

Columbia College Math Assessment/Placement Update

Preliminary Data Summary

Fall 2008 – Spring 2011

The following data are preliminary and exploratory in terms of providing an update to the 2008 assessment validation study and prompted by questions brought forward from the Columbia College Math Department faculty. The data presented here are expressly intended as exploratory information and to identify topics needed for further study.

Background

Columbia College requires new students, or students who have been on an extended hiatus from college coursework to complete a placement exam in order to assess skill levels in mathematics. Done prior to registering in computational and language related courses, the results prevent the student from reenrolling in coursework above their assigned skill level unless they are evaluated as having a higher placement through the advisement process.

For placement into math courses, Columbia College uses the College Board's online and adaptive "Accuplacer" test battery that consists of basic mathematics, elementary algebra, and college-level or transfer level math. The Accuplacer testing process branches across the separate test modules, Arithmetic, Elementary Algebra and College Level Math as the student answers questions correctly or incorrectly, and then produces score reports from each of the modules completed. Separate score reports are thus generated and can result in up to three separate placement results per student tested. These are then made available to counseling and advisement staff at the time of advisement where students are assisted in selecting the appropriate coursework given their backgrounds and skill level.

Math Placement

There are several reasons why math placements have been problematic for Columbia. First, when the college switched from using the ACT exam to the College Board Accuplacer, the cut scores were put in place given guidelines provided from the test publisher, and what information could be gathered from other colleges as the test and the process of Accuplacer adaptive testing was still fairly new. The college's size also meant Columbia had to collect data from multiple semesters in order to accumulate sufficient numbers of records to produce a valid statistical sample for analysis. Another complicating factor is of determining placement from up to three separate math placement results from three test modules. This means the burden of determining math placement falls on the shoulders of the counseling and advisement staff who must manually weight the student's placement scores, background information and a personal interview (multiple measures). Finally, the Datatel IS database system cannot accommodate weighting, algorithms or decision rules in determining a single placement from multiple test scores.

The Math Faculty not surprisingly has seen less than expected student performance in their math courses. Whether the outcome may be a result of students being placed improperly, or from a combination of other factors, will be explored and hopefully provide some concrete information and direction for further exploration.

From the previous 2008 cut score validation report, the process of providing some baseline data and test score cut score analysis was begun. This study included a content analysis from the test questions and testing process (faculty evaluated the process as the students do by taking the tests) and baseline cut score information.

The following tabulations and exploratory statistics build on that process and update the previous report forward from Fall 2008 to Spring of 2011. Data include all student testing records extracted from the Datatel system's TSUM files and the Student Demographic Detail reports for course completions (grades). The data include the last graded term available that was reported to the California State Chancellor's Office MIS system.

General Data Distributions: Fall 2008-Spring 2011

Placements via the Accuplacer Assessment Battery

| | | MATH | EALG | CLM |
|----------------|-------|---------|---------|---------|
| N | Valid | 615 | 2,136 | 1,201 |
| Mean | | 40.45 | 46.53 | 28.53 |
| Median | | 34.00 | 40.00 | 24.00 |
| Mode | | 20 | 21 | 20 |
| Std. Deviation | | 19.255 | 22.101 | 12.131 |
| Variance | | 370.749 | 488.448 | 147.159 |
| Range | | 88 | 113 | 77 |
| Percentiles | 25 | 26.00 | 29.00 | 20.00 |
| | 50 | 34.00 | 40.00 | 24.00 |
| | 75 | 50.00 | 60.00 | 32.00 |

Summary of All Placements by Average Placement Levels¹

| Columbia College | | | |
|-------------------------------|-----------------------------|---------------------------|---|
| Accuplacer Tests Taken | Math | Elem | College |
| Fall 2008 – Spring 2011 | Skills | Algebra | Level Math |
| Accuplacer N: | 615 | 2,136 | 1,201 |
| Test Score Mean: | 40.8 | 46.6 | 28.6 |
| | Math 601 | Math 101 | |
| Average Accuplacer Placement: | Three levels below transfer | Two levels below transfer | Math 101/ 104 One to two levels below transfer |

¹ Refer to the "Columbia College Placement Test Score Interpretation", 2011-12 Columbia College Catalog.

Cut Score Analysis - Mathematics

The assumption: Beginning with the skill level assessment as measured through the Accuplacer placement instrument, the College uses background information and any other pertinent information to inform students as to coursework in which to enroll for successful performance in mathematics. The expectation is that students will be “very” likely to succeed in the course of placement given their skill level and barring any uncontrolled interference from circumstances, e.g., illness, life events, etc.

To begin, there were two to three math assessment records for every student ID found in the TSUM record set. Removing the retests, the highest placement score was retained per student and then matched to all math course grade records by their ID numbers. The mean grades were then calculated by course and placement level. The intersections of those math courses to placement levels are highlighted below.

**Overview of All Average Math Grades Received (4pt_Grade Scale) for Placed Students Sorted by Accuplacer Test and Highest Placement Received (taken from the highest possible Math score) to Mean Grade Received in Math Courses (can be duplicated if student enrolled in more than one math course over the study period).
Fall 2008- Spring 2011**

| Courses: | Accuplacer Placement Levels in Math | | | | | | | | | | Totals | |
|-------------|-------------------------------------|----|-----------------------|-----|-------------------|-----|-------------------|-----|-------------------|----|--------|-------|
| | Math 601/20 Level | | Math 602/202 Level | | Math 101 Level | | Math 104 Level | | Transfer Level | | Mean | Total |
| | Mean GPA | N | Mean GPA | N | Mean GPA | N | Mean GPA | N | Mean GPA | N | GPA | N |
| CMATH-601 | 2.56 | 16 | 2.36 | 22 | 2.78 | 9 | | | | | 2.51 | 47 |
| CMATH-201 | 2.33 | 6 | 1.50 | 2 | 0.50 | 2 | | | | | 1.80 | 10 |
| CMATH-602 | 2.41 | 17 | 2.22 | 79 | 1.96 | 51 | 1.78 | 9 | | | 2.13 | 156 |
| CMATH-202 | | | 1.25 | 4 | 1.50 | 6 | 3.67 | 3 | | | 1.92 | 13 |
| CMATH-100A | | | 1.50 | 2 | 1.95 | 81 | 2.25 | 8 | | | 1.97 | 91 |
| CMATH-101 | 1.86 | 7 | 1.82 | 33 | 2.00 | 289 | 2.23 | 44 | 3.00 | 1 | 2.01 | 374 |
| CMATH-104 | 1.33 | 3 | 2.60 | 10 | 2.22 | 113 | 2.20 | 205 | 3.17 | 6 | 2.23 | 337 |
| CMATH-2 | | | 3.00 | 1 | 2.50 | 14 | 2.04 | 49 | 3.23 | 13 | 2.34 | 77 |
| CMATH-4A | | | | | | | 2.25 | 4 | 4.00 | 1 | 2.60 | 5 |
| CMATH-6 | | | | | 2.83 | 6 | 2.65 | 23 | 3.00 | 3 | 2.72 | 32 |
| CMATH-8 | | | | | 1.60 | 5 | 1.93 | 14 | 2.00 | 7 | 1.88 | 26 |
| CMATH-12 | | | | | 3.00 | 1 | 3.33 | 6 | 4.00 | 2 | 3.44 | 9 |
| CMATH-17A | | | | | 2.00 | 2 | 2.31 | 13 | 2.00 | 8 | 2.17 | 23 |
| Grand Total | 2.31 | 49 | 2.14 | 153 | 2.06 | 579 | 2.22 | 378 | 2.80 | 41 | 2.15 | 1,200 |

Includes all students with a math placement who completed *any* math course(s) within the six semesters of the study. Data are duplicated.

A total of 714 student grade records intersected with Accuplacer placements records (highlighted above). The mean grades that fell below the highlighted intersections were courses in which the student opted to enroll in a lower level course than their placement, and the mean grades above the intersections were subsequent course completions. The courses below and above the intersecting matches were filtered from the data for analysis.

Data were filtered to include only students who tested into *and* enrolled in their placement course, and completed (received a grade) during the study period of Fall 2008 to Spring 2010.

Descriptive Detail for Math Placements and Grade Outcomes

Highest Math Placement Level (highest of up to three math separate test scores)

Mean Grade Averages (based on 4 pt. grade scale)

| | | Statistic | Std. Error |
|---------------------|-----------------------------|-----------|------------|
| N: 714 | | | |
| Placed into | Mean | 2.50 | .292 |
| Math 601/201 | 95% Confidence Interval for | 1.89 | |
| and | Mean | 3.11 | |
| received a grade in | | | |
| Math 601/201 | 5% Trimmed Mean | 2.56 | |
| | Median | 3.00 | |
| N: 22 | Variance | 1.881 | |
| | Std. Deviation | 1.371 | |
| | Minimum | 0 | |
| | Maximum | 4 | |
| | Range | 4 | |
| | Interquartile Range | 1 | |
| | Skewness | -1.036 | .491 |
| | Kurtosis | -.213 | .953 |
| Placed into | Mean | 2.17 | .158 |
| Math 602/202 | 95% Confidence Interval for | 1.85 | |
| and | Mean | 2.48 | |
| received a grade in | | | |
| Math 602/202 | 5% Trimmed Mean | 2.19 | |
| | Median | 2.00 | |
| N: 83 | Variance | 2.069 | |
| | Std. Deviation | 1.438 | |
| | Minimum | 0 | |
| | Maximum | 4 | |
| | Range | 4 | |
| | Interquartile Range | 2 | |
| | Skewness | -.303 | .264 |
| | Kurtosis | -1.201 | .523 |

Descriptive Detail for Math Placements and Grade Outcomes (continued)

| <i>Highest Math Placement Level (from possible one to three math test scores)</i> | | Statistic | Std. Error | |
|---|---|-------------------------------------|------------|------|
| Placed into Math 101 (100 A) and received a grade in Math 101 (100 A) N: 370 | Mean | 1.99 | .072 | |
| | 95% Confidence Interval for Mean | Lower Bound | 1.85 | |
| | | Upper Bound | 2.13 | |
| | 5% Trimmed Mean | 1.99 | | |
| | Median | 2.00 | | |
| | Variance | 1.927 | | |
| | Std. Deviation | 1.388 | | |
| | Minimum | 0 | | |
| | Maximum | 4 | | |
| | Range | 4 | | |
| | Interquartile Range | 2 | | |
| | Skewness | -.138 | .127 | |
| | Kurtosis | -1.227 | .253 | |
| | Placed into Math 104 and received a grade in Math 104 N: 205 | Mean | 2.20 | .094 |
| | | 95% Confidence Interval for Mean | 2.01 | |
| 2.38 | | | | |
| 5% Trimmed Mean | | 2.22 | | |
| Median | | 2.00 | | |
| Variance | | 1.815 | | |
| Std. Deviation | | 1.347 | | |
| Minimum | | 0 | | |
| Maximum | | 4 | | |
| Range | | 4 | | |
| Interquartile Range | | 2 | | |
| Skewness | | -.312 | .170 | |
| Kurtosis | | -.976 | .338 | |

Descriptive Detail for Math Placements and Grade Outcomes (continued)

| <i>Highest Math Placement Level (from possible one to three math test scores)</i> | | Statistic | Std. Error |
|--|--|-----------|------------|
|--|--|-----------|------------|

| | | | | |
|--|-------------------------------------|-------------|-------|------|
| Placed into Transfer Level Math and received a grade in Transfer Level Math N: 34 | Mean | | 2.74 | .236 |
| | 95% Confidence Interval for Mean | Lower Bound | 2.25 | |
| | | Upper Bound | 3.22 | |
| | 5% Trimmed Mean | | 2.82 | |
| | Median | | 3.00 | |
| | Variance | | 1.898 | |
| | Std. Deviation | | 1.377 | |
| | Minimum | | 0 | |
| | Maximum | | 4 | |
| | Range | | 4 | |
| | Interquartile Range | | 2 | |
| | Skewness | | -.821 | .403 |
| | Kurtosis | | -.467 | .788 |

Correlations Grades by Courses for Students Who Enrolled in Placement Courses

The data that follow were used for correlations and filtered for students with a placement and a course completion that matched course levels as identified in the Columbia College “Placement Test Score Interpretation” matrix.

Math 601/201 – Four Levels Below Transfer Level Math

Nonparametric Correlations

Scores on Accuplacer Mathematics Test to Grades in Math 601/201 Course:

| | | Accuplacer Arithmetic | GPA 4pt |
|----------------|-------------------------|-----------------------|---------|
| Spearman's rho | Correlation Coefficient | .464* | 1.000 |
| | Sig. (2-tailed) | .030 | . |
| | N | 22 | 22 |

Spearman's correlation coefficient selected for small N of 24.

**Correlation is significant at the 0.05 level (2-tailed)*

A positive correlation of math placements to final grades was found in Math 601/201; and it was statistically significant at the .05 level. While the correlation of test scores to grades was moderately strong, the small number of records may not be sufficient enough to spur a policy change. The data is statistically significant (meaning unlikely to have occurred through chance) however and may indicate there is some efficacy in placement at this level.

| <i>Mean Grades for Accuplacer Placed Math 601/201 Students</i> | | | | <i>Mean Grades for Non-Accuplacer* Placed Math 601/201 Students</i> | | | |
|--|------|----|-------------------|---|------|----|-------------------|
| GPA 4pt | | | | GPA 4pt | | | |
| Course Name | Mean | N | Std. Deviation | Course Name | Mean | N | Std. Deviation |
| CMATH-201 | 2.33 | 6 | 1.553 | CMATH-201 | 2.42 | 36 | 1.422 |
| CMATH-601 | 2.56 | 16 | 1.365 | CMATH-601 | 2.33 | 49 | 1.329 |
| Total | 2.50 | 22 | 1.412 | Total | 2.36 | 85 | 1.361 |

* Non-Accuplacer students were those with outside institution placements or those who were allowed to enroll in the course via a course completion (either at Columbia or another institution). In the case of Math 601/201, students could enroll without a placement as it is the entry mathematics course at Columbia College.

The mean grade comparison for students placed into Math 601/201 via the Columbia College placement process was higher vs. those students who arrived in the 601/201 course via some other means. (A prerequisite course completion would not be possible at this level as it is Columbia's entry-level mathematics course).

Correlations Grades by Courses for Students Who Enrolled in Placement Courses

Math 602/202 – Three Levels Below Transfer Level Math

Nonparametric Correlations

Score on Accuplacer Math Test to Grade in Math 602/202 Course:

| | | Accuplacer Test Score | | |
|----------------|-------------------------|-----------------------|--------------|---------|
| | | Arithmetic | Elem Algebra | GPA 4pt |
| Spearman's rho | Correlation Coefficient | .176 | -.173 | 1.000 |
| | Sig. (2-tailed) | .123 | .130 | . |
| | N | 21 | 62 | 83 |

A positive correlation on the Arithmetic module to final grades was found in Math 602/202; however, it was not statistically significant at the .05 or below level. The negative correlation for the Elementary Algebra Module to final grades was unexpected and not statistically significant though it had an N of 82.

| <i>Mean Grades for Accuplacer Placed Math 602/202 Students</i> | | | | <i>Mean Grades for Non-Accuplacer* Placed Math 602/202 Students</i> | | | |
|--|------|----|-------------------|---|------|-----|-------------------|
| GPA 4pt | | | | GPA 4pt | | | |
| Course Name | Mean | N | Std. Deviation | Course Name | Mean | N | Std. Deviation |
| CMATH-202 | 1.25 | 4 | .957 | CMATH-202 | 2.01 | 107 | 1.424 |
| CMATH-602 | 2.22 | 79 | 1.447 | CMATH-602 | 2.24 | 165 | 1.388 |
| Total | 2.17 | 83 | 1.438 | Total | 2.15 | 272 | 1.404 |

* Non-Accuplacer students were those with outside institution placements or those who were allowed to enroll in the course via a course completion (either Columbia's or from another institution).

The mean grade comparison of students placed into Math 602/202 via the Columbia College placement process vs. those students who arrived in the 602/202 course via some other means such as an outside institution's placement report or prerequisite course completion. The mean of 2.17 vs. the mean grade of 2.15 for non-Accuplacer students is near par.

Correlations Grades by Courses for Students Who Enrolled in Placement Courses

Math 101 or Math 100 A – Two Levels Below Transfer Level Math

Only records for students' with an Accuplacer score and who enrolled in Math 101/100 level were retained. Those students who repeated the course, or who took Math 100 B were excluded. Any record that did not contain both a score and a grade was also excluded.

Nonparametric Correlations

Scores on Any Accuplacer Math Module to Grades in Math 101, 100A/100B Courses:

| | | Accuplacer Placement into Math 101 | | | |
|----------------|-------------------------|------------------------------------|-----------------------|--------------|---------|
| | | Arithmetic Score | Elem Algebra Score | CLM Score | GPA 4pt |
| Spearman's rho | Correlation Coefficient | -.181* | .175** | -.059 | 1.000 |
| | Sig. (2-tailed) | .012 | .001 | .908 | - |
| | N | 16 | 254 | 100 | 370 |

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Pearson Correlation was also positive at .199, and significant at the .01 level.

The Elementary Algebra Module test scores had a positive and significant correlation to grade outcomes in courses at the Math 101 level (excluding Math 100B). This would indicate that scores are moderately capable of accuracy in placement. (The Research and Planning Group's suggested statistically significant coefficient for assessment placement by grades is .35)

| <i>Mean Grades for Accuplacer Placed Math 101, 100 A Students</i> | | | | <i>Report - Mean Grades for Non-Accuplacer* Math 101, 100 A Students</i> | | | |
|---|------|-----|-------------------|--|------|-----|-------------------|
| GPA 4pt | | | | GPA 4pt | | | |
| Course Name | Mean | N | Std. Deviation | Course Name | Mean | N | Std. Deviation |
| CMATH-100A | 1.95 | 81 | 1.387 | CMATH-100A | 2.14 | 106 | 1.366 |
| CMATH-101 | 2.00 | 289 | 1.391 | CMATH-101 | 2.07 | 542 | 1.353 |
| Total | 1.99 | 370 | 1.388 | Total | 2.06 | 648 | 1.357 |

* Non-Accuplacer students were those with outside institution placements or those who were allowed to enroll in the course via a course completion (either Columbia's or from another institution).

Mean grades across courses at the Elementary Algebra, Math 101 were slightly lower for the Accuplacer placed students as compared to the Non-Accuplacer students.

Correlations Grades by Courses for Students Who Enrolled in Placement Courses

Math 104 – One Level Below Transfer Level Math

Nonparametric Correlations

Score on Accuplacer Test Module to Grades Received in Math 104:

| | | Accuplacer Module | | |
|----------------|-------------------------|-------------------|--------|---------|
| | | Elem Algebra | CLM | GPA 4pt |
| Spearman's rho | Correlation Coefficient | .340** | .213** | 1.000 |
| | Sig. (2-tailed) | .000 | .003 | - |
| | N | 86 | 119 | 205 |

** Correlation is significant at the 0.01 level (2-tailed).

Both the Accuplacer Modules of Elementary Algebra and College Level Math (CLM) had positive and statistically significant correlations for test scores to grades in Math 104. The scores from the Elementary Algebra test module correlated somewhat stronger to grades than the CLM.

| <i>Mean Grades for Accuplacer Placed Math 104 Students</i> | | | | <i>Mean Grades for Non-Accuplacer* Placed Math 104 Students</i> | | | |
|--|------|-----|----------------|---|------|-----|----------------|
| GPA 4pt | | | | GPA 4pt | | | |
| Course Name | Mean | N | Std. Deviation | Course Name | Mean | N | Std. Deviation |
| CMATH-104 | 2.18 | 205 | 1.349 | CMATH-104 | 2.21 | 634 | 1.262 |

* Non-Accuplacer students were those with outside institution placements or those who were allowed to enroll in the course via a course completion (either Columbia's or from another institution).

Mean grades for the Intermediate Algebra course, Math 104 are slightly lower than mean grades for the non-Accuplacer placed students. Non-Accuplacer means only those students who did not have an Accuplacer score, or any other outside institution test score.

Correlations Grades by Courses for Students Who Enrolled in Placement Courses

Transfer Level Math – Math 2, 4A, 6, 8, 12, 17A

Nonparametric Correlations

Score on Accuplacer Elementary Algebra Test or CLM to Grades in Transfer Math Courses:

| | | Accuplacer Test Module | | |
|----------------|-------------------------|------------------------|-------|---------|
| | | Elem Algebra | CLM | GPA 4pt |
| Spearman's rho | Correlation Coefficient | -.577* | -.265 | 1.000 |
| | Sig. (2-tailed) | .049 | .136 | - |
| | N | 12 | 22 | 34 |

* Correlation is significant at the 0.05 level (2-tailed).

A total of 34 students were placed into college level math only twelve were placed via the Accuplacer Elementary Algebra which had a negative correlation to grades that was statistically significant. The majority of the CLM placements was for the lower level courses of Math 104 and Math 101 (see tables above).

| <i>Report – Mean Grades for Accuplacer Placed Transfer Math Students</i> | | | | <i>Mean Grades for Non-Accuplacer* Placed Transfer Math Students</i> | | | |
|--|------|----|----------------|--|------|-----|----------------|
| GPA 4pt | | | | GPA 4pt | | | |
| Course Name | Mean | N | Std. Deviation | Course Name | Mean | N | Std. Deviation |
| CMATH-2 | 3.23 | 13 | .832 | CMATH-2 | 2.53 | 300 | 1.175 |
| CMATH-4A | 4.00 | 1 | . | CMATH-4A | 2.44 | 18 | .856 |
| CMATH-6 | 3.00 | 3 | 1.000 | CMATH-6 | 2.67 | 117 | 1.232 |
| CMATH-8 | 2.00 | 7 | 2.000 | CMATH-8 | 2.08 | 39 | 1.458 |
| CMATH-12 | 4.00 | 2 | .000 | CMATH-12 | 3.22 | 37 | 1.004 |
| CMATH-17A | 2.00 | 8 | 1.309 | CMATH-17A | 2.21 | 117 | 1.303 |
| Total | 2.74 | 34 | 1.377 | Total | 2.50 | 628 | 1.234 |

* Non-Accuplacer students were those with outside institution placements or those who were allowed to enroll in the course via a course completion (either Columbia's or from another institution).

The distribution of mean grades across transfer level courses for students placed into the courses compared to students arriving in the course through some other means. With only 38 students to compare to 628 non-Accuplacer placed students, the mean grade by course for the Accuplacer placed students is provided here as information only.

Disproportionate Impact Data

This report unlike the analysis above, includes all students who participated in the Accuplacer placement testing process between Fall 2008 and Spring 2011. After selecting Accuplacer-only records and filtering out any non-Accuplacer data such as retests and placements received from other institutions, the number evaluated in the tables below (unless otherwise noted) was 1,368.

The shaded areas indicate larger percentages of placements in lower level math courses than would be expected. The rule of thumb is the view the percent distribution for the student category to the percent distribution in lower than transfer level courses. If the proportion is 20% higher in lower course level placements (80% of the proportion is met plus 20% or more in the placement level) than disproportional number of students were recommended to remedial math courses.

NOTE: The counts and percentages that follow reflect all test placements regardless of whether the student enrolled in the placement course or not.

Disproportionate Data Distribution in Math Placements - Gender

| | Gender | | | | | | | |
|------------------------------|--------|-------|-------|-------|------------|------|-------|--------|
| | F | | M | | Unreported | | Total | |
| | Count | % | Count | % | Count | % | Count | % |
| Math 601/201 | 30 | 63.8% | 16 | 34.0% | 1 | 2.1% | 47 | 100.0% |
| Math 602/202 | 108 | 61.7% | 67 | 38.3% | 0 | .0% | 175 | 100.0% |
| Math 101 (100 A/B) | 373 | 54.9% | 305 | 44.9% | 1 | .1% | 679 | 100.0% |
| Math 104 | 208 | 51.4% | 192 | 47.4% | 5 | 1.2% | 405 | 100.0% |
| Transfer Math (Math 2-17) | 23 | 37.1% | 36 | 58.1% | 3 | 4.8% | 62 | 100.0% |
| Total | 742 | 54.2% | 616 | 45.0% | 10 | .7% | 1,368 | 100.0% |

Though neither gender reached the threshold of 20% higher proportions in their placements that would trigger a plan for action, it is noteworthy that a higher proportion of males and a lower proportion of females placed in transfer level math than their distributions in the population studied.

Distribution of Math Placements by Ethnicity

| Highest Math Placement | African-American | | AmIndian/Alaskan Native | | Asian | | Filipino | | Hispanic | | Pacific Islander | | Unknown | | White | | Unrecorded (blank) | | Total | |
|---------------------------|------------------|-------------|-------------------------|-------------|-----------|-------------|-----------|------------|------------|-------------|------------------|------------|------------|--------------|------------|--------------|--------------------|-------------|--------------|-------------|
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| Math 601/201 | 0 | .0% | 1 | 2.1% | 0 | .0% | 0 | .0% | 1 | 2.1% | 0 | .0% | 9 | 19.1% | 34 | 72.3% | 1 | 2.1% | 47 | 100% |
| Math 602/202 | 2 | 1.1% | 8 | 4.6% | 0 | .0% | 1 | .6% | 4 | 2.3% | 0 | .0% | 39 | 22.3% | 110 | 62.9% | 4 | 2.3% | 175 | 100% |
| Math 101 (100 A/B) | 10 | 1.5% | 10 | 1.5% | 10 | 1.5% | 7 | 1.0% | 64 | 9.4% | 4 | .6% | 158 | 23.3% | 372 | 54.8% | 64 | 9.4% | 679 | 100% |
| Math 104 | 7 | 1.7% | 6 | 1.5% | 3 | .7% | 3 | .7% | 42 | 10.4% | 1 | .2% | 113 | 27.9% | 204 | 50.4% | 42 | 10.4% | 405 | 100% |
| Transfer Math (Math 2-17) | 0 | .0% | 5 | 8.1% | 0 | .0% | 0 | .0% | 5 | 8.1% | 0 | .0% | 25 | 40.3% | 25 | 40.3% | 5 | 8.1% | 62 | 100% |
| Total | 19 | 1.4% | 30 | 2.2% | 13 | 1.0% | 11 | .8% | 116 | 8.5% | 5 | .4% | 344 | 25.1% | 745 | 54.5% | 116 | 8.5% | 1,368 | 100% |

Disproportionate placements were not indicated in the data at the > 80% threshold; however some populations were close to the threshold and bear further monitoring. Caution in interpreting the ratios however is advised since some of the Ns, as in the case of the Filipino group, are so small that one additional count change could affect the ratio dramatically.

Disproportionate Data Distribution in Math Placements - Age Groups

| | Age Groups | | | | | | | | | | | | | | Total | |
|----------------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-----|-------|------|
| | 00-17 | | 18-24 | | 25-34 | | 35-44 | | 45-54 | | 55-64 | | 65-00 | | | |
| | N | % | N | % | N | % | N | % | N | % | N | % | N | % | N | % |
| Math 601/201 | 1 | 2.1% | 3 | 6.4% | 23 | 48.9% | 13 | 27.7% | 7 | 14.9% | 0 | .0% | 0 | .0% | 47 | 100% |
| Math 602/202 | 0 | .0% | 62 | 35.4% | 58 | 33.1% | 31 | 17.7% | 15 | 8.6% | 9 | 5.1% | 0 | .0% | 175 | 100% |
| Math 101 (100 A/B) | 53 | 7.8% | 466 | 68.6% | 92 | 13.5% | 43 | 6.3% | 23 | 3.4% | 0 | .0% | 2 | .3% | 679 | 100% |
| Math 104 | 47 | 11.6% | 324 | 80.0% | 19 | 4.7% | 5 | 1.2% | 5 | 1.2% | 5 | 1.2% | 0 | .0% | 405 | 100% |
| Transfer (Math 2-17) | 7 | 11.3% | 50 | 80.6% | 3 | 4.8% | 0 | .0% | 1 | 1.6% | 1 | 1.6% | 0 | .0% | 62 | 100% |
| Total | 108 | 7.9% | 905 | 66.2% | 195 | 14.3% | 92 | 6.7% | 51 | 3.7% | 15 | 1.1% | 2 | .1% | 1,368 | 100% |

The threshold was reached for the 25-34, 35-44 and 45-54 age groups in the basic skills math placements. Again, caution is advised when the underlying N counts are less than 10 for a given percentage. The reverse was true for the 18-24 year olds who nearly reached the threshold in higher level math placements of Math 104 and transfer level Math.

Appendix

The following data are provided to explain the progression and data refinement that arrived at the final data set used in this report's cut score analysis.

Table 1a. All Columbia College Math course records before filtering

*Distribution of All Enrollments in Columbia College Math Courses
By Academic Year*

| COLUMBIA COLLEGE MATH COURSES | ACADEMIC YEAR | | | | | | | |
|--|---------------|--------|---------|--------|---------|--------|-------|--------|
| | 2008-09 | | 2009-10 | | 2010-11 | | Total | |
| | Count | % | Count | % | Count | % | Count | % |
| CMATH-201 | 44 | 4.6% | 0 | .0% | 0 | .0% | 44 | 1.3% |
| CMATH-601 | 0 | .0% | 26 | 2.2% | 39 | 3.1% | 65 | 1.9% |
| CMATH-202 | 112 | 11.7% | 0 | .0% | 0 | .0% | 112 | 3.3% |
| CMATH-602 | 0 | .0% | 120 | 10.2% | 127 | 10.1% | 247 | 7.3% |
| CMATH-100A | 57 | 5.9% | 71 | 6.0% | 64 | 5.1% | 192 | 5.7% |
| CMATH-100B | 35 | 3.7% | 40 | 3.4% | 36 | 2.9% | 111 | 3.3% |
| CMATH-101 | 230 | 24.0% | 295 | 25.1% | 317 | 25.2% | 842 | 24.8% |
| CMATH-104 | 221 | 23.1% | 270 | 23.0% | 345 | 27.4% | 836 | 24.6% |
| CMATH-2 | 91 | 9.5% | 121 | 10.3% | 102 | 8.1% | 314 | 9.3% |
| CMATH-4A | 8 | .8% | 0 | .0% | 11 | .9% | 19 | .6% |
| CMATH-4B | 5 | .5% | 0 | .0% | 6 | .5% | 11 | .3% |
| CMATH-6 | 34 | 3.5% | 49 | 4.2% | 39 | 3.1% | 122 | 3.6% |
| CMATH-8 | 0 | .0% | 24 | 2.0% | 23 | 1.8% | 47 | 1.4% |
| CMATH-12 | 7 | .7% | 13 | 1.1% | 19 | 1.5% | 39 | 1.1% |
| CMATH-17A | 42 | 4.4% | 47 | 4.0% | 36 | 2.9% | 125 | 3.7% |
| Total | 958 | 100.0% | 1,175 | 100.0% | 1,259 | 100.0% | 3,392 | 100.0% |

Placement records that matched students course enrollments as listed on the Columbia College Placement Test Score Interpretation matrix. The data set was reduced to 1,200 records with the majority (66.9%) clustered in the Math 100A, Math 101 and Math 104 levels.

Table 1b. Frequencies for all records matching the TSUM records (Accuplacer placements) to course records with grades.

| YSTU_COURSE_NAME | Frequency* | Percent | Cumulative |
|------------------|------------|---------|------------|
| | | | Percent |
| CMATH-201 | 10 | .8 | 76.8 |
| CMATH-601 | 47 | 3.9 | 84.8 |
| CMATH-202 | 13 | 1.1 | 77.8 |
| CMATH-602 | 156 | 13.0 | 97.8 |
| CMATH-100A | 91 | 7.6 | 7.6 |
| CMATH-101 | 374 | 31.2 | 38.8 |
| CMATH-104 | 337 | 28.1 | 66.8 |
| CMATH-2 | 77 | 6.4 | 75.9 |
| CMATH-4A | 5 | .4 | 78.2 |
| CMATH-6 | 32 | 2.7 | 80.9 |
| CMATH-8 | 26 | 2.2 | 100.0 |
| CMATH-12 | 9 | .8 | 67.6 |
| CMATH-17A | 23 | 1.9 | 69.5 |
| Total | 1,200 | 100.0 | |

* Note: Frequencies above include duplicated student grades if student took more than one math course during the period of Fall 2008-Spring 2011.

Table 1c. Data reduction isolating the course completions to placement courses only.

Data were further reduced by eliminating course repeats, subsequent courses completed (after completing the placement course), and/or lower than placement level courses the student opted to complete prior to their enrolling in their placement course.

Course Completions Matching Accuplacer Math Placements

(YSTU_COURSE_NAME)

| | Frequency | Percent | Cumulative Percent |
|------------|-----------|---------|-----------------------|
| CMATH-100A | 81 | 11.3 | 11.3 |
| CMATH-101 | 289 | 40.5 | 51.8 |
| CMATH-104 | 205 | 28.7 | 80.5 |
| CMATH-12 | 2 | .3 | 80.8 |
| CMATH-17A | 8 | 1.1 | 81.9 |
| CMATH-2 | 13 | 1.8 | 83.8 |
| CMATH-201 | 6 | .8 | 84.6 |
| CMATH-202 | 4 | .6 | 85.2 |
| CMATH-4A | 1 | .1 | 85.3 |
| CMATH-6 | 3 | .4 | 85.7 |
| CMATH-601 | 16 | 2.2 | 88.0 |
| CMATH-602 | 79 | 11.1 | 99.0 |
| CMATH-8 | 7 | 1.0 | 100.0 |
| Total | 714 | 100.0 | |

Table 2. The final count after filtering and data refinement

Accuplacer Math Placements by Level

| | Frequency | Percent | Cumulative Percent |
|---------------------|-----------|---------|-----------------------|
| Math 601 Level | 22 | 3.1 | 3.1 |
| Math 602 Level | 83 | 11.6 | 14.7 |
| Math 101 Level | 370 | 51.8 | 66.5 |
| Math 104 Level | 205 | 28.7 | 95.2 |
| Transfer Math Level | 34 | 4.8 | 100.0 |
| Total | 714 | 100.0 | |

Additional Information – Non-Accuplacer placed Math Students

There were 60 math placements accepted from outside institutions' test scores that were found in the 2008-2011 TSUM data file. The majority (65%) of those placements were for Math 101, Elementary Algebra, 17% for Math 104, and 12% were placed into transfer level Math.

Table 3. Students who placed but not from Columbia's Accuplacer:

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------|-----------|---------|---------------|-----------------------|
| Math 601 | 1 | 1.7 | 1.7 | 1.7 |
| Math 602 | 3 | 5.0 | 5.0 | 6.7 |
| Math 101 | 39 | 65.0 | 65.0 | 71.7 |
| Math 104 | 10 | 16.7 | 16.7 | 88.3 |
| Transfer Math | 7 | 11.7 | 11.7 | 100.0 |
| Total | 60 | 100.0 | 100.0 | |