Research Brief

Key Findings from 6-Year MJC Study of Basic Skills Math 10/20/70 Course Success Rates and Math Placement Trends

Date: January 2018
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Purpose: Summary of Trends in MJC Developmental Math Course Success Rates 2011-2017

Executive Summary

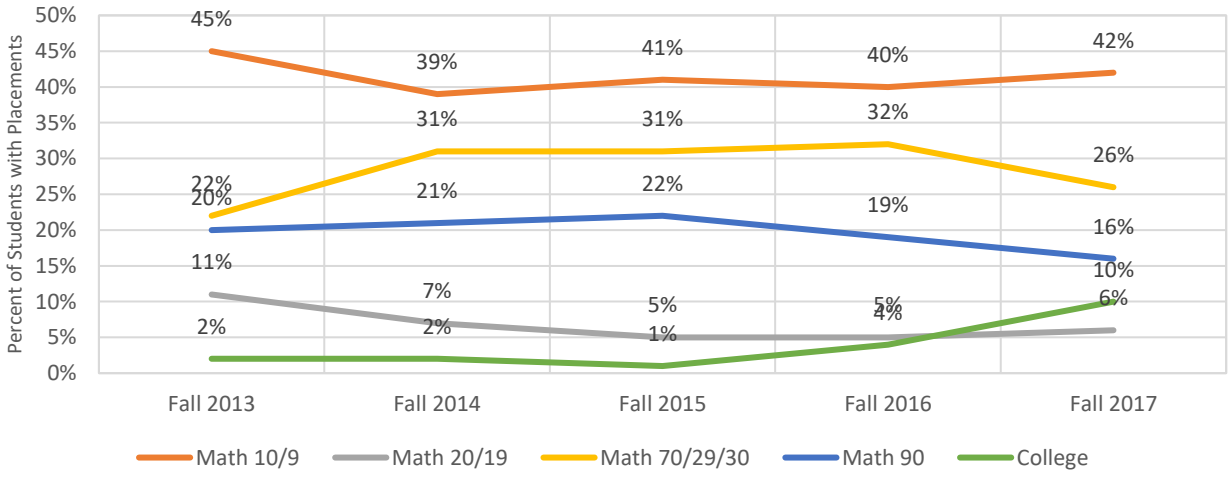
In the 2016-17 academic year, a major longitudinal research study of pre-college transfer-level Mathematics course activity at MJC was conducted for the academic years of 2011-2016 (see http://mjc.edu/general/research/mjc5yrmathstudy2011to16.pdf for the 2-page research brief and http://mjc.edu/general/research/mjcbasicskillsmathreport2011-16.pdf for the full 20-page research report). The primary objective was to measure patterns and trends in student success and student retention at the course level over the five-year span. Courses of greatest emphasis in that study were **Math 10** (Introduction to Math), **Math 20** (Pre-Algebra), **Math 70** (Elementary Algebra), **Math 89** (Intermediate Algebra Essentials), and **Math 90** (Intermediate Algebra).

The purpose of this current report is to extend the previous Math study to include data through Fall 2017 with an emphasis on courses **Math 10 (Math 9** in Fall 2017), **Math 20 (Math 19** in Fall 2017), and **Math 70** (which became **Math 29** for non-STEM majors and **Math 30** for STEM majors in Fall 2017).

Overview: Trends and Measures

I. Placement of New Students

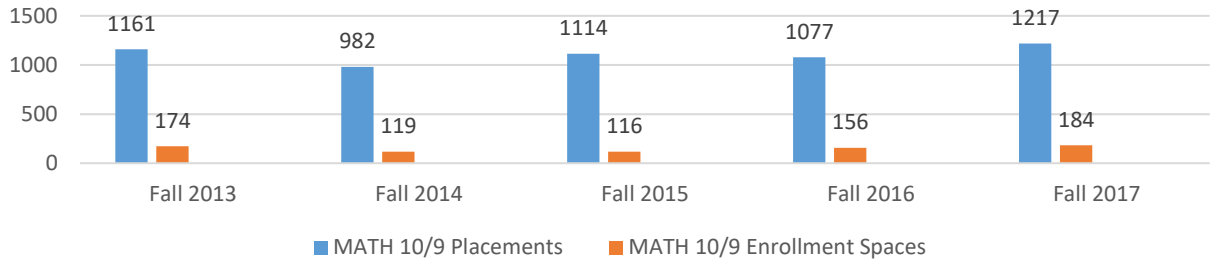
CHART 1: Math Placement Trends for Entering New Students



It is common for the largest proportion of entering MJC students (i.e. new students) to receive Math assessment scores at three or four levels below college-level math. For example, in Fall 2017, among entering new MJC students who participated in the Math assessment tests, 42% assessed at four levels below college Math (**Math 10**, now **Math 9**, Introduction to Math) while an additional 6% assessed at three levels below.

Among the entering MJC students who receive Math assessment scores at higher levels, the most common placement is at the Introduction to Algebra or **Math 70** (recently updated to **Math 29 and 30**) level, which is two levels below college-level Math.

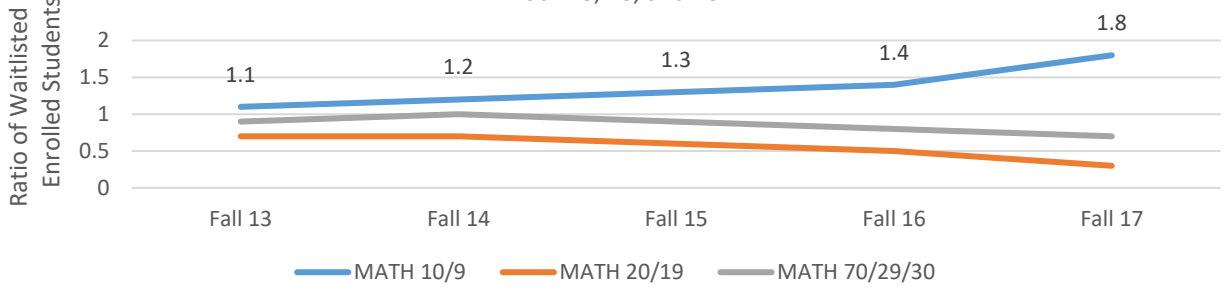
CHART 2: Math 10/9 Placements vs. Enrollment Spaces Trends, Fall 2013 to Fall 2017



Despite the large proportion of entering MJC students placed at 4 levels below college Math, **Math 10/9** (Introduction to Math) typically has the lowest average of available course enrollment seats. During the most recent years for which this study was conducted, the average enrollment space for Math 10 was just **149 students per semester**. *By comparison, the average number of new students per semester who received placements for Math 10/9 was **1110 students per semester**.*

II. Waitlist Patterns

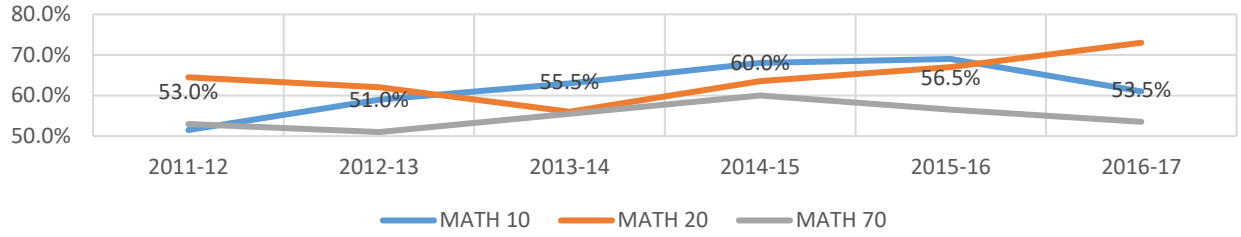
CHART 3: Course Waitlist to Enrollment Ratio Trends Fall 2013 to Fall 2017 for Math 10, 20, and 70



Course waitlist data for Fall 2013 through Fall 2017 was contrasted with overall enrollment data per course to calculate a **Waitlist to Enrollment Ratio**. **Math 10/9** had the highest Waitlist to Enrollment Ratio, suggesting that *more students in Math 10/9 are on the waitlist in the average semester than are actually enrolled*. This ratio has actually worsened since Fall 2013, reaching 1.8 by Fall 2017 (i.e. there were nearly 2 waitlisted students in Math 9 during Fall 2017 per enrolled student).

III. Course Success

CHART 4: Course Success Rate Trends 2011-12 to 2016-17



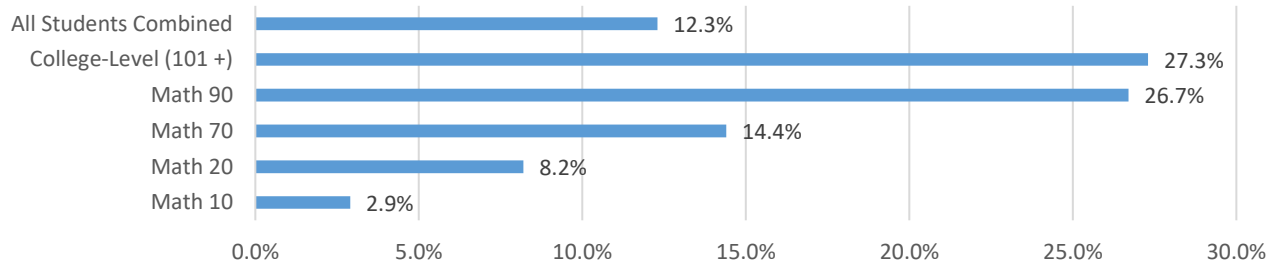
Math 70 had the lowest overall course success rate averaged over six years, at **54.6%**. **Math 20** had the highest rate at **64.3%**. In Fall 2017, the newly configured **Math 29** (Elementary Algebra) course for non-STEM majors had a success rate of **62.4%,** while the **Math 30** (Elementary Algebra for STEM Majors) had a **49.1%** success rate.

IV. Gatekeeper Courses

During the period 2011 to 2017, **Math 70** was identified as a "gatekeeper" courses as a course that significantly impedes students' academic progress toward meeting their educational objectives. A "gatekeeper" course is any course with high annual enrollment rates and a high rate of students not passing (i.e. grade of C- or below). Such courses tend to be first-year courses that can effectively function as pre-requisites for progression to higher-level (or in the case of Math or English, college-transfer level-courses). Average success rate for **Math 70** was just **55%** over six years (see details and definitions at http://mjc.edu/general/research/mjcgatekeepercoursetrends2011-17.pdf).

V. Graduation Rates by Initial Math Placement

CHART 5: 6-Year Graduation Rate for MJC Students Cohort 2010 Based on Initial Math Placement (Tracked to Spring 2016)

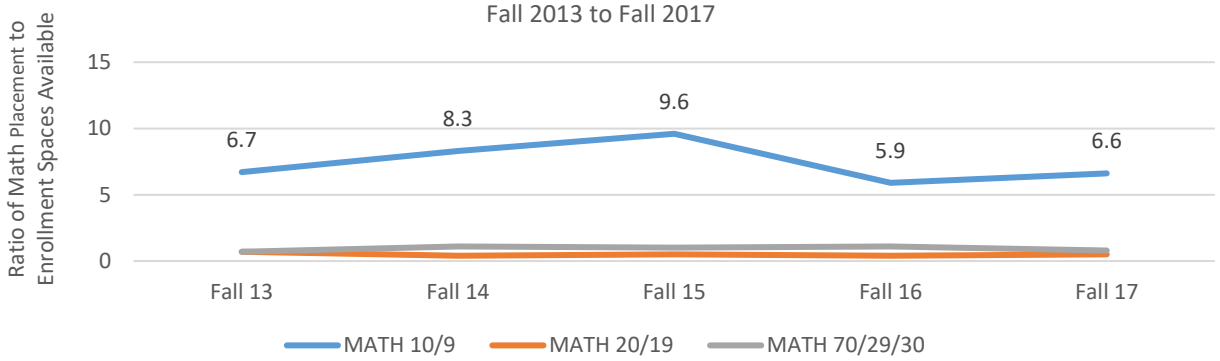


In a 6-year graduation rate study of students who entered MJC in Fall 2010, the 6-year graduation rates (degree or certificate) were:

- 2.9% of students initially placed at the Math 10 level graduated from MJC within 6 years
- 8.2% of students placed at Math 20 graduated from MJC within 6 years
- 14.4% of students placed at Math 70 graduated within 6 years

VI. New Student Placement Counts Compared with Enrollment Spaces

CHART 6: New Student Math Placement vs. Enrollment Spaces Ratios, Math 10, 20, and 70
Fall 2013 to Fall 2017

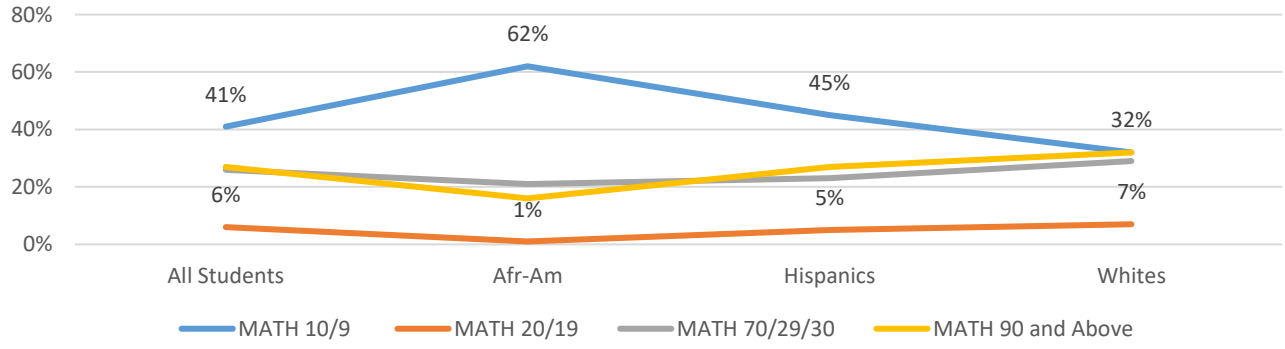


Comparative statistics for MJC new student placements in **Math 10, 20,** and **70** and available course enrollment spaces (i.e. course availability) were developed for the period of Fall 2013 through Fall 2017. For each course, a ratio scale was generated which calculated the overall count of new students placed at a specific course level such as **Math 10** vs. the overall enrollment availability (in terms of seats) for that same course level during this same period of Fall 2013 through Fall 2017.

- Math 10 has the greatest disparity between placements and seats. Between Fall 2013 and Fall 2017, 150 seats were available, on average, to **1100** students who received placement scores for **Math 10**. *This means that even if every new student assessed at **Math 10** desired to enroll in a **Math 10** course (or equivalent) during their first term of study at MJC, there are typically only enough course sections available to accommodate about one new student out of eight*.
- For **Math 20** (or equivalent), the overall count of new students initially assessed at this level is much less than for **Math 10** (or equivalent), representing an average of about 175 students per semester. On average, 350 seats were available to 175 students who placed into **Math 20**.
- For **Math 70**, 880 seats on average were available to 900 students who placed at this level.

VII. Equity Trends in Course Placements

CHART 7: Math Placement Results for Fall 2017 New Students at MJC



There are significant gaps in Math placement results for new students enrolled at MJC when race/ethnicity is taken into consideration. Among new students who enrolled in Fall 2017, 41% of all placed into **Math**

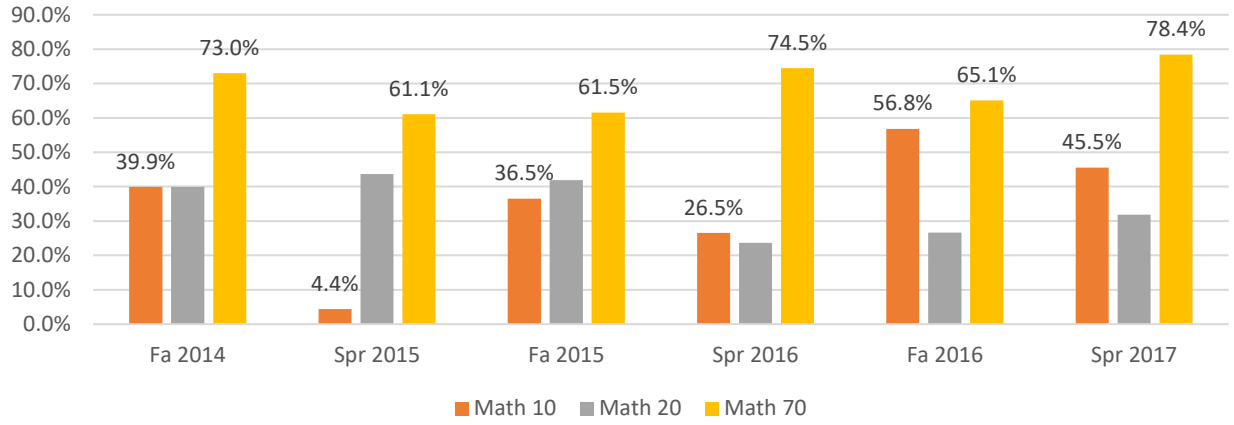
10/9 (4 levels below college-level Math), including 62% **of African-Americans**, **45%** of **Hispanics**, and **32%** of **Whites**.

VIII. Equity Trends in Course Success Rates

Average 6-year Success Rate gaps by ethnicity (i.e. lowest vs. highest success rate by course) were greatest for **Math 20**. The equity gap for **Math 20** was **25.4%** (i.e. **African-American** students averaged **42.6%** and **Asian** students averaged **68.0%)**. For **Math 70**, the equity gap was **15.4%** (i.e. **African-Americans** averaged **42.6%** and **Asians** averaged **57.0%**).

X. Course Success Rates Gap Analysis Across Course Sections

CHART 8: Course Success Rate Gap Analysis Across Sections by Semester



Overall course success rates gaps (defined as the degree of variation in course success rates across the range of sections offered in a given semester) were measured for **Math 10**, **Math 20**, and **Math 70** during the period Fall 2014 through Spring 2017. The success rates gap is a calculation of the difference between the highest-success section and lowest section of each course.

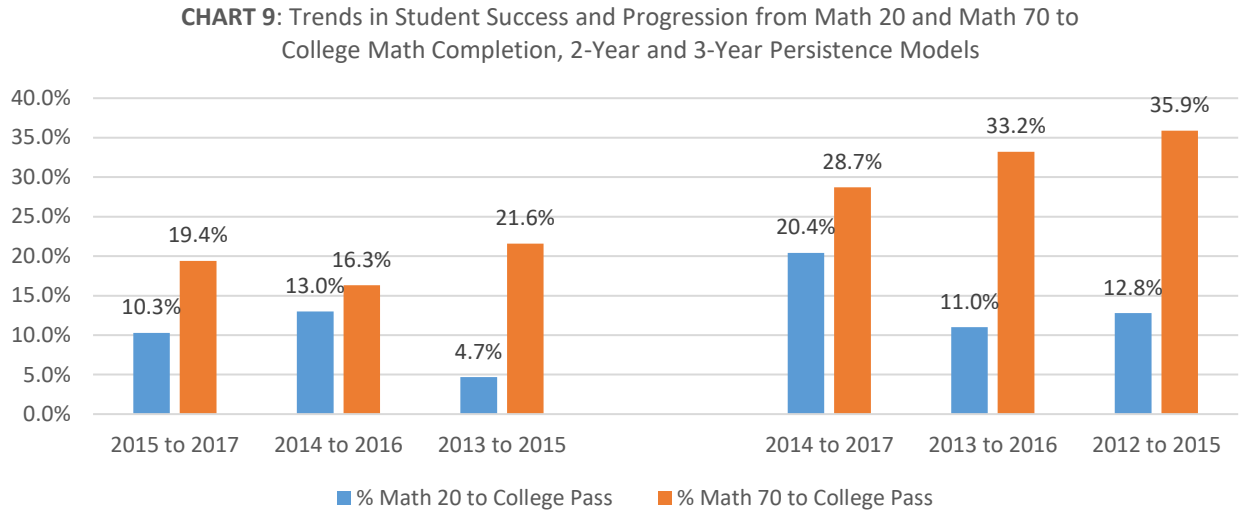
Math 70 consistently had the highest course success rate gap, averaging 69% between Fall 2014 and Spring 2017. In Spring 2017, the gap reached its highest rate at **78.4%**.

XI. No-Pass and Multiple Course Enrollment Trends

No-Pass and Multiple Course Enrollment Trends: Based on seven years of enrollment data trends at MJC, the following no-pass and retake counts:

- **Math 10**: **34%** of students who enroll never pass; **59%** pass on the first try; **7%** on second try
- **Math 20**: **25%** of students never pass; **64%** pass on the first try; **11%** on second try
- **Math 70**: **27%** of students never pass; **56%** pass on the first try; **17%** on second or third try
- **Math 90**: **25%** of students never pass; **60%** pass on the first try; **15%** on second try

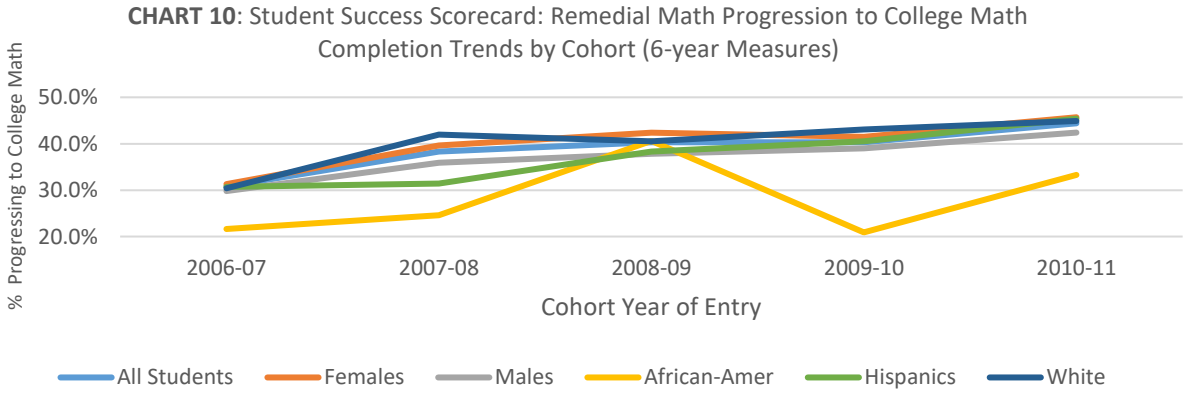
XII. Trends in Math 20 and Math 70 Persistence to College Math Success



In an analysis of data on MJC course progression patterns among **Math 20** and **Math 70** students (source: Basic Skills data tracker, http://datamart.cccco.edu/Outcomes/BasicSkills_Cohort_Tracker.aspx), student persistence rates to completion of college-level math courses were calculated for 3-year periods and 2-year periods. CHART 9 shows that for students who enroll in **Math 20**, fewer than 15% of students completing **Math 20** ultimately pass college-level math within two years, and fewer than 20% in three years.

Among **Math 70** students, an average of less than 20% pass college-level math in two years and approximately 33% complete college math in three years.

XIII. Student Success Scorecard Trends in Math



The Chancellor's Office Student Success Scorecard provides comparative data for MJC and other California community colleges for several key performance measures. Two measures pertaining to Mathematics progress are provided below.

a. The Scorecard measure for **Remedial Math** as reported in the 2017 Scorecard is defined as "Percentage of credit students tracked for six years through 2015-16 who first enrolled in a course below transfer level in mathematics during 2010-11 and completed a college-level course in the same discipline." The chart above shows the trends for all MJC students during the past five cohort years. **MJC has shown a steady improvement in proportions of students who successfully progress from Basic Skills math to college-level math. For the 2006-07 entering cohort, less than 31% of all students reached this milestone, while for the 2010-11 entering cohort, more than 44% reached this status. Most ethnicities showed substantial progress during this same period.**

b. The newest Scorecard data element, **Transfer-level Achievement in Math**, is defined as "The percent of first-time students in 2014-15 who complete 6 units and attempt any Math in their first year who complete a transfer-level course in Math in their first or second year." MJC had the lowest score at just **2.9%** of students in the first year, and **12.0%** of the second year. Trend data for this data element appears in http://www.mjc.edu/general/research/mjcscorecardtrends.pdf. (See Math Transfer 1-Year and 2-Year columns). It is especially noteworthy that the **2017 Mathematics Department Program Review**, page 24, acknowledges this low transfer-level achievement score for MJC at Year 1 and Year 2, noting that "these numbers represent either a low level of preparation for students in our service area, or possibly a flawed placement system." (See http://mjc.edu/instruction/outcomesassessment/programreview/archive/documents/math_pr.pdf)

XIV. Student Survey Feedback on Math Courses at MJC

In Spring 2017, MJC conducted its first annual Student Experience Survey. Details of the survey are available at http://www.mjc.edu/general/research/surveys/studentexperiencesurvey17.php. Among the 1700 students who participated, several offered feedback to qualitative questions pertaining to program and course satisfaction at the College.

Overall my experience has been great, but the math class I took last semester was very unorganized. The instructor seemed distracted and study guides that were given out had the wrong answers on them, so it was very confusing for myself as well as the rest of the class.

The need of more math 10 classes. I try to sign up but all the classes are full.

I scored into math70 tried math70 and had to drop because it was way out of my league. Scared me from math.

Not able to registered into a lower Math class due to a very limited amount of classes available for students.

Getting into math classes.

My math teachers lack of communication and availability.

The fact that math 173 & math 174 are always taught by the same teacher who doesn't want students to pass his class. When I was in Math 173 everyday he would say "oh another dropped" like he was proud that students couldn't pass his class even though he got paid for teaching the class, but he didn't teach at all. Needless to say I dropped as well, but it was ok with him because he still got paid. I will take Math 174 once I transfer like so many others students have had to do. It's sad that this professor is allowed to be the only teacher that teachers this class and so many

engineering and computer science majors MUST take Math 174 to transfer. Yet the college allows this professor to keep his job and do nothing to help students.

The most disappointing aspect of my educational experience at MJC would be taking a Hybrid Math class and not really grasping the subject as well as I thought I would.

The Math 70 and 89 is too hard of a course for a community college.

The tutors who assist with math in the library. The only one that has been helpful is Matthew an Asian guy the rest seem bother to help one told me he never had to do that for his statistics class

Statistics teachers are no good. The only one that I felt was good was Noela. They teach very differently maybe because they want to teach old school methods when there is a graphing calculator. I feel the other instructors just make the class harder than what it is.

Very dissatisfied with the statistics teachers available.