526 | 823 | 578 | 839 | 630 | 850 |
| 267 | 653 | 319 | 664 | 371 | 707 | 423 | 754 | 475 | 799 | 527 | 823 | 579 | 839 | 631 | 850 |
| 268 | 653 | 320 | 665 | 372 | 709 | 424 | 754 | 476 | 801 | 528 | 824 | 580 | 839 | 632 | 850 |
| 269 | 654 | 321 | 667 | 373 | 709 | 425 | 755 | 477 | 802 | 529 | 824 | 581 | 840 | 633 | 850 |
| 270 | 654 | 322 | 667 | 374 | 710 | 426 | 757 | 478 | 802 | 530 | 824 | 582 | 840 | 634 | 850 |
| 271 | 654 | 323 | 668 | 375 | 711 | 427 | 759 | 479 | 802 | 531 | 825 | 583 | 840 | 635 | 850 |
| 272 | 654 | 324 | 668 | 376 | 712 | 428 | 759 | 480 | 802 | 532 | 825 | 584 | 841 | 636 | 850 |
| 273 | 654 | 325 | 669 | 377 | 713 | 429 | 759 | 481 | 802 | 533 | 825 | 585 | 841 | 637 | 850 |
| 274 | 654 | 326 | 669 | 378 | 714 | 430 | 760 | 482 | 802 | 534 | 826 | 586 | 841 | 638 | 850 |
| 275 | 654 | 327 | 670 | 379 | 715 | 431 | 760 | 483 | 802 | 535 | 826 | 587 | 842 | 639 | 850 |
| 276 | 655 | 328 | 670 | 380 | 716 | 432 | 763 | 484 | 802 | 536 | 826 | 588 | 842 | 640 | 850 |
| 277 | 655 | 329 | 671 | 381 | 717 | 433 | 764 | 485 | 802 | 537 | 827 | 589 | 842 | 641 | 850 |
| 278 | 655 | 330 | 672 | 382 | 718 | 434 | 764 | 486 | 802 | 538 | 827 | 590 | 843 | 642 | 850 |
| 279 | 655 | 331 | 673 | 383 | 718 | 435 | 764 | 487 | 802 | 539 | 827 | 591 | 843 | 643 | 850 |
| 280 | 655 | 332 | 674 | 384 | 720 | 436 | 765 | 488 | 803 | 540 | 827 | 592 | 843 | 644 | 850 |
| 281 | 655 | 333 | 675 | 385 | 720 | 437 | 765 | 489 | 805 | 541 | 828 | 593 | 843 | 645 | 850 |
| 282 | 655 | 334 | 676 | 386 | 721 | 438 | 767 | 490 | 810 | 542 | 828 | 594 | 844 | 646 | 850 |
| 283 | 656 | 335 | 676 | 387 | 721 | 439 | 770 | 491 | 813 | 543 | 828 | 595 | 844 | 647 | 850 |
| 284 | 656 | 336 | 677 | 388 | 722 | 440 | 770 | 492 | 814 | 544 | 829 | 596 | 844 | 648 | 850 |
| 285 | 656 | 337 | 678 | 389 | 724 | 441 | 770 | 493 | 814 | 545 | 829 | 597 | 845 | 649 | 850 |
| 286 | 656 | 338 | 679 | 390 | 724 | 442 | 770 | 494 | 814 | 546 | 829 | 598 | 845 | 650 | 850 |
| 287 | 656 | 339 | 680 | 391 | 725 | 443 | 770 | 495 | 814 | 547 | 830 | 599 | 845 | | |
| 288 | 656 | 340 | 680 | 392 | 726 | 444 | 771 | 496 | 814 | 548 | 830 | 600 | 846 | | |
| 289 | 656 | 341 | 681 | 393 | 727 | 445 | 772 | 497 | 814 | 549 | 830 | 601 | 846 | | |
| 290 | 656 | 342 | 682 | 394 | 728 | 446 | 775 | 498 | 814 | 550 | 830 | 602 | 846 | | |
| 291 | 657 | 343 | 682 | 395 | 729 | 447 | 777 | 499 | 814 | 551 | 831 | 603 | 846 | | |

Table 1.19

*Concordance Table for MSA Grade 5 Reading and PARCC ELA05*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 657 | 344 | 672 | 396 | 711 | 448 | 761 | 500 | 799 | 552 | 823 | 604 | 838 |
| 241 | 650 | 293 | 658 | 345 | 673 | 397 | 712 | 449 | 761 | 501 | 799 | 553 | 824 | 605 | 839 |
| 242 | 650 | 294 | 658 | 346 | 673 | 398 | 714 | 450 | 763 | 502 | 800 | 554 | 824 | 606 | 839 |
| 243 | 650 | 295 | 658 | 347 | 674 | 399 | 714 | 451 | 764 | 503 | 802 | 555 | 824 | 607 | 839 |
| 244 | 650 | 296 | 658 | 348 | 675 | 400 | 715 | 452 | 765 | 504 | 802 | 556 | 824 | 608 | 839 |
| 245 | 650 | 297 | 658 | 349 | 676 | 401 | 715 | 453 | 766 | 505 | 802 | 557 | 825 | 609 | 840 |
| 246 | 650 | 298 | 658 | 350 | 676 | 402 | 717 | 454 | 767 | 506 | 803 | 558 | 825 | 610 | 840 |
| 247 | 651 | 299 | 658 | 351 | 676 | 403 | 719 | 455 | 767 | 507 | 803 | 559 | 825 | 611 | 840 |
| 248 | 651 | 300 | 659 | 352 | 677 | 404 | 719 | 456 | 767 | 508 | 805 | 560 | 826 | 612 | 841 |
| 249 | 651 | 301 | 659 | 353 | 678 | 405 | 720 | 457 | 767 | 509 | 808 | 561 | 826 | 613 | 841 |
| 250 | 651 | 302 | 659 | 354 | 679 | 406 | 721 | 458 | 769 | 510 | 808 | 562 | 826 | 614 | 841 |
| 251 | 651 | 303 | 659 | 355 | 679 | 407 | 723 | 459 | 771 | 511 | 808 | 563 | 826 | 615 | 841 |
| 252 | 651 | 304 | 659 | 356 | 680 | 408 | 723 | 460 | 773 | 512 | 808 | 564 | 827 | 616 | 842 |
| 253 | 652 | 305 | 659 | 357 | 681 | 409 | 724 | 461 | 773 | 513 | 808 | 565 | 827 | 617 | 842 |
| 254 | 652 | 306 | 659 | 358 | 682 | 410 | 724 | 462 | 773 | 514 | 808 | 566 | 827 | 618 | 842 |
| 255 | 652 | 307 | 660 | 359 | 682 | 411 | 726 | 463 | 773 | 515 | 808 | 567 | 828 | 619 | 843 |
| 256 | 652 | 308 | 660 | 360 | 683 | 412 | 728 | 464 | 773 | 516 | 808 | 568 | 828 | 620 | 843 |
| 257 | 652 | 309 | 660 | 361 | 683 | 413 | 728 | 465 | 774 | 517 | 808 | 569 | 828 | 621 | 843 |
| 258 | 652 | 310 | 660 | 362 | 685 | 414 | 728 | 466 | 776 | 518 | 809 | 570 | 828 | 622 | 843 |
| 259 | 652 | 311 | 660 | 363 | 685 | 415 | 729 | 467 | 779 | 519 | 809 | 571 | 829 | 623 | 844 |
| 260 | 653 | 312 | 660 | 364 | 686 | 416 | 731 | 468 | 779 | 520 | 810 | 572 | 829 | 624 | 844 |
| 261 | 653 | 313 | 661 | 365 | 686 | 417 | 732 | 469 | 780 | 521 | 812 | 573 | 829 | 625 | 844 |
| 262 | 653 | 314 | 661 | 366 | 686 | 418 | 733 | 470 | 780 | 522 | 812 | 574 | 830 | 626 | 845 |
| 263 | 653 | 315 | 661 | 367 | 688 | 419 | 733 | 471 | 780 | 523 | 813 | 575 | 830 | 627 | 845 |
| 264 | 653 | 316 | 661 | 368 | 688 | 420 | 734 | 472 | 780 | 524 | 813 | 576 | 830 | 628 | 845 |
| 265 | 653 | 317 | 661 | 369 | 689 | 421 | 737 | 473 | 780 | 525 | 816 | 577 | 830 | 629 | 845 |
| 266 | 653 | 318 | 661 | 370 | 689 | 422 | 737 | 474 | 781 | 526 | 816 | 578 | 831 | 630 | 846 |
| 267 | 654 | 319 | 661 | 371 | 690 | 423 | 738 | 475 | 784 | 527 | 816 | 579 | 831 | 631 | 846 |
| 268 | 654 | 320 | 662 | 372 | 691 | 424 | 738 | 476 | 785 | 528 | 816 | 580 | 831 | 632 | 846 |
| 269 | 654 | 321 | 662 | 373 | 692 | 425 | 739 | 477 | 787 | 529 | 817 | 581 | 832 | 633 | 847 |
| 270 | 654 | 322 | 662 | 374 | 692 | 426 | 741 | 478 | 787 | 530 | 817 | 582 | 832 | 634 | 847 |
| 271 | 654 | 323 | 662 | 375 | 694 | 427 | 742 | 479 | 787 | 531 | 817 | 583 | 832 | 635 | 847 |
| 272 | 654 | 324 | 662 | 376 | 695 | 428 | 743 | 480 | 787 | 532 | 818 | 584 | 833 | 636 | 847 |
| 273 | 655 | 325 | 662 | 377 | 695 | 429 | 743 | 481 | 787 | 533 | 818 | 585 | 833 | 637 | 848 |
| 274 | 655 | 326 | 662 | 378 | 695 | 430 | 744 | 482 | 788 | 534 | 818 | 586 | 833 | 638 | 848 |
| 275 | 655 | 327 | 663 | 379 | 696 | 431 | 746 | 483 | 789 | 535 | 818 | 587 | 833 | 639 | 848 |
| 276 | 655 | 328 | 663 | 380 | 697 | 432 | 747 | 484 | 790 | 536 | 819 | 588 | 834 | 640 | 849 |
| 277 | 655 | 329 | 663 | 381 | 698 | 433 | 748 | 485 | 791 | 537 | 819 | 589 | 834 | 641 | 849 |
| 278 | 655 | 330 | 663 | 382 | 699 | 434 | 748 | 486 | 791 | 538 | 819 | 590 | 834 | 642 | 849 |
| 279 | 655 | 331 | 663 | 383 | 699 | 435 | 749 | 487 | 792 | 539 | 820 | 591 | 835 | 643 | 849 |
| 280 | 656 | 332 | 663 | 384 | 701 | 436 | 750 | 488 | 794 | 540 | 820 | 592 | 835 | 644 | 850 |
| 281 | 656 | 333 | 664 | 385 | 702 | 437 | 752 | 489 | 794 | 541 | 820 | 593 | 835 | 645 | 850 |
| 282 | 656 | 334 | 665 | 386 | 703 | 438 | 752 | 490 | 794 | 542 | 820 | 594 | 835 | 646 | 850 |
| 283 | 656 | 335 | 666 | 387 | 703 | 439 | 753 | 491 | 794 | 543 | 821 | 595 | 836 | 647 | 850 |
| 284 | 656 | 336 | 667 | 388 | 704 | 440 | 753 | 492 | 795 | 544 | 821 | 596 | 836 | 648 | 850 |
| 285 | 656 | 337 | 667 | 389 | 705 | 441 | 754 | 493 | 795 | 545 | 821 | 597 | 836 | 649 | 850 |
| 286 | 656 | 338 | 668 | 390 | 706 | 442 | 755 | 494 | 796 | 546 | 822 | 598 | 837 | 650 | 850 |
| 287 | 657 | 339 | 668 | 391 | 706 | 443 | 757 | 495 | 798 | 547 | 822 | 599 | 837 | | |
| 288 | 657 | 340 | 669 | 392 | 707 | 444 | 758 | 496 | 799 | 548 | 822 | 600 | 837 | | |
| 289 | 657 | 341 | 670 | 393 | 709 | 445 | 759 | 497 | 799 | 549 | 822 | 601 | 837 | | |
| 290 | 657 | 342 | 671 | 394 | 710 | 446 | 760 | 498 | 799 | 550 | 823 | 602 | 838 | | |
| 291 | 657 | 343 | 672 | 395 | 711 | 447 | 760 | 499 | 799 | 551 | 823 | 603 | 838 | | |

Table 1.20

*Concordance Table for MSA Grade 6 Reading and PARCC ELA06*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 658 | 344 | 676 | 396 | 723 | 448 | 771 | 500 | 801 | 552 | 820 | 604 | 836 |
| 241 | 650 | 293 | 659 | 345 | 677 | 397 | 725 | 449 | 771 | 501 | 801 | 553 | 821 | 605 | 837 |
| 242 | 650 | 294 | 659 | 346 | 678 | 398 | 725 | 450 | 771 | 502 | 801 | 554 | 821 | 606 | 837 |
| 243 | 650 | 295 | 659 | 347 | 679 | 399 | 726 | 451 | 771 | 503 | 802 | 555 | 821 | 607 | 837 |
| 244 | 650 | 296 | 659 | 348 | 679 | 400 | 727 | 452 | 771 | 504 | 806 | 556 | 822 | 608 | 838 |
| 245 | 650 | 297 | 659 | 349 | 680 | 401 | 729 | 453 | 772 | 505 | 810 | 557 | 822 | 609 | 838 |
| 246 | 651 | 298 | 660 | 350 | 681 | 402 | 729 | 454 | 774 | 506 | 812 | 558 | 822 | 610 | 838 |
| 247 | 651 | 299 | 660 | 351 | 682 | 403 | 730 | 455 | 777 | 507 | 812 | 559 | 823 | 611 | 838 |
| 248 | 651 | 300 | 660 | 352 | 683 | 404 | 730 | 456 | 777 | 508 | 812 | 560 | 823 | 612 | 839 |
| 249 | 651 | 301 | 660 | 353 | 683 | 405 | 731 | 457 | 777 | 509 | 812 | 561 | 823 | 613 | 839 |
| 250 | 651 | 302 | 660 | 354 | 684 | 406 | 733 | 458 | 777 | 510 | 812 | 562 | 824 | 614 | 839 |
| 251 | 651 | 303 | 660 | 355 | 685 | 407 | 733 | 459 | 777 | 511 | 812 | 563 | 824 | 615 | 840 |
| 252 | 652 | 304 | 661 | 356 | 686 | 408 | 734 | 460 | 777 | 512 | 812 | 564 | 824 | 616 | 840 |
| 253 | 652 | 305 | 661 | 357 | 687 | 409 | 734 | 461 | 778 | 513 | 812 | 565 | 824 | 617 | 840 |
| 254 | 652 | 306 | 661 | 358 | 687 | 410 | 736 | 462 | 779 | 514 | 812 | 566 | 825 | 618 | 841 |
| 255 | 652 | 307 | 661 | 359 | 688 | 411 | 737 | 463 | 782 | 515 | 812 | 567 | 825 | 619 | 841 |
| 256 | 652 | 308 | 661 | 360 | 689 | 412 | 738 | 464 | 784 | 516 | 812 | 568 | 825 | 620 | 841 |
| 257 | 652 | 309 | 661 | 361 | 690 | 413 | 739 | 465 | 784 | 517 | 812 | 569 | 826 | 621 | 842 |
| 258 | 653 | 310 | 662 | 362 | 691 | 414 | 741 | 466 | 784 | 518 | 812 | 570 | 826 | 622 | 842 |
| 259 | 653 | 311 | 662 | 363 | 691 | 415 | 741 | 467 | 784 | 519 | 812 | 571 | 826 | 623 | 842 |
| 260 | 653 | 312 | 662 | 364 | 692 | 416 | 742 | 468 | 784 | 520 | 812 | 572 | 827 | 624 | 842 |
| 261 | 653 | 313 | 662 | 365 | 693 | 417 | 742 | 469 | 784 | 521 | 812 | 573 | 827 | 625 | 843 |
| 262 | 653 | 314 | 662 | 366 | 695 | 418 | 743 | 470 | 784 | 522 | 812 | 574 | 827 | 626 | 843 |
| 263 | 654 | 315 | 662 | 367 | 695 | 419 | 745 | 471 | 784 | 523 | 812 | 575 | 827 | 627 | 843 |
| 264 | 654 | 316 | 663 | 368 | 696 | 420 | 746 | 472 | 785 | 524 | 812 | 576 | 828 | 628 | 844 |
| 265 | 654 | 317 | 663 | 369 | 697 | 421 | 746 | 473 | 787 | 525 | 812 | 577 | 828 | 629 | 844 |
| 266 | 654 | 318 | 663 | 370 | 698 | 422 | 747 | 474 | 791 | 526 | 812 | 578 | 828 | 630 | 844 |
| 267 | 654 | 319 | 663 | 371 | 699 | 423 | 747 | 475 | 791 | 527 | 813 | 579 | 829 | 631 | 845 |
| 268 | 654 | 320 | 663 | 372 | 700 | 424 | 749 | 476 | 792 | 528 | 813 | 580 | 829 | 632 | 845 |
| 269 | 655 | 321 | 663 | 373 | 700 | 425 | 750 | 477 | 792 | 529 | 813 | 581 | 829 | 633 | 845 |
| 270 | 655 | 322 | 664 | 374 | 702 | 426 | 751 | 478 | 792 | 530 | 814 | 582 | 830 | 634 | 845 |
| 271 | 655 | 323 | 664 | 375 | 703 | 427 | 751 | 479 | 792 | 531 | 814 | 583 | 830 | 635 | 846 |
| 272 | 655 | 324 | 664 | 376 | 704 | 428 | 752 | 480 | 792 | 532 | 814 | 584 | 830 | 636 | 846 |
| 273 | 655 | 325 | 664 | 377 | 705 | 429 | 754 | 481 | 792 | 533 | 815 | 585 | 831 | 637 | 846 |
| 274 | 655 | 326 | 664 | 378 | 706 | 430 | 755 | 482 | 792 | 534 | 815 | 586 | 831 | 638 | 847 |
| 275 | 656 | 327 | 664 | 379 | 707 | 431 | 755 | 483 | 792 | 535 | 815 | 587 | 831 | 639 | 847 |
| 276 | 656 | 328 | 665 | 380 | 708 | 432 | 755 | 484 | 792 | 536 | 816 | 588 | 831 | 640 | 847 |
| 277 | 656 | 329 | 665 | 381 | 709 | 433 | 756 | 485 | 793 | 537 | 816 | 589 | 832 | 641 | 848 |
| 278 | 656 | 330 | 665 | 382 | 710 | 434 | 758 | 486 | 796 | 538 | 816 | 590 | 832 | 642 | 848 |
| 279 | 656 | 331 | 667 | 383 | 710 | 435 | 760 | 487 | 800 | 539 | 816 | 591 | 832 | 643 | 848 |
| 280 | 656 | 332 | 668 | 384 | 711 | 436 | 760 | 488 | 801 | 540 | 817 | 592 | 833 | 644 | 849 |
| 281 | 657 | 333 | 669 | 385 | 712 | 437 | 760 | 489 | 801 | 541 | 817 | 593 | 833 | 645 | 849 |
| 282 | 657 | 334 | 669 | 386 | 713 | 438 | 760 | 490 | 801 | 542 | 817 | 594 | 833 | 646 | 849 |
| 283 | 657 | 335 | 670 | 387 | 714 | 439 | 761 | 491 | 801 | 543 | 818 | 595 | 834 | 647 | 849 |
| 284 | 657 | 336 | 670 | 388 | 715 | 440 | 763 | 492 | 801 | 544 | 818 | 596 | 834 | 648 | 850 |
| 285 | 657 | 337 | 671 | 389 | 716 | 441 | 765 | 493 | 801 | 545 | 818 | 597 | 834 | 649 | 850 |
| 286 | 657 | 338 | 672 | 390 | 717 | 442 | 765 | 494 | 801 | 546 | 819 | 598 | 834 | 650 | 850 |
| 287 | 658 | 339 | 673 | 391 | 718 | 443 | 766 | 495 | 801 | 547 | 819 | 599 | 835 | | |
| 288 | 658 | 340 | 673 | 392 | 719 | 444 | 766 | 496 | 801 | 548 | 819 | 600 | 835 | | |
| 289 | 658 | 341 | 674 | 393 | 721 | 445 | 766 | 497 | 801 | 549 | 820 | 601 | 835 | | |
| 290 | 658 | 342 | 675 | 394 | 721 | 446 | 767 | 498 | 801 | 550 | 820 | 602 | 836 | | |
| 291 | 658 | 343 | 676 | 395 | 722 | 447 | 770 | 499 | 801 | 551 | 820 | 603 | 836 | | |

Table 1.21

*Concordance Table for MSA Grade 7 Reading and PARCC ELA07*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 650 | 344 | 668 | 396 | 717 | 448 | 764 | 500 | 800 | 552 | 823 | 604 | 838 |
| 241 | 650 | 293 | 650 | 345 | 668 | 397 | 719 | 449 | 764 | 501 | 801 | 553 | 823 | 605 | 838 |
| 242 | 650 | 294 | 651 | 346 | 669 | 398 | 720 | 450 | 767 | 502 | 801 | 554 | 823 | 606 | 838 |
| 243 | 650 | 295 | 651 | 347 | 670 | 399 | 721 | 451 | 768 | 503 | 803 | 555 | 823 | 607 | 838 |
| 244 | 650 | 296 | 651 | 348 | 670 | 400 | 721 | 452 | 770 | 504 | 806 | 556 | 824 | 608 | 839 |
| 245 | 650 | 297 | 651 | 349 | 671 | 401 | 723 | 453 | 770 | 505 | 806 | 557 | 824 | 609 | 839 |
| 246 | 650 | 298 | 651 | 350 | 672 | 402 | 724 | 454 | 770 | 506 | 806 | 558 | 825 | 610 | 839 |
| 247 | 650 | 299 | 651 | 351 | 673 | 403 | 725 | 455 | 770 | 507 | 806 | 559 | 825 | 611 | 839 |
| 248 | 650 | 300 | 651 | 352 | 674 | 404 | 726 | 456 | 770 | 508 | 806 | 560 | 825 | 612 | 840 |
| 249 | 650 | 301 | 651 | 353 | 675 | 405 | 727 | 457 | 771 | 509 | 806 | 561 | 825 | 613 | 840 |
| 250 | 650 | 302 | 651 | 354 | 676 | 406 | 728 | 458 | 772 | 510 | 806 | 562 | 826 | 614 | 840 |
| 251 | 650 | 303 | 651 | 355 | 677 | 407 | 729 | 459 | 774 | 511 | 806 | 563 | 826 | 615 | 841 |
| 252 | 650 | 304 | 651 | 356 | 678 | 408 | 730 | 460 | 775 | 512 | 806 | 564 | 826 | 616 | 841 |
| 253 | 650 | 305 | 651 | 357 | 678 | 409 | 730 | 461 | 776 | 513 | 806 | 565 | 827 | 617 | 841 |
| 254 | 650 | 306 | 651 | 358 | 680 | 410 | 731 | 462 | 778 | 514 | 806 | 566 | 827 | 618 | 841 |
| 255 | 650 | 307 | 651 | 359 | 681 | 411 | 732 | 463 | 778 | 515 | 806 | 567 | 827 | 619 | 842 |
| 256 | 650 | 308 | 651 | 360 | 681 | 412 | 734 | 464 | 778 | 516 | 806 | 568 | 827 | 620 | 842 |
| 257 | 650 | 309 | 651 | 361 | 682 | 413 | 735 | 465 | 778 | 517 | 806 | 569 | 828 | 621 | 842 |
| 258 | 650 | 310 | 651 | 362 | 684 | 414 | 736 | 466 | 778 | 518 | 806 | 570 | 828 | 622 | 843 |
| 259 | 650 | 311 | 651 | 363 | 684 | 415 | 736 | 467 | 778 | 519 | 806 | 571 | 828 | 623 | 843 |
| 260 | 650 | 312 | 651 | 364 | 685 | 416 | 737 | 468 | 779 | 520 | 807 | 572 | 829 | 624 | 843 |
| 261 | 650 | 313 | 651 | 365 | 686 | 417 | 738 | 469 | 779 | 521 | 807 | 573 | 829 | 625 | 843 |
| 262 | 650 | 314 | 651 | 366 | 688 | 418 | 740 | 470 | 781 | 522 | 809 | 574 | 829 | 626 | 844 |
| 263 | 650 | 315 | 651 | 367 | 688 | 419 | 740 | 471 | 782 | 523 | 813 | 575 | 829 | 627 | 844 |
| 264 | 650 | 316 | 651 | 368 | 689 | 420 | 741 | 472 | 783 | 524 | 814 | 576 | 830 | 628 | 844 |
| 265 | 650 | 317 | 651 | 369 | 690 | 421 | 742 | 473 | 783 | 525 | 814 | 577 | 830 | 629 | 844 |
| 266 | 650 | 318 | 651 | 370 | 691 | 422 | 743 | 474 | 783 | 526 | 815 | 578 | 830 | 630 | 845 |
| 267 | 650 | 319 | 651 | 371 | 692 | 423 | 744 | 475 | 786 | 527 | 816 | 579 | 831 | 631 | 845 |
| 268 | 650 | 320 | 651 | 372 | 692 | 424 | 745 | 476 | 788 | 528 | 818 | 580 | 831 | 632 | 845 |
| 269 | 650 | 321 | 651 | 373 | 694 | 425 | 745 | 477 | 788 | 529 | 821 | 581 | 831 | 633 | 846 |
| 270 | 650 | 322 | 651 | 374 | 695 | 426 | 746 | 478 | 788 | 530 | 822 | 582 | 831 | 634 | 846 |
| 271 | 650 | 323 | 651 | 375 | 696 | 427 | 747 | 479 | 788 | 531 | 822 | 583 | 832 | 635 | 846 |
| 272 | 650 | 324 | 652 | 376 | 696 | 428 | 748 | 480 | 788 | 532 | 822 | 584 | 832 | 636 | 846 |
| 273 | 650 | 325 | 652 | 377 | 698 | 429 | 750 | 481 | 788 | 533 | 823 | 585 | 832 | 637 | 847 |
| 274 | 650 | 326 | 653 | 378 | 699 | 430 | 751 | 482 | 789 | 534 | 823 | 586 | 832 | 638 | 847 |
| 275 | 650 | 327 | 655 | 379 | 700 | 431 | 751 | 483 | 789 | 535 | 822 | 587 | 833 | 639 | 847 |
| 276 | 650 | 328 | 656 | 380 | 700 | 432 | 751 | 484 | 791 | 536 | 822 | 588 | 833 | 640 | 848 |
| 277 | 650 | 329 | 656 | 381 | 702 | 433 | 752 | 485 | 793 | 537 | 822 | 589 | 833 | 641 | 848 |
| 278 | 650 | 330 | 657 | 382 | 703 | 434 | 752 | 486 | 793 | 538 | 822 | 590 | 834 | 642 | 848 |
| 279 | 650 | 331 | 657 | 383 | 704 | 435 | 754 | 487 | 794 | 539 | 823 | 591 | 834 | 643 | 848 |
| 280 | 650 | 332 | 659 | 384 | 705 | 436 | 756 | 488 | 794 | 540 | 823 | 592 | 834 | 644 | 849 |
| 281 | 650 | 333 | 660 | 385 | 706 | 437 | 756 | 489 | 794 | 541 | 823 | 593 | 834 | 645 | 849 |
| 282 | 650 | 334 | 660 | 386 | 707 | 438 | 757 | 490 | 794 | 542 | 823 | 594 | 835 | 646 | 849 |
| 283 | 650 | 335 | 661 | 387 | 708 | 439 | 757 | 491 | 794 | 543 | 823 | 595 | 835 | 647 | 850 |
| 284 | 650 | 336 | 661 | 388 | 709 | 440 | 757 | 492 | 794 | 544 | 823 | 596 | 835 | 648 | 850 |
| 285 | 650 | 337 | 662 | 389 | 711 | 441 | 758 | 493 | 796 | 545 | 823 | 597 | 836 | 649 | 850 |
| 286 | 650 | 338 | 663 | 390 | 711 | 442 | 760 | 494 | 799 | 546 | 823 | 598 | 836 | 650 | 850 |
| 287 | 650 | 339 | 664 | 391 | 712 | 443 | 761 | 495 | 800 | 547 | 823 | 599 | 836 | | |
| 288 | 650 | 340 | 664 | 392 | 713 | 444 | 763 | 496 | 800 | 548 | 823 | 600 | 836 | | |
| 289 | 650 | 341 | 666 | 393 | 715 | 445 | 763 | 497 | 800 | 549 | 823 | 601 | 837 | | |
| 290 | 650 | 342 | 667 | 394 | 715 | 446 | 763 | 498 | 800 | 550 | 823 | 602 | 837 | | |
| 291 | 650 | 343 | 667 | 395 | 716 | 447 | 763 | 499 | 800 | 551 | 823 | 603 | 837 | | |

Table 1.22

*Concordance Table for MSA Grade 8 Reading and PARCC ELA08*

| MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 240 | 650 | 292 | 650 | 344 | 659 | 396 | 717 | 448 | 773 | 500 | 823 | 552 | 835 | 604 | 843 |
| 241 | 650 | 293 | 650 | 345 | 660 | 397 | 718 | 449 | 774 | 501 | 824 | 553 | 835 | 605 | 843 |
| 242 | 650 | 294 | 650 | 346 | 661 | 398 | 720 | 450 | 776 | 502 | 824 | 554 | 835 | 606 | 843 |
| 243 | 650 | 295 | 650 | 347 | 662 | 399 | 721 | 451 | 778 | 503 | 824 | 555 | 835 | 607 | 844 |
| 244 | 650 | 296 | 650 | 348 | 663 | 400 | 722 | 452 | 779 | 504 | 824 | 556 | 835 | 608 | 844 |
| 245 | 650 | 297 | 650 | 349 | 664 | 401 | 723 | 453 | 780 | 505 | 824 | 557 | 836 | 609 | 844 |
| 246 | 650 | 298 | 650 | 350 | 665 | 402 | 724 | 454 | 780 | 506 | 824 | 558 | 836 | 610 | 844 |
| 247 | 650 | 299 | 650 | 351 | 665 | 403 | 726 | 455 | 780 | 507 | 824 | 559 | 836 | 611 | 844 |
| 248 | 650 | 300 | 650 | 352 | 666 | 404 | 727 | 456 | 780 | 508 | 824 | 560 | 836 | 612 | 844 |
| 249 | 650 | 301 | 650 | 353 | 667 | 405 | 728 | 457 | 782 | 509 | 824 | 561 | 836 | 613 | 845 |
| 250 | 650 | 302 | 650 | 354 | 668 | 406 | 730 | 458 | 784 | 510 | 824 | 562 | 836 | 614 | 845 |
| 251 | 650 | 303 | 650 | 355 | 669 | 407 | 731 | 459 | 786 | 511 | 824 | 563 | 837 | 615 | 845 |
| 252 | 650 | 304 | 650 | 356 | 671 | 408 | 732 | 460 | 788 | 512 | 825 | 564 | 837 | 616 | 845 |
| 253 | 650 | 305 | 650 | 357 | 672 | 409 | 733 | 461 | 788 | 513 | 825 | 565 | 837 | 617 | 845 |
| 254 | 650 | 306 | 650 | 358 | 673 | 410 | 734 | 462 | 788 | 514 | 828 | 566 | 837 | 618 | 845 |
| 255 | 650 | 307 | 650 | 359 | 673 | 411 | 736 | 463 | 788 | 515 | 829 | 567 | 837 | 619 | 845 |
| 256 | 650 | 308 | 650 | 360 | 675 | 412 | 737 | 464 | 788 | 516 | 829 | 568 | 837 | 620 | 846 |
| 257 | 650 | 309 | 650 | 361 | 676 | 413 | 738 | 465 | 789 | 517 | 830 | 569 | 838 | 621 | 846 |
| 258 | 650 | 310 | 650 | 362 | 677 | 414 | 739 | 466 | 789 | 518 | 830 | 570 | 838 | 622 | 846 |
| 259 | 650 | 311 | 650 | 363 | 677 | 415 | 740 | 467 | 790 | 519 | 830 | 571 | 838 | 623 | 846 |
| 260 | 650 | 312 | 650 | 364 | 679 | 416 | 742 | 468 | 792 | 520 | 830 | 572 | 838 | 624 | 846 |
| 261 | 650 | 313 | 650 | 365 | 680 | 417 | 742 | 469 | 795 | 521 | 830 | 573 | 838 | 625 | 846 |
| 262 | 650 | 314 | 650 | 366 | 681 | 418 | 743 | 470 | 797 | 522 | 830 | 574 | 838 | 626 | 847 |
| 263 | 650 | 315 | 650 | 367 | 681 | 419 | 744 | 471 | 798 | 523 | 830 | 575 | 838 | 627 | 847 |
| 264 | 650 | 316 | 650 | 368 | 683 | 420 | 746 | 472 | 798 | 524 | 830 | 576 | 839 | 628 | 847 |
| 265 | 650 | 317 | 650 | 369 | 684 | 421 | 747 | 473 | 798 | 525 | 830 | 577 | 839 | 629 | 847 |
| 266 | 650 | 318 | 650 | 370 | 685 | 422 | 748 | 474 | 798 | 526 | 831 | 578 | 839 | 630 | 847 |
| 267 | 650 | 319 | 650 | 371 | 686 | 423 | 749 | 475 | 798 | 527 | 831 | 579 | 839 | 631 | 847 |
| 268 | 650 | 320 | 650 | 372 | 688 | 424 | 750 | 476 | 798 | 528 | 831 | 580 | 839 | 632 | 848 |
| 269 | 650 | 321 | 650 | 373 | 689 | 425 | 751 | 477 | 798 | 529 | 831 | 581 | 839 | 633 | 848 |
| 270 | 650 | 322 | 650 | 374 | 690 | 426 | 753 | 478 | 800 | 530 | 831 | 582 | 840 | 634 | 848 |
| 271 | 650 | 323 | 651 | 375 | 691 | 427 | 754 | 479 | 802 | 531 | 831 | 583 | 840 | 635 | 848 |
| 272 | 650 | 324 | 651 | 376 | 692 | 428 | 754 | 480 | 803 | 532 | 832 | 584 | 840 | 636 | 848 |
| 273 | 650 | 325 | 651 | 377 | 694 | 429 | 755 | 481 | 803 | 533 | 832 | 585 | 840 | 637 | 848 |
| 274 | 650 | 326 | 651 | 378 | 695 | 430 | 755 | 482 | 806 | 534 | 832 | 586 | 840 | 638 | 849 |
| 275 | 650 | 327 | 651 | 379 | 696 | 431 | 757 | 483 | 809 | 535 | 832 | 587 | 840 | 639 | 849 |
| 276 | 650 | 328 | 651 | 380 | 697 | 432 | 758 | 484 | 809 | 536 | 832 | 588 | 841 | 640 | 849 |
| 277 | 650 | 329 | 651 | 381 | 699 | 433 | 760 | 485 | 809 | 537 | 832 | 589 | 841 | 641 | 849 |
| 278 | 650 | 330 | 651 | 382 | 700 | 434 | 760 | 486 | 810 | 538 | 833 | 590 | 841 | 642 | 849 |
| 279 | 650 | 331 | 651 | 383 | 701 | 435 | 761 | 487 | 810 | 539 | 833 | 591 | 841 | 643 | 849 |
| 280 | 650 | 332 | 651 | 384 | 702 | 436 | 762 | 488 | 810 | 540 | 833 | 592 | 841 | 644 | 849 |
| 281 | 650 | 333 | 651 | 385 | 703 | 437 | 764 | 489 | 810 | 541 | 833 | 593 | 841 | 645 | 850 |
| 282 | 650 | 334 | 651 | 386 | 705 | 438 | 766 | 490 | 810 | 542 | 833 | 594 | 841 | 646 | 850 |
| 283 | 650 | 335 | 651 | 387 | 706 | 439 | 766 | 491 | 810 | 543 | 833 | 595 | 842 | 647 | 850 |
| 284 | 650 | 336 | 652 | 388 | 707 | 440 | 766 | 492 | 810 | 544 | 834 | 596 | 842 | 648 | 850 |
| 285 | 650 | 337 | 653 | 389 | 709 | 441 | 767 | 493 | 811 | 545 | 834 | 597 | 842 | 649 | 850 |
| 286 | 650 | 338 | 654 | 390 | 710 | 442 | 767 | 494 | 814 | 546 | 834 | 598 | 842 | 650 | 850 |
| 287 | 650 | 339 | 655 | 391 | 711 | 443 | 769 | 495 | 814 | 547 | 834 | 599 | 842 | | |
| 288 | 650 | 340 | 656 | 392 | 713 | 444 | 771 | 496 | 815 | 548 | 834 | 600 | 842 | | |
| 289 | 650 | 341 | 657 | 393 | 714 | 445 | 772 | 497 | 815 | 549 | 834 | 601 | 843 | | |
| 290 | 650 | 342 | 658 | 394 | 715 | 446 | 772 | 498 | 818 | 550 | 834 | 602 | 843 | | |
| 291 | 650 | 343 | 659 | 395 | 716 | 447 | 773 | 499 | 822 | 551 | 835 | 603 | 843 | | |

## Impact

To evaluate the impact of the mapped PARCC equivalent cut scores summarized in Table 1.10 based on PSM, the classification rates for the basic, proficient, and advanced categories are computed for all tests (see Table 1.23). The classification rates are calculated based on students who have a score larger than or equal to the cut score for each category. If students fall in proficient or advanced categories, they are classified as passing. Generally speaking, the passing rates for students in lower grades are higher for both subjects. For example, the passing rate at the 4th grade is higher than the passing rate at the 5th grade for both PARCC MATH and ELA tests. This pattern is consistent with the classification rate patterns for 2004 to 2014 MSA tests summarized in the next section in Table 2.1.

Table 1.23
*Classification Rates Based on the Mapped PARCC Cut Scores for Grades 3 to 8 Tests*

| Grade | Math | | | Reading/English | | |
|---|---|---|---|---|---|---|
| | Basic | Proficient | Advanced | Basic | Proficient | Advanced |
| 3 | 25.63% | 56.13% | 18.25% | 22.43% | 62.37% | 15.21% |
| 4 | 24.20% | 51.59% | 24.21% | 17.09% | 58.11% | 24.80% |
| 5 | 35.84% | 52.21% | 11.95% | 12.62% | 34.84% | 52.54% |
| 6 | 39.67% | 44.72% | 15.61% | 18.21% | 40.75% | 41.04% |
| 7 | 50.78% | 40.40% | 8.82% | 21.15% | 34.90% | 43.94% |
| 8 | 60.89% | 25.25% | 13.86% | 24.43% | 36.13% | 39.44% |

To further investigate the relationship between the mapped PARCC equivalents of MSA cut scores and the PARCC cut scores, the conditional standard errors of measurement (CSEM) for the mapped PARCC equivalents of the MSA cut scores were utilized to construct a 95% confidence interval and 1 standard deviation above and below the mapped cut scores. As multiple forms were constructed for the PARCC tests, the CSEM for the same PARCC score could be different for different forms. Thus, the mean, minimum, and maximum CSEM were used to construct the intervals respectively. The six intervals around the PARCC equivalents of the MSA cut scores obtained for each of the two cut scores (basic vs. proficient, proficient vs. advanced categories) in both subjects at grades 3 to 8 are summarized in Tables 1.24-1.27.

Table 1.24
*95% Confidence Intervals and One Standard Deviation above and below the Mapped PARCC Equivalent Cut Scores for the Basic vs. Proficient Categories for Math*

| Grade | Cut Score | Mean CSEM | Minimum CSEM | Maximum CSEM | 95% CI Mean CSEM | 1 SD Mean CSEM | 95% CI Minimum CSEM | 1 SD Minimum CSEM | 95% CI Maximum CSEM | 1 SD Maximum CSEM |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 713 | 7.8 | 7.2 | 8.2 | (698, 728) | (705, 721) | (699, 727) | (706, 720) | (697, 729) | (705, 721) |
| 4 | 710 | 7.2 | 6.8 | 7.7 | (696, 724) | (703, 717) | (697, 723) | (703, 717) | (695, 725) | (702, 718) |
| 5 | 720 | 7.7 | 6.9 | 8.2 | (705, 735) | (712, 728) | (706, 734) | (713, 727) | (704, 736) | (712, 728) |
| 6 | 723 | 6.9 | 6.3 | 7.9 | (709, 737) | (716, 730) | (711, 735) | (717, 729) | (708, 738) | (715, 731) |
| 7 | 729 | 6.9 | 6.5 | 7.4 | (715, 743) | (722, 736) | (716, 742) | (722, 736) | (714, 744) | (722, 736) |
| 8 | 730 | 10.1 | 9.7 | 10.8 | (710, 750) | (720, 740) | (711, 749) | (720, 740) | (709, 751) | (719, 741) |

Table 1.25

*95% Confidence Intervals and One Standard Deviation above and below the Mapped PARCC Equivalent Cut Scores for the Proficient vs. Advanced Categories for Math*

| Grade | Cut Score | Mean CSEM | Minimum CSEM | Maximum CSEM | 95% CI Mean CSEM | 1 SD Mean CSEM | 95% CI Minimum CSEM | 1 SD Minimum CSEM | 95% CI Maximum CSEM | 1 SD Maximum CSEM |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 770 | 6.6 | 6.1 | 7.2 | (757, 783) | (763, 777) | (758, 782) | (764, 776) | (756, 784) | (763, 777) |
| 4 | 757 | 6.6 | 6.1 | 7.0 | (744, 770) | (750, 764) | (745, 769) | (751, 763) | (743, 771) | (750, 764) |
| 5 | 772 | 6.2 | 5.9 | 7.7 | (760, 784) | (766, 778) | (760, 784) | (766, 778) | (757, 787) | (764, 780) |
| 6 | 765 | 5.6 | 5.2 | 6.3 | (754, 776) | (759, 771) | (755, 775) | (760, 770) | (753, 777) | (759, 771) |
| 7 | 764 | 5.0 | 4.6 | 5.7 | (754, 774) | (759, 769) | (755, 773) | (759, 769) | (753, 775) | (758, 770) |
| 8 | 768 | 7.6 | 7.1 | 8.6 | (753, 783) | (760, 776) | (754, 782) | (761, 775) | (751, 785) | (759, 777) |

Table 1.26

*95% Confidence Intervals and One Standard Deviation above and below the Mapped PARCC Equivalent Cut Scores for the Basic vs. Proficient Categories for Reading*

| Grade | Cut Score | Mean CSEM | Minimum CSEM | Maximum CSEM | 95% CI Mean CSEM | 1 SD Mean CSEM | 95% CI Minimum CSEM | 1 SD Minimum CSEM | 95% CI Maximum CSEM | 1 SD Maximum CSEM |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 703 | 10.7 | 9.7 | 11.6 | (682, 724) | (692, 714) | (684, 722) | (693, 713) | (680, 726) | (691, 715) |
| 4 | 707 | 8.7 | 7.8 | 9.6 | (690, 724) | (698, 716) | (692, 722) | (699, 715) | (688, 726) | (697, 717) |
| 5 | 701 | 9.6 | 8.8 | 10.7 | (682, 720) | (791, 711) | (684, 718) | (692, 710) | (680, 722) | (690, 712) |
| 6 | 709 | 7.6 | 7.0 | 8.6 | (694, 724) | (701, 717) | (695, 723) | (702, 716) | (692, 726) | (700, 718) |
| 7 | 706 | 8.8 | 8.2 | 9.4 | (689, 723) | (697, 715) | (690, 722) | (698, 714) | (688, 724) | (697, 715) |
| 8 | 711 | 8.2 | 7.2 | 9.3 | (695, 727) | (703, 719) | (697, 725) | (704, 718) | (693, 729) | (702, 720) |

Table 1.27

*95% Confidence Intervals and One Standard Deviation above and below the Mapped PARCC Equivalent Cut Scores for the Proficient vs. Advanced Categories for Reading*

| Grade | Cut Score | Mean CSEM | Minimum CSEM | Maximum CSEM | 95% CI Mean CSEM | 1 SD Mean CSEM | 95% CI Minimum CSEM | 1 SD Minimum CSEM | 95% CI Maximum CSEM | 1 SD Maximum CSEM |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 781 | 10.3 | 9.4 | 10.6 | (761, 801) | (771, 791) | (763, 799) | (772, 790) | (760, 802) | (770, 792) |
| 4 | 765 | 8.0 | 7.6 | 8.5 | (749, 781) | (757, 773) | (750, 780) | (757, 773) | (748, 782) | (756, 774) |
| 5 | 739 | 7.7 | 7.0 | 8.6 | (724, 754) | (731, 747) | (725, 753) | (732, 746) | (722, 756) | (730, 748) |
| 6 | 746 | 6.6 | 6.1 | 7.0 | (733, 759) | (739, 753) | (734, 758) | (740, 752) | (732, 760) | (739, 753) |
| 7 | 745 | 7.5 | 7.1 | 7.9 | (730, 760) | (737, 753) | (731, 759) | (738, 752) | (730, 760) | (737, 753) |
| 8 | 751 | 7.9 | 7.4 | 8.3 | (736, 766) | (743, 759) | (736, 766) | (744, 758) | (735, 767) | (743, 759) |

For the PARCC equivalents of the MSA cut scores for being proficient in grades 5 to 8 MATH tests, all intervals captured the PARCC cut score of 725 between performance levels 2 vs. 3. For the PARCC equivalents of the MSA cut scores for being proficient in grades 3 and 4

MATH test, all 95% intervals captured the PARCC cut score of 725, whereas one standard deviation intervals failed to capture 725. For the PARCC equivalents of the MSA cut scores for being classified as advanced in grades 4 to 8 MATH tests, all computed intervals were above the PARCC cut score of 750 between performance levels 3 vs. 4 and below the PARCC cut scores between performance levels 4 vs. level 5 (Please note these cut scores vary depending on grades). Cut scores for PARCC grades 3 to 8 tests in MATH and ELA are presented in Appendix B.

For the mapped PARCC ELA cut scores, none of the intervals constructed around the PARCC equivalents of the MSA cut scores for being proficient in the $4^{th}$ to $7^{th}$ grade tests captured the PARCC cut score of 725 between performance levels 2 vs. 3, rather the upper bound of the intervals were all smaller than 725. Yet, for the $8^{th}$ grade PARCC ELA, the 95% intervals for being proficient captured the PARCC cut score of 725. The 95% interval constructed with the maximum CSEM around the grade 3 PARCC ELA equivalent of the MSA cut score for being proficient also captured 725. The 95% confidence intervals for being advanced in the $4^{th}$ and the $5^{th}$ grade ELA tests captured the PARCC cut score of 750. For the PARCC equivalents of the MSA cut scores for being advanced in the $6^{th}$ to $8^{th}$ grade tests, all of the intervals captured the PARCC cut score of 750 between performance levels 3 vs. 4.

## Option II
## Using Impact Data to Map the MSA Cut Scores to the PARCC Scale by Extrapolation

### Data Preparation

The impact data from the 2003 to 2014 test administrations were provided by MSDE to MARC showing the percentages of students falling into each performance level: basic, proficient and advanced. Due to the fact that MSA tests were only administered to grade 3, grade 5, grade 8 and grade 10 in 2003, such data were missing for 2003 grades 4, 6 and 7 MSA Math and Reading tests. So classification rates for all performance levels from 2004 to 2014 MSA test administrations were used to conduct the analysis. The percentages of students fall in each performance level for 2004 to 2014 MSA tests for both Math and Reading are summarized in Table 2.1.

Table 2.1
*Classification Rates for 2004-2014 MSA 3rd to 8th Grade Math and Reading Tests*

| | | Math | | | Reading/English | | |
|---|---|---|---|---|---|---|---|
| | | Basic | Proficient | Advanced | Basic | Proficient | Advanced |
| Grade 3 | 2004 | 27.75% | 52.31% | 19.94% | 28.99% | 58.47% | 12.55% |
| | 2005 | 23.17% | 51.21% | 25.62% | 24.14% | 58.21% | 17.64% |
| | 2006 | 20.89% | 54.29% | 24.82% | 21.75% | 63.15% | 15.10% |
| | 2007 | 21.41% | 53.77% | 24.83% | 19.46% | 60.30% | 20.25% |
| | 2008 | 17.40% | 55.91% | 26.69% | 17.01% | 66.12% | 16.87% |
| | 2009 | 15.66% | 55.50% | 28.84% | 15.09% | 62.97% | 21.94% |
| | 2010 | 13.98% | 51.87% | 34.15% | 16.03% | 62.80% | 21.17% |
| | 2011 | 13.72% | 50.89% | 35.38% | 14.90% | 64.58% | 20.53% |
| | 2012 | 12.24% | 49.03% | 38.74% | 14.98% | 64.44% | 20.58% |
| | 2013 | 17.84% | 53.29% | 28.87% | 17.38% | 60.49% | 22.13% |
| | 2014 | 25.83% | 54.79% | 19.39% | 22.81% | 62.34% | 14.85% |
| Grade 4 | 2004 | 30.43% | 49.56% | 20.01% | 24.93% | 59.31% | 15.76% |
| | 2005 | 23.53% | 49.52% | 26.95% | 19.04% | 63.28% | 17.69% |
| | 2006 | 17.91% | 49.92% | 32.17% | 18.20% | 58.63% | 23.17% |
| | 2007 | 14.04% | 47.99% | 37.98% | 13.95% | 61.24% | 24.81% |
| | 2008 | 11.44% | 46.16% | 42.40% | 11.51% | 60.55% | 27.94% |
| | 2009 | 10.79% | 44.32% | 44.89% | 13.36% | 59.88% | 26.76% |
| | 2010 | 9.80% | 43.62% | 46.59% | 12.59% | 57.91% | 29.50% |
| | 2011 | 9.68% | 40.60% | 49.72% | 11.32% | 59.28% | 29.40% |
| | 2012 | 10.13% | 38.64% | 51.23% | 10.16% | 55.63% | 34.21% |
| | 2013 | 11.21% | 42.06% | 46.73% | 11.76% | 58.40% | 29.83% |
| | 2014 | 19.38% | 48.41% | 32.22% | 13.69% | 55.50% | 30.82% |
| Grade 5 | 2004 | 36.88% | 50.43% | 12.69% | 31.64% | 39.79% | 28.57% |
| | 2005 | 30.80% | 51.95% | 17.25% | 25.69% | 44.43% | 29.88% |
| | 2006 | 26.62% | 54.15% | 19.22% | 23.42% | 42.85% | 33.73% |
| | 2007 | 21.73% | 57.57% | 20.70% | 23.31% | 43.61% | 33.09% |
| | 2008 | 19.48% | 55.12% | 25.40% | 13.30% | 35.71% | 50.99% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2009 | 18.78% | 56.08% | 25.14% | 10.48% | 39.94% | 49.59% |
| | 2010 | 16.85% | 57.88% | 25.27% | 10.60% | 36.15% | 53.25% |
| | 2011 | 17.74% | 59.43% | 22.82% | 9.78% | 34.45% | 55.77% |
| | 2012 | 14.66% | 54.82% | 30.52% | 10.06% | 34.89% | 55.05% |
| | 2013 | 19.14% | 55.54% | 25.32% | 11.56% | 31.80% | 56.64% |
| | 2014 | 27.17% | 52.89% | 19.94% | 11.05% | 34.53% | 54.42% |
| | 2004 | 49.72% | 39.09% | 11.19% | 31.66% | 37.94% | 30.40% |
| | 2005 | 39.88% | 45.16% | 14.97% | 29.72% | 39.08% | 31.20% |
| | 2006 | 34.33% | 46.93% | 18.74% | 28.18% | 37.66% | 34.16% |
| | 2007 | 28.12% | 48.33% | 23.56% | 23.44% | 43.63% | 32.93% |
| | 2008 | 24.19% | 43.97% | 31.84% | 18.21% | 38.85% | 42.94% |
| Grade 6 | 2009 | 23.99% | 46.99% | 29.03% | 16.56% | 43.26% | 40.18% |
| | 2010 | 20.16% | 50.14% | 29.70% | 13.88% | 42.84% | 43.29% |
| | 2011 | 19.02% | 48.87% | 32.11% | 16.21% | 41.02% | 42.77% |
| | 2012 | 16.95% | 47.57% | 35.48% | 15.52% | 42.69% | 41.79% |
| | 2013 | 22.89% | 47.99% | 29.12% | 15.90% | 40.64% | 43.46% |
| | 2014 | 32.19% | 46.44% | 21.38% | 16.79% | 39.47% | 43.75% |
| | 2004 | 50.17% | 39.72% | 10.12% | 32.98% | 41.07% | 25.94% |
| | 2005 | 44.63% | 41.56% | 13.82% | 32.80% | 39.03% | 28.17% |
| | 2006 | 39.89% | 44.21% | 15.90% | 28.92% | 45.01% | 26.07% |
| | 2007 | 38.74% | 43.32% | 17.93% | 29.82% | 40.71% | 29.47% |
| | 2008 | 31.78% | 46.52% | 21.70% | 18.83% | 38.32% | 42.85% |
| Grade 7 | 2009 | 28.02% | 48.97% | 23.02% | 18.25% | 38.09% | 43.66% |
| | 2010 | 27.42% | 49.23% | 23.35% | 18.18% | 36.76% | 45.06% |
| | 2011 | 25.67% | 48.91% | 25.42% | 15.95% | 40.64% | 43.41% |
| | 2012 | 23.68% | 49.45% | 26.87% | 18.85% | 35.49% | 45.66% |
| | 2013 | 27.39% | 49.30% | 23.31% | 15.00% | 36.86% | 48.14% |
| | 2014 | 36.89% | 43.47% | 19.64% | 21.21% | 35.95% | 42.84% |
| | 2004 | 54.28% | 28.86% | 16.86% | 36.14% | 43.02% | 20.83% |
| | 2005 | 48.26% | 32.90% | 18.84% | 33.58% | 42.48% | 23.94% |
| | 2006 | 44.93% | 32.54% | 22.54% | 32.99% | 43.03% | 23.98% |
| | 2007 | 43.30% | 31.69% | 25.01% | 31.74% | 44.33% | 23.94% |
| | 2008 | 38.15% | 32.83% | 29.02% | 27.18% | 38.70% | 34.12% |
| Grade 8 | 2009 | 34.22% | 37.13% | 28.65% | 19.85% | 43.25% | 36.90% |
| | 2010 | 34.57% | 35.89% | 29.54% | 19.62% | 35.54% | 44.84% |
| | 2011 | 33.95% | 33.66% | 32.39% | 17.29% | 36.85% | 45.86% |
| | 2012 | 30.74% | 36.17% | 33.09% | 19.22% | 36.63% | 44.16% |
| | 2013 | 32.98% | 36.42% | 30.60% | 18.96% | 34.91% | 46.13% |
| | 2014 | 41.28% | 32.81% | 25.91% | 23.11% | 36.56% | 40.33% |

It is noted that the percentages of students being classified in the basic performance level for all tests decreased from 2004 to 2012 and that for being classified in the proficient and above level for all tests increased, indicating students' performance improved across years. However, this trend was reversed after the introduction of PARCC field tests and the new "Common Core" curricula in 2013. Starting from 2013, the percentages of students being classified in the basic

level increased and that for being classified in the proficient and above level decreased. A possible explanation confirmed by the State assessment experts is that since the introduction of PARCC tests, MSA did not appear to be as important as it was to students and/or teachers, as a change in instructional materials occurred too. Hence, we only used the data from 2004 to 2012 test administrations to conduct extrapolation to remove the influence of the unusual trend in the 2013-2014 MSA test administrations.

**Extrapolation and Mapping the Extrapolated Percentages of Students Falling into Performance Levels onto the PARCC Scale**

Table 2.2
*Prediction Equations for Classification Rates*

| Test Name | Cut score | Prediction Equation |
|---|---|---|
| Grade 3 MSA Math | basic vs. proficient | $y = 0.2934e^{-0.099x}$ |
| | proficient vs. advanced | $y = 0.0016x^2 + 0.0047x + 0.212$ |
| Grade 4 MSA Math | basic vs. proficient | $y = 0.318x^{-0.574}$ |
| | proficient vs. advanced | $y = -0.0038x^2 + 0.0766x + 0.1297$ |
| Grade 5 MSA Math | basic vs. proficient | $y = -0.101\ln x + 0.3702$ |
| | proficient vs. advanced | $y = 0.1314x^{0.3461}$ |
| Grade 6 MSA Math | basic vs. proficient | $y = -0.151\ln x + 0.4992$ |
| | proficient vs. advanced | $y = 0.1095x^{0.5411}$ |
| Grade 7 MSA Math | basic vs. proficient | $y = 0.0027x^2 - 0.0602x + 0.5596$ |
| | proficient vs. advanced | $y = -0.0015x^2 + 0.0348x + 0.0698$ |
| Grade 8 MSA Math | basic vs. proficient | $y = 0.0026x^2 - 0.0537x + 0.5892$ |
| | proficient vs. advanced | $y = -0.0016x^2 + 0.037x + 0.1293$ |
| Grade 3 MSA Reading | basic vs. proficient | $y = -0.068\ln(x) + 0.2879$ |
| | proficient vs. advanced | $y = 0.1332x^{0.2214}$ |
| Grade 4 MSA Reading | basic vs. proficient | $y = -0.065\ln(x) + 0.242$ |
| | proficient vs. advanced | $y = 0.1525x^{0.3421}$ |
| Grade 5 MSA Reading | basic vs. proficient | $y = -0.111\ln(x) + 0.3341$ |
| | proficient vs. advanced | $y = -0.0019x^2 + 0.0593x + 0.1982$ |
| Grade 6 MSA Reading | basic vs. proficient | $y = -0.0234x + 0.332$ |
| | proficient vs. advanced | $y = -0.002x^2 + 0.0374x + 0.253$ |
| Grade 7 MSA Reading | basic vs. proficient | $y = 0.0024x^2 - 0.0474x + 0.3992$ |
| | proficient vs. advanced | $y = -0.0018x^2 + 0.0471x + 0.1873$ |
| Grade 8 MSA Reading | basic vs. proficient | $y = -0.0259x + 0.3933$ |
| | proficient vs. advanced | $y = 0.0356x + 0.1536$ |

Using this method, statistical modeling and subsequent extrapolation had to be conducted to get classification rates for all three performance levels for 2015 MSA tests. Two scatterplots were generated to examine the trends in the percentage changes for the basic and the advanced level, respectively, for each MSA test. Prediction equations are developed using Excel best fitting line function. The choice of the best fitting line was based on two criteria simultaneously---1) the R square measure for the best fitting line is the highest and 2) the extrapolated percentages of being in the basic level for 2015 MSA tests are lower than those in 2012. An

example of the scatterplot and the best fitting line is presented in Appendix C. Using the prediction equations, the percentages of students being classified in the basic and advanced level were extrapolated for 2015 MSA tests. The extrapolation equations for all tests are presented in Table 2.2. The extrapolated classification rates for 2015 MSA tests are summarized in Table 2.3.

Table 2.3
*Extrapolated Classification Rates for 2015 MSA Tests*

| Grade | Math | | | Reading | | |
|---|---|---|---|---|---|---|
| | Basic | Proficient | Advanced | Basic | Proficient | Advanced |
| 3 | 8.94% | 41.18% | 49.88% | 11.89% | 65.02% | 23.09% |
| 4 | 7.64% | 42.19% | 50.17% | 8.05% | 56.27% | 35.68% |
| 5 | 11.92% | 57.02% | 31.05% | 5.83% | 30.55% | 63.62% |
| 6 | 12.40% | 45.59% | 42.01% | 16.56% | 42.06% | 41.38% |
| 7 | 22.50% | 51.51% | 27.14% | 17.60% | 33.07% | 49.33% |
| 8 | 31.92% | 33.79% | 34.29% | 8.25% | 33.67% | 58.08% |

We then ranked students who took each PARCC test based on their test scores, and located the PARCC scale scores with the same classification rates as we extrapolated for each 2015 MSA test. Table 2.4 summarizes the mapped PARCC cut scores and the corresponding MSA cut scores.

Table 2.4
*MSA Cut Scores and PARCC Equivalent Scores Using Extrapolation*

| Grade | Math | | | | Reading/ELA | | | |
|---|---|---|---|---|---|---|---|---|
| | Scale Score for Proficient | | Scale Score for Advanced | | Scale Score for Proficient | | Scale Score for Advanced | |
| | MSA | PARCC | MSA | PARCC | MSA | PARCC | MSA | PARCC |
| 3 | 379 | 690 | 441 | 736 | 388 | 686 | 456 | 768 |
| 4 | 374 | 691 | 433 | 731 | 371 | 691 | 437 | 754 |
| 5 | 392 | 697 | 453 | 748 | 384 | 689 | 425 | 728 |
| 6 | 396 | 697 | 447 | 738 | 381 | 706 | 421 | 745 |
| 7 | 396 | 708 | 451 | 744 | 385 | 700 | 425 | 739 |
| 8 | 407 | 703 | 444 | 735 | 391 | 681 | 425 | 731 |

Similar to what was done in Option I, the CSEM for the mapped PARCC cut score was utilized to construct 95% confidence intervals and one standard deviation above and below the mapped cut scores. The mean, minimum, and maximum CSEM were used to construct the intervals respectively to represent the variation of CSEM for the same PARCC score across test forms. The six intervals around the PARCC equivalent cut scores obtained for each of the two cut scores (basic vs. proficient, proficient vs. advanced) in both subjects at grades 3 to 8 are summarized in Tables 2.5-2.8.

With respect to the PARCC MATH tests, the 95% CIs around the mapped PARCC equivalent cut scores between the basic vs. proficient categories generally captured the PARCC cut score of 700 between performance levels 1 vs. 2, but seldom captured the PARCC cut score of 725 between performance levels 2 vs. 3. For the mapped PARCC equivalents of the MSA cut

scores between the proficient vs. advanced categories, the 95% CIs generally captured the PARCC cut score of 750 between performance levels 3 vs. 4 except for grade 4. For grades 3, 4, and 8, the PARCC cut score of 725 between performance levels 2 vs. 3 also fell in the 95% CIs.

On the other hand, for the PARCC ELA tests, most of the intervals around the mapped PARCC equivalent cut scores between the basic vs. proficient categories shown in Table 2.7 captured 700, which is the PARCC cut score between performance levels 1 vs. 2. None of them captured the PARCC cut score of 725 between performance levels 2 vs. 3. In terms of the mapped PARCC equivalent cut scores of proficient vs. advanced, the intervals for grades 5 and 8 only captured the PARCC cut score of 725 between performance levels 2 vs. 3, while the intervals for grades 3, 4, 6, 7 only captured the PARCC cut score of 750 between performance levels 3 vs. 4.

Table 2.5
*95% Confidence Intervals and One Standard Deviation above and below the Mapped PARCC Equivalent Cut Scores for the Basic vs. Proficient Categories for Math*

| Grade | Cut Score | Mean CSEM | Minimum CSEM | Maximum CSEM | 95% CI Mean CSEM | 1 SD Mean CSEM | 95% CI Minimum CSEM | 1 SD Minimum CSEM | 95% CI Maximum CSEM | 1 SD Maximum CSEM |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 690 | 9.4 | 8.9 | 9.9 | (672, 708) | (681, 699) | (673, 707) | (681, 699) | (671, 709) | (680, 700) |
| 4 | 691 | 8.1 | 7.7 | 8.5 | (675, 707) | (683, 699) | (676, 706) | (683, 699) | (674, 708) | (682, 700) |
| 5 | 697 | 9.5 | 8.3 | 10.1 | (678, 716) | (687, 707) | (681, 713) | (689, 705) | (677, 717) | (687, 707) |
| 6 | 697 | 9.2 | 8.1 | 10 | (679, 715) | (688, 706) | (681, 713) | (689, 705) | (677, 717) | (687, 707) |
| 7 | 708 | 8.5 | 8.1 | 9.4 | (691, 725) | (699, 717) | (692, 724) | (700, 716) | (690, 726) | (699, 717) |
| 8 | 703 | 12.0 | 11.6 | 12.8 | (679, 727) | (691, 715) | (680, 726) | (691, 715) | (678, 728) | (690, 716) |

Table 2.6
*95% Confidence Intervals and One Standard Deviation above and below the Mapped PARCC Equivalent Cut Scores for the Proficient vs. Advanced Categories for Math*

| Grade | Cut Score | Mean CSEM | Minimum CSEM | Maximum CSEM | 95% CI Mean CSEM | 1 SD Mean CSEM | 95% CI Minimum CSEM | 1 SD Minimum CSEM | 95% CI Maximum CSEM | 1 SD Maximum CSEM |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 736 | 7.0 | 6.6 | 8 | (722, 750) | (729, 743) | (723, 749) | (729, 743) | (720, 752) | (728, 744) |
| 4 | 731 | 6.9 | 6.4 | 7.4 | (717, 745) | (724, 738) | (718, 744) | (725, 737) | (716, 746) | (724, 738) |
| 5 | 748 | 6.6 | 6 | 7 | (735, 761) | (741, 755) | (736, 760) | (742, 754) | (734, 762) | (741, 755) |
| 6 | 738 | 6.4 | 5.7 | 7.3 | (725, 751) | (732, 744) | (727, 749) | (732, 744) | (724, 752) | (731, 745) |
| 7 | 744 | 6.1 | 5.7 | 6.6 | (732, 756) | (738, 750) | (733, 755) | (738, 750) | (731, 757) | (737, 751) |
| 8 | 735 | 10.0 | 9.3 | 10.6 | (715, 755) | (725, 745) | (717, 753) | (726, 744) | (714, 756) | (724, 746) |

Table 2.7

*95% Confidence Intervals and One Standard Deviation above and below the Mapped PARCC Equivalent Cut Scores for the Basic vs. Proficient Categories for Reading*

| Grade | Cut Score | Mean CSEM | Minimum CSEM | Maximum CSEM | 95% CI Mean CSEM | 1 SD Mean CSEM | 95% CI Minimum CSEM | 1 SD Minimum CSEM | 95% CI Maximum CSEM | 1 SD Maximum CSEM |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 686 | 12.2 | 11.7 | 13.4 | (662, 710) | (674, 698) | (663, 709) | (674, 698) | (660, 712) | (673, 699) |
| 4 | 691 | 10.0 | 9.3 | 11.5 | (671, 711) | (681, 701) | (673, 709) | (682, 700) | (668, 714) | (680, 702) |
| 5 | 689 | 11.3 | 10.2 | 12.2 | (667, 711) | (678, 700) | (669, 709) | (679, 699) | (665, 713) | (677, 701) |
| 6 | 706 | 7.9 | 7.1 | 8.9 | (691, 721) | (698, 714) | (692, 720) | (699, 713) | (689, 723) | (697, 715) |
| 7 | 700 | 9.2 | 8.6 | 9.9 | (682, 718) | (691, 709) | (683, 717) | (691, 709) | (681, 719) | (690, 710) |
| 8 | 681 | 10.5 | 8.9 | 11.7 | (660, 702) | (670, 692) | (664, 698) | (672, 690) | (658, 704) | (669, 693) |

Table 2.8

*95% Confidence Intervals and One Standard Deviation above and below the Mapped PARCC Equivalent Cut Scores for the Proficient vs. Advanced Categories for Reading*

| Grade | Cut Score | Mean CSEM | Minimum CSEM | Maximum CSEM | 95% CI Mean CSEM | 1 SD Mean CSEM | 95% CI Minimum CSEM | 1 SD Minimum CSEM | 95% CI Maximum CSEM | 1 SD Maximum CSEM |
|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 768 | 9.9 | 9.1 | 10.7 | (749, 787) | (758, 778) | (750, 786) | (759, 777) | (747, 789) | (757, 779) |
| 4 | 754 | 7.8 | 7.4 | 8.4 | (739, 769) | (746, 762) | (739, 769) | (747, 761) | (738, 770) | (746, 762) |
| 5 | 728 | 8.0 | 7.2 | 9 | (712, 744) | (720, 736) | (714, 742) | (721, 735) | (710, 746) | (719, 737) |
| 6 | 745 | 6.6 | 6.1 | 7 | (732, 758) | (738, 752) | (733, 757) | (739, 751) | (731, 759) | (738, 752) |
| 7 | 739 | 7.5 | 7.1 | 7.9 | (724, 754) | (731, 747) | (725, 753) | (732, 746) | (724, 754) | (731, 747) |
| 8 | 731 | 7.8 | 7.2 | 8.5 | (716, 746) | (723, 739) | (717, 745) | (724, 738) | (714, 748) | (722, 740) |

## Summary and Recommendations

This study explored two methods of obtaining the PARCC equivalent scores of the MSA cut scores for grades 3 to 8 math and reading/English tests. One method used propensity score matching to come up with equivalent groups between students taking MSA in 2014 and PARCC in 2015. One to one without replacement matching with the caliper value of 0.25 was used in this study. The absolute standardized mean difference values for each covariate indicated the matched samples were equivalent on these covariates. Based on the equivalent groups, equipercentile linking was carried out to map the MSA scores on the PARCC scale.

The other method used MSA impact data from 2004 to 2012 test administrations. The percentages of students classified in basic, proficient and advanced levels by MSA cut scores were extrapolated for 2015 MSA math and reading tests. Then, the extrapolated 2015 MSA classification rates for each performance level were mapped to the PARCC scale.

Table 3.1 summarizes the mapped PARCC equivalents of the MSA cut scores based on both methods. The PARCC equivalents of the MSA cut scores produced in Option I were consistently higher than the mapped PARCC cut scores in Option II. This is due to the use of different data in conducting these two analyses. In Option I, equivalent student groups were built based on data from 2014 and 2013 MSA test administrations. As State assessment professionals have indicated, students' performance in 2013 and 2014 MSA test administrations dropped due to the introduction of PARCC and new learning materials, it is reasonable that the PARCC equivalents of MSA cut scores mapped from 2014 and 2013 student population tend to be higher than the PARCC equivalent cut scores obtained in Option II where only data from 2004 to 2012 test administrations were used to remove the impact of the introduction of PARCC and new curricula.

Applying the PARCC equivalents of the MSA cut scores using PSM, the percentages of students fall in basic, proficient and advanced were calculated. To summarize and compare the two analytical approaches, historical classification rates, classification rates calculated based on mapped PARCC cut score in Option I, and the extrapolated classification rates in Option II are presented in Table 3.2. Compared with the classification rates produced from Option I, the classification rates from Option II were more consistent with the historical trend in classification rates from 2004 to 2012 MSA test administrations when students' performance was not impacted by the PARCC and new "Common Core" curricula starting from 2013.

Table 3.1

*MSA Cut Scores and PARCC Equivalent Scores Using Each Method*

| Grade | Math | | | | | | Reading/ELA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Scale Score for Being Proficient | | | Scale Score for Being Advanced | | | Scale Score for Being Proficient | | | Scale Score for Being Advanced | | |
| | MSA | PARCC Option I | PARCC Option II | MSA | PARCC Option I | PARCC Option II | MSA | PARCC Option I | PARCC Option II | MSA | PARCC Option I | PARCC Option II |
| 3 | 379 | 713 | 690 | 441 | 770 | 736 | 388 | 703 | 700 | 456 | 721 | 768 |
| 4 | 374 | 710 | 708 | 433 | 757 | 731 | 371 | 707 | 691 | 437 | 765 | 754 |
| 5 | 392 | 720 | 697 | 453 | 772 | 748 | 384 | 701 | 699 | 425 | 739 | 728 |
| 6 | 396 | 723 | 697 | 447 | 765 | 738 | 381 | 709 | 706 | 421 | 746 | 745 |
| 7 | 396 | 729 | 708 | 451 | 764 | 744 | 385 | 706 | 700 | 425 | 745 | 739 |
| 8 | 407 | 730 | 703 | 444 | 768 | 735 | 391 | 711 | 681 | 425 | 751 | 731 |

Table 3.2

*Historical Classification Rates for 2004-2014 MSA and the Mapped 2015 PARCC Classification Rates for Grades 3 to 8 Math and Reading Tests*

| Grade | Year | Math | | | Reading/English | | |
|---|---|---|---|---|---|---|---|
| | | Basic | Proficient | Advanced | Basic | Proficient | Advanced |
| 3 | 2004 | 27.75% | 52.31% | 19.94% | 28.99% | 58.47% | 12.55% |
| | 2005 | 23.17% | 51.21% | 25.62% | 24.14% | 58.21% | 17.64% |
| | 2006 | 20.89% | 54.29% | 24.82% | 21.75% | 63.15% | 15.10% |
| | 2007 | 21.41% | 53.77% | 24.83% | 19.46% | 60.30% | 20.25% |
| | 2008 | 17.40% | 55.91% | 26.69% | 17.01% | 66.12% | 16.87% |
| | 2009 | 15.66% | 55.50% | 28.84% | 15.09% | 62.97% | 21.94% |
| | 2010 | 13.98% | 51.87% | 34.15% | 16.03% | 62.80% | 21.17% |
| | 2011 | 13.72% | 50.89% | 35.38% | 14.90% | 64.58% | 20.53% |
| | 2012 | 12.24% | 49.03% | 38.74% | 14.98% | 64.44% | 20.58% |
| | Option I: PSM & Equipercentile Link | | | | | | |
| | 2013 | 17.84% | 53.29% | 28.87% | 17.38% | 60.49% | 22.13% |
| | 2014 | 25.83% | 54.79% | 19.39% | 22.81% | 62.34% | 14.85% |
| | 2015 | 25.63% | 56.13% | 18.25% | 22.43% | 62.37% | 15.21% |
| | Option II: Extrapolation | | | | | | |
| | 2013 | 10.90% | 47.20% | 41.90% | 13.13% | 64.69% | 22.18% |
| | 2014 | 9.87% | 44.40% | 45.73% | 12.48% | 64.87% | 22.65% |
| | 2015 | 8.94% | 41.18% | 49.88% | 11.89% | 65.02% | 23.09% |
| 4 | 2004 | 30.43% | 49.56% | 20.01% | 24.93% | 59.31% | 15.76% |
| | 2005 | 23.53% | 49.52% | 26.95% | 19.04% | 63.28% | 17.69% |
| | 2006 | 17.91% | 49.92% | 32.17% | 18.20% | 58.63% | 23.17% |
| | 2007 | 14.04% | 47.99% | 37.98% | 13.95% | 61.24% | 24.81% |
| | 2008 | 11.44% | 46.16% | 42.40% | 11.51% | 60.55% | 27.94% |
| | 2009 | 10.79% | 44.32% | 44.89% | 13.36% | 59.88% | 26.76% |
| | 2010 | 9.80% | 43.62% | 46.59% | 12.59% | 57.91% | 29.50% |
| | 2011 | 9.68% | 40.60% | 49.72% | 11.32% | 59.28% | 29.40% |
| | 2012 | 10.13% | 38.64% | 51.23% | 10.16% | 55.63% | 34.21% |
| | Option I: PSM & Equipercentile Link | | | | | | |
| | 2013 | 11.21% | 42.06% | 46.73% | 11.76% | 58.40% | 29.83% |
| | 2014 | 19.38% | 48.41% | 32.22% | 13.69% | 55.50% | 30.82% |
| | 2015 | 24.20% | 51.59% | 24.21% | 17.09% | 58.11% | 24.80% |
| | Option II: Extrapolation | | | | | | |
| | 2013 | 8.48% | 39.95% | 51.57% | 9.23% | 57.24% | 33.53% |
| | 2014 | 8.03% | 40.72% | 51.25% | 8.61% | 56.75% | 34.64% |
| | 2015 | 7.64% | 42.19% | 50.17% | 8.05% | 56.27% | 35.68% |
| 5 | 2004 | 36.88% | 50.43% | 12.69% | 31.64% | 39.79% | 28.57% |
| | 2005 | 30.80% | 51.95% | 17.25% | 25.69% | 44.43% | 29.88% |
| | 2006 | 26.62% | 54.15% | 19.22% | 23.42% | 42.85% | 33.73% |
| | 2007 | 21.73% | 57.57% | 20.70% | 23.31% | 43.61% | 33.09% |
| | 2008 | 19.48% | 55.12% | 25.40% | 13.30% | 35.71% | 50.99% |
| | 2009 | 18.78% | 56.08% | 25.14% | 10.48% | 39.94% | 49.59% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2010 | 16.85% | 57.88% | 25.27% | 10.60% | 36.15% | 53.25% |
| | 2011 | 17.74% | 59.43% | 22.82% | 9.78% | 34.45% | 55.77% |
| | 2012 | 14.66% | 54.82% | 30.52% | 10.06% | 34.89% | 55.05% |
| | Option I: PSM & Equipercentile Link | | | | | | |
| | 2013 | 19.14% | 55.54% | 25.32% | 11.56% | 31.80% | 56.64% |
| | 2014 | 27.17% | 52.89% | 19.94% | 11.05% | 34.53% | 54.42% |
| | 2015 | 35.84% | 52.21% | 11.95% | 12.62% | 34.84% | 52.54% |
| | Option II: Extrapolation | | | | | | |
| | 2013 | 13.76% | 57.08% | 29.15% | 7.85% | 32.03% | 60.12% |
| | 2014 | 12.80% | 57.07% | 30.13% | 6.79% | 31.15% | 62.06% |
| | 2015 | 11.92% | 57.02% | 31.05% | 5.83% | 30.55% | 63.62% |
| | 2004 | 49.72% | 39.09% | 11.19% | 31.66% | 37.94% | 30.40% |
| | 2005 | 39.88% | 45.16% | 14.97% | 29.72% | 39.08% | 31.20% |
| | 2006 | 34.33% | 46.93% | 18.74% | 28.18% | 37.66% | 34.16% |
| | 2007 | 28.12% | 48.33% | 23.56% | 23.44% | 43.63% | 32.93% |
| | 2008 | 24.19% | 43.97% | 31.84% | 18.21% | 38.85% | 42.94% |
| | 2009 | 23.99% | 46.99% | 29.03% | 16.56% | 43.26% | 40.18% |
| | 2010 | 20.16% | 50.14% | 29.70% | 13.88% | 42.84% | 43.29% |
| | 2011 | 19.02% | 48.87% | 32.11% | 16.21% | 41.02% | 42.77% |
| 6 | 2012 | 16.95% | 47.57% | 35.48% | 15.52% | 42.69% | 41.79% |
| | Option I: PSM & Equipercentile Link | | | | | | |
| | 2013 | 22.89% | 47.99% | 29.12% | 15.90% | 40.64% | 43.46% |
| | 2014 | 32.19% | 46.44% | 21.38% | 16.79% | 39.47% | 43.75% |
| | 2015 | 39.67% | 44.72% | 15.61% | 18.21% | 40.75% | 41.04% |
| | Option II: Extrapolation | | | | | | |
| | 2013 | 15.15% | 46.79% | 38.06% | 14.60% | 42.70% | 42.70% |
| | 2014 | 13.71% | 46.21% | 40.08% | 15.30% | 42.46% | 42.24% |
| | 2015 | 12.40% | 45.59% | 42.01% | 16.56% | 42.06% | 41.38% |
| | 2004 | 50.17% | 39.72% | 10.12% | 32.98% | 41.07% | 25.94% |
| | 2005 | 44.63% | 41.56% | 13.82% | 32.80% | 39.03% | 28.17% |
| | 2006 | 39.89% | 44.21% | 15.90% | 28.92% | 45.01% | 26.07% |
| | 2007 | 38.74% | 43.32% | 17.93% | 29.82% | 40.71% | 29.47% |
| | 2008 | 31.78% | 46.52% | 21.70% | 18.83% | 38.32% | 42.85% |
| | 2009 | 28.02% | 48.97% | 23.02% | 18.25% | 38.09% | 43.66% |
| | 2010 | 27.42% | 49.23% | 23.35% | 18.18% | 36.76% | 45.06% |
| | 2011 | 25.67% | 48.91% | 25.42% | 15.95% | 40.64% | 43.41% |
| 7 | 2012 | 23.68% | 49.45% | 26.87% | 18.85% | 35.49% | 45.66% |
| | Option I: PSM & Equipercentile Link | | | | | | |
| | 2013 | 27.39% | 49.30% | 23.31% | 15.00% | 36.86% | 48.14% |
| | 2014 | 36.89% | 43.47% | 19.64% | 21.21% | 35.95% | 42.84% |
| | 2015 | 50.78% | 40.40% | 8.82% | 21.15% | 34.90% | 43.94% |
| | Option II: Extrapolation | | | | | | |
| | 2013 | 22.68% | 50.54% | 26.78% | 16.52% | 35.65% | 47.83% |
| | 2014 | 22.32% | 50.57% | 27.11% | 16.82% | 34.42% | 48.76% |
| | 2015 | 22.50% | 51.51% | 27.14% | 17.60% | 33.07% | 49.33% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2004 | 54.28% | 28.86% | 16.86% | 36.14% | 43.02% | 20.83% |
| | 2005 | 48.26% | 32.90% | 18.84% | 33.58% | 42.48% | 23.94% |
| | 2006 | 44.93% | 32.54% | 22.54% | 32.99% | 43.03% | 23.98% |
| | 2007 | 43.30% | 31.69% | 25.01% | 31.74% | 44.33% | 23.94% |
| | 2008 | 38.15% | 32.83% | 29.02% | 27.18% | 38.70% | 34.12% |
| | 2009 | 34.22% | 37.13% | 28.65% | 19.85% | 43.25% | 36.90% |
| | 2010 | 34.57% | 35.89% | 29.54% | 19.62% | 35.54% | 44.84% |
| | 2011 | 33.95% | 33.66% | 32.39% | 17.29% | 36.85% | 45.86% |
| 8 | 2012 | 30.74% | 36.17% | 33.09% | 19.22% | 36.63% | 44.16% |
| | Option I: PSM & Equipercentile Link | | | | | | |
| | 2013 | 32.98% | 36.42% | 30.60% | 18.96% | 34.91% | 46.13% |
| | 2014 | 41.28% | 32.81% | 25.91% | 23.11% | 36.56% | 40.33% |
| | 2015 | 60.89% | 25.25% | 13.86% | 24.43% | 36.13% | 39.44% |
| | Option II: Extrapolation | | | | | | |
| | 2013 | 31.22% | 34.85% | 33.93% | 13.43% | 35.61% | 50.96% |
| | 2014 | 31.31% | 34.42% | 34.27% | 10.84% | 34.64% | 54.52% |
| | 2015 | 31.92% | 33.79% | 34.29% | 8.25% | 33.67% | 58.08% |

Note: In Option I, the classification rates for 2013 and 2014 were provided by MSDE, and the classification rates in 2015 were based on the mapped PARCC cut scores using PSM and equipercentile linking. In Option II, the classification rates for 2013, 2014 and 2015 were rates extrapolated with the prediction functions obtained by fitting with the classification rates from 2004 to 2012.

Using PSM (Option I), six intervals were constructed around each cut score: 95% confidence intervals and one standard deviation above and below the PARCC equivalents of the MSA cut scores using mean CSEM, minimum CSEM the maximum CSEM at the PARCC equivalent scores. For Math tests, all intervals constructed for being proficient captured the PARCC cut score of 725 between performance levels 2 vs. 3, except for the one SD intervals for grade 4 and grade 3. However, for the PARCC equivalents of the MSA cut scores for being advanced, the intervals failed to capture either the PARCC cut score between performance levels 3 vs. 4 or 4 vs. 5. For ELA tests, none of the intervals constructed for being proficient captured the PARCC cut score of 725 between performance levels 2 vs. 3, except for the 95% intervals for grade 8 and the 95% interval with the maximum CSEM for grade 3. For the PARCC equivalents of MSA scale scores for advanced, however, all the 95% intervals were able to capture the PARCC cut score between performance levels 3 vs. 4.

Using extrapolation (Option II), similar intervals were also constructed. For math tests, all of the 95% C.I.s around the mapped PARCC equivalent cut scores of basic vs. proficient captured the PARCC cut score of 700 between performance levels 1 vs. 2; and the 95% C.I.s constructed around the PARCC equivalents of MSA cut scores between proficient vs. advanced captured the PARCC cut score of 750 between performance levels 3 vs. 4 except for grade 4. For PARCC ELA tests, most of the intervals around the mapped PARCC equivalent cut scores of basic vs. proficient captured 700. For the mapped PARCC equivalent cut scores of proficient vs. advanced, the intervals for grades 5 and 8 only captured the PARCC cut score of 725, while the intervals for grades 3, 4, 6 and 7 only captured the PARCC cut score of 750.

Given the consistence of the percentages of students classified into different performance levels by the cut scores obtained by the extrapolation method (Option II), the cut scores yielded from Option II are recommended over those obtained from PSM (Option I), that is, using a PARCC scale score of 700 as the cut score between the basic vs. proficient categories, and 750 as the cut score between the proficient vs. advanced categories for grades 3 to 8 for both PARCC MATH and ELA tests.

However, the cut scores obtained from the extrapolation method were all lower than those obtained from PSM. If higher performance standards are expected for the new PARCC tests, given the cut scores obtained from PSM and its alignment with the PARCC cut scores for different performance levels, the following cut scores could be adopted, that is, using a PARCC scale score of 725 as the cut score between the basic vs. proficient categories, and a PARCC scale score of 750 as the cut score between the proficient vs. advanced categories for grades 3 to 8 for both PARCC MATH and ELA tests.

The final adoption of cut scores obtained in this study depends on considerations from policy, and practical perspectives in addition to the empirical evidence provided by psychometric analyses carried out in this study.

## References


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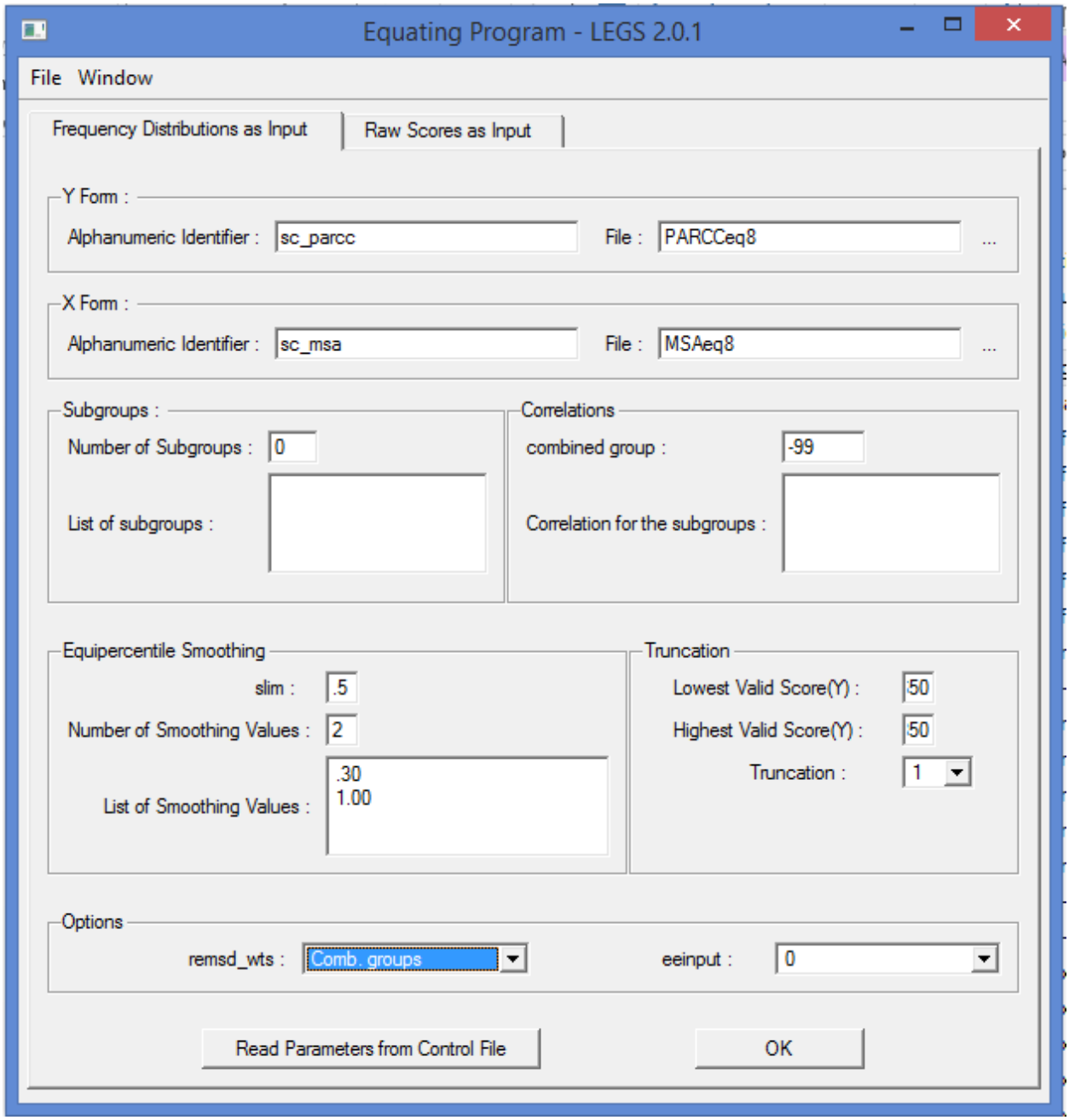
## Appendix A

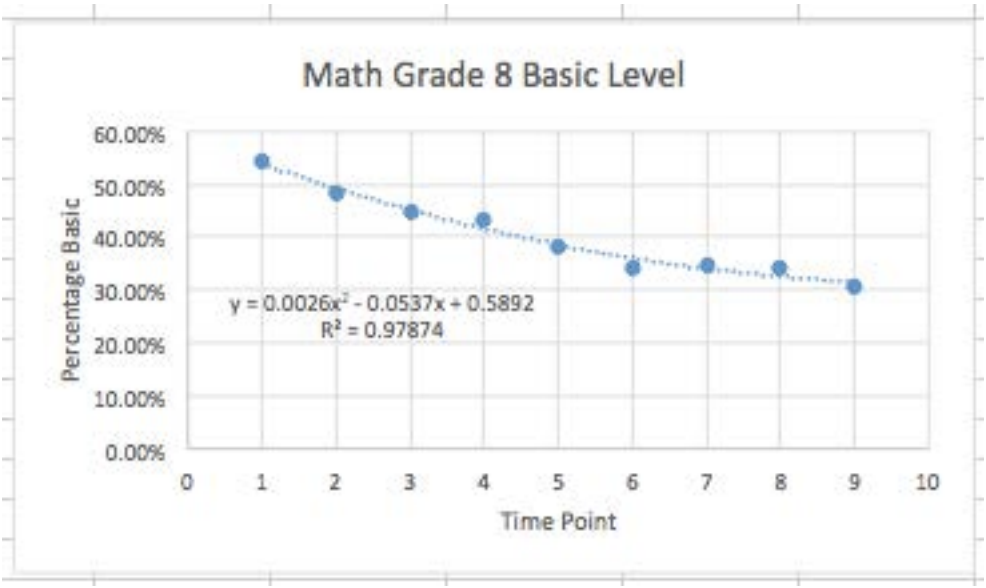

Equating Program - LEGS 2.0.1
File Window
Frequency Distributions as Input
Raw Scores as Input
Y Form :
Alphanumeric Identifier : sc_parcc
File : PARCCeq8
X Form :
Alphanumeric Identifier : sc_msa
File : MSAeq8
Subgroups :
Number of Subgroups : 0
List of subgroups :
Correlations
combined group : -99
Correlation for the subgroups :
Equipercentile Smoothing
slim : .5
Number of Smoothing Values : 2
List of Smoothing Values : .30 1.00
Truncation
Lowest Valid Score(Y) : 50
Highest Valid Score(Y) : 50
Truncation : 1
Options
remsd_wts : Comb. groups
eeinput : 0
Read Parameters from Control File
OK

**Appendix** B

*PARCC Cut Scores*

| Grade | MATH | | | | ELA | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 vs. 2 | 2 vs. 3 | 3 vs. 4 | 4 vs. 5 | 1 vs. 2 | 2 vs. 3 | 3 vs. 4 | 4 vs. 5 |
| 3 | 700 | 725 | 750 | 790 | 700 | 725 | 750 | 810 |
| 4 | 700 | 725 | 750 | 796 | 700 | 725 | 750 | 790 |
| 5 | 700 | 725 | 750 | 790 | 700 | 725 | 750 | 799 |
| 6 | 700 | 725 | 750 | 788 | 700 | 725 | 750 | 790 |
| 7 | 700 | 725 | 750 | 786 | 700 | 725 | 750 | 785 |
| 8 | 700 | 725 | 750 | 801 | 700 | 725 | 750 | 794 |

## Appendix C


Math Grade 8 Basic Level
Percentage Basic
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
y = 0.0026x² - 0.0537x + 0.5892
R² = 0.97874
0
1
2
3
4
5
6
7
8
9
10
Time Point