El Camino Community College

PROGRAM REVIEW 2021-22

Mathematical Sciences

CM1

DEAN:
Dr. Marlow Lemons

CONTRIBUTOR(S):
Michael Bateman
Diaa Eldanaf
Robert Eleuteri
Greg Fry
Megan Granich
Hamza Hamza
Arturo Hernandez
Zach Marks
Matthew Mata
Ashod Minasian
Ben Mitchell
Eduardo Morales
Jasmine Ng
Gordon Song
Gerson Valle (Associate Dean)
Oscar Villareal
Paul Yun

TABLE OF CONTENTS

Contents

SECTION 1
Program Overview

A) Provide a brief narrative description of the current program, (e.g., the program's mission statement, a description of the students it serves) and any highlights of the program's previous success, future vision, and related needs.

The College Level Mathematics Program (CM1) is a vital part of the Mathematics Division at El Camino College. We provide an outstanding learning environment in which students can develop the skills and knowledge needed for success in any STEM (Science, Technology, Engineering, and Mathematics) field.

The program consists of the following courses:

Math 170 – Trigonometry
Math 170S – Trigonometry with Support
Math 180 – Precalculus
Math 180S – Precalculus with Support
Math 190 – Single Variable Calculus and Analytical Geometry I
Math 191 – Single Variable Calculus and Analytical Geometry II
Math 210 – Introduction to Discrete Structures
Math 220 – Multivariable Calculus
Math 270 – Differential Equations with Linear Algebra

The core of the program is the STEM Calculus sequence. Many students must take this progression of courses: Math 170, 180, 190, 191, 220 and 270. The outlier is Math 210, a course in math relating to computer science, but also relevant to future mathematicians and others interested in math.

The CM1 program served 3697 students in 131 course sections during the 2020-21 school year. We are dealing with two major events that have affected all California community college math programs over the past three years: 1) the inception of AB-705, and 2) the Covid crisis.

In Fall 2019 we had to adapt to state law AB-705. This law eliminated the use of Placement Tests and allowed students to be placed based on high school grades. The expected lack of prerequisite skills in many students forced us to create supplemental S classes for Trigonometry and Precalculus to help deal with prerequisite deficits. As a result, we had an increase in students: We went from 1884 students in 54 sections in Fall 2018 to 2181 students in 68 sections in Fall 2019.

However, the Covid crisis began in Spring 2020 and led to a decrease in enrollment: we dropped to 1995 students in Fall 2020 and then to 1849 students in Fall 2021. This also caused all our courses to go online from Spring 2020 to Winter 2022. About half of our courses returned to the campus classroom in Spring 2022.

CM1 faces huge challenges in the coming years. We must continue to fine-tune our response to AB-705 (and the upcoming AB-1705, which is similar). We will consider more S courses, the increased use of SI (Supplemental Instruction) facilitators, and various other ways to help students who need the basic skills help that they previously got from the prerequisite courses that AB-705 has unfortunately outlawed. We will also need to adapt to the fact that Remote Instruction is here to stay. In order to be competitive and to meet the needs of our students we will need to have a portion of our CM1 course offerings online. Whether these will be fully online or in a hybrid format needs to be explored.

With the increase in distance education the issue of cheating online needs to be addressed. We must explore ways to promote online student integrity through the use of such things as online proctoring software and/or the creation of a campus Exam Proctoring Center.

CM1 also attempts to offer students opportunities outside of the classroom. We offer brown-bags on topics such as NASA's Mars mission. However, the biggest thing we promote is participation in the AMATYC (American Math Association of Two-Year Colleges) Student Math League. CM1 students form the core of the Math Team that consistently places in the top 10% of schools nationally. Typically, around one hundred students participate each year, attending weekly practices and taking the test once in the Fall and once in the Spring. Unfortunately, participation has dropped to zero, because the contest has been cancelled for five successive semesters. We hope it returns in Fall 2022.

B) Describe the degrees and/or certificates offered by the program.

Students may earn an A.S. degree in Mathematics.

From the El Camino College 2020-21 catalog:

"The degree provides the student with sufficient depth to support a lifelong interest in mathematics, and is suitable for the student who plans to transfer in mathematics. The core of the major is the calculus sequence, in which the student will acquire a conceptual understanding of the principles of differential and integral calculus for calculus of one and several variables, as well as the ability to apply calculus techniques in a variety of applications.

Required: Math 190, 191, 220, and 270. Also, 4-5 units from Math 150, Math 210, CSCI 1, CSCI 2, CSCI 3, PHYS 1A or PHYS 3A."

Additionally, the A.S.T. degree in Mathematics is available. This is intended for students who plan to complete a bachelor's degree in a similar subject at a CSU campus. Students completing the A.S.T. degree are given priority consideration for admission to the CSU system. This has the same required courses as the A.S. Degree.

C) Explain how the program fulfills the college's mission.

CM1 Mission Statement:

The College Level Mathematics Program at El Camino College offers quality, comprehensive mathematics courses to ensure the educational success of all students from our diverse community, with an emphasis on preparing students to transfer to STEM-related majors at four-year colleges and universities. Students will learn to think analytically and critically, to work collaboratively, and to model real world problems both with and without technology and to become better communicators.

D) Discuss the status of recommendations from your previous program review.

If more than ten recommendations were presented in the previous program review, expand the enumerated list below as needed.

These previous recommendations were made six years before AB-705 and the Covid Lockdowns. We feel it's more productive to focus on the present and the future than to comment in much detail about what we were thinking six years ago. We placed this section at the end of the report.

SECTION 2
Program Assessment

Program Contribution to Student Success and Equity

a) Degree Completion: Number/percent of students earning a program degree

The Department of Mathematics offers two different degree paths:

1. Associate of Science (A.S) - Program is designed as a terminal degree in general mathematics.
2. Associate of Science Transfer (A.S.T) [also called Associate Degree of Transfer (A.D.T)] – This degree is designed for students planning to transfer with a major in mathematics.

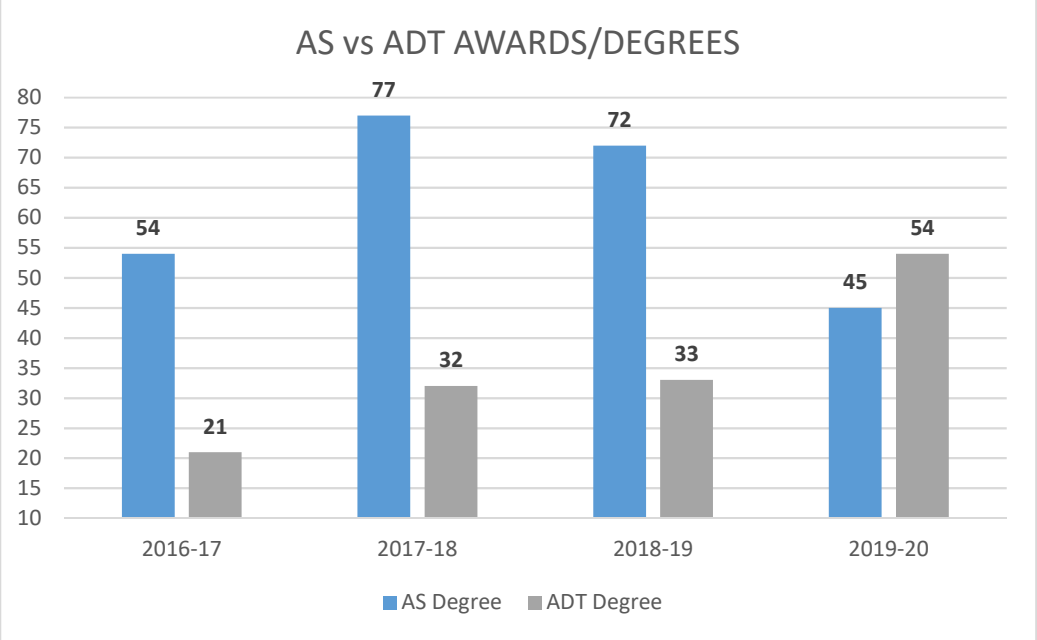


Figure 1: A.S. and A.D.T. Awards and Degrees

Figure 1 above shows the number of A.S. and A.D.T. awards given out from 2016-2020. With the exception of 2019-2020, the number of A.S. degrees far surpasses the number of A.D.T. degrees. Since the A.D.T degree is for students who plan on majoring in mathematics, this makes sense as the majority of students will not be majoring in mathematics, but other majors in the STEM field, such as the Natural Sciences or Industry and Technology.

If we look at 2019-2020, the number of A.S. degrees drops sharply, yet the number of A.D.T. degrees increases more than in any of the prior 3 years. There is no obvious reason for this outlier nor any speculation that can be made without adequate data.

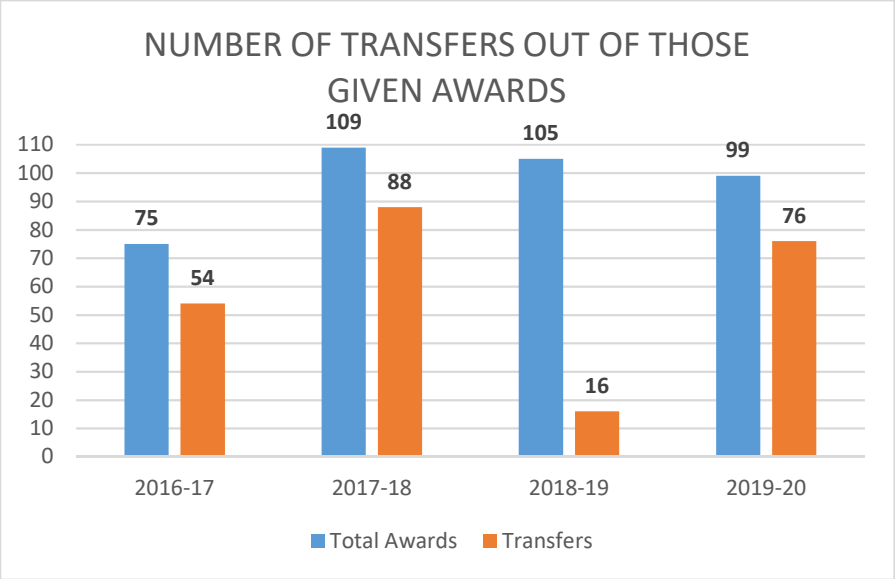


Figure 2: Number of Student Transfers

Figure 2 shows how many students (in orange) who successfully transferred to universities after being awarded the A.S. or A.D.T. degrees. In every academic year with the exception of 2018-19, the differences between those who received a degree and those who received the degree and successfully transferred are fairly consistent.

However, the data show an obvious outlier in 2018-19. Since this was before the pandemic and before AB705 was implemented, neither of those can be considered as reasons for this. We can only assume there was an error in the data input by the Office of Institutional Research & Planning Office. We can confirm that there was an issue with the transfer data that was received for 2018-19 from National Student Clearinghouse.

Awards by Transferability

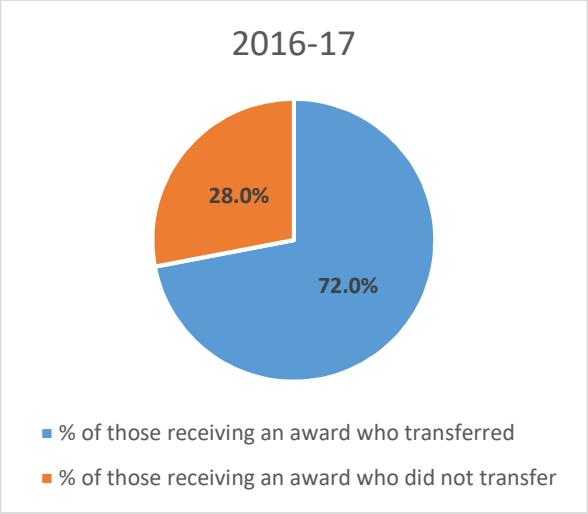


Figure 3

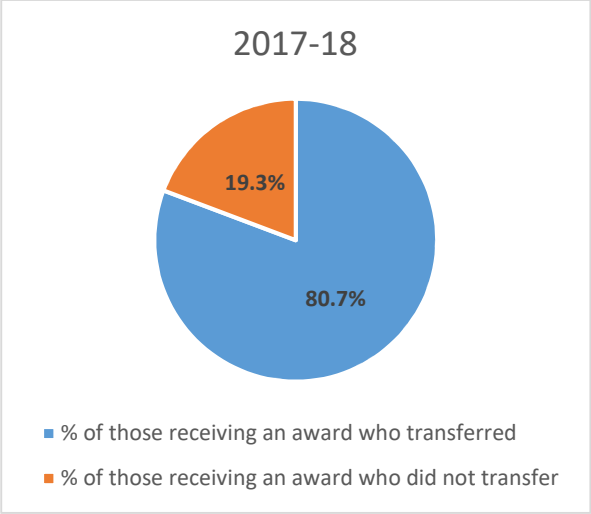


Figure 4

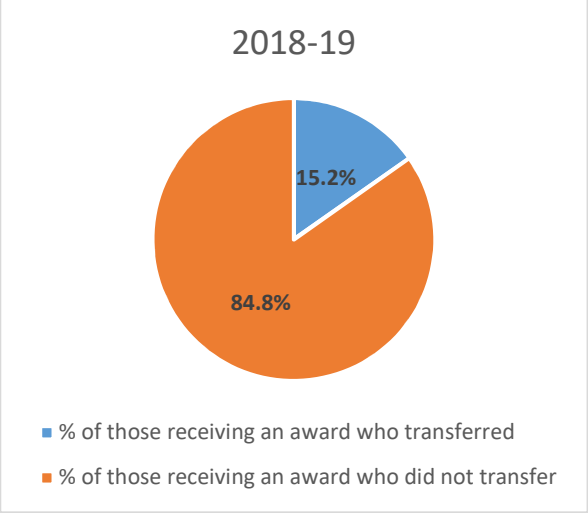


Figure 5

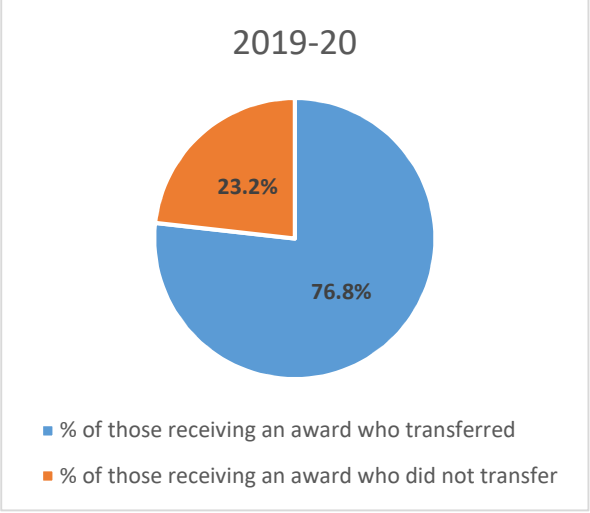


Figure 6

Figures 3 through 6 dive deeper into the numbers of those who transferred after receiving a degree. For reasons mentioned above, let's take the seemingly incorrect data from 2018-2019 out. The other three years showed between 19% to 28% of students receiving awards successfully transferring to four-year institutions. Even during the 2019-2020 academic year when Covid-19 occurred (Spring 2020 semester),

the percentage of successful transfers was concordant and consistent with previous years. While 19-28% may seem low, most students who transfer to a 4-year institution do so without getting an AS/ADT degree.

Disaggregating by race/ethnicity, gender and age cannot be done as that data was not provided for review.

b) Certificate Completion: Number/percent of students earning a program certificate

The Department of Mathematics does not offer any program certificates.

c) Success rates (Discuss your program's rates in light of the college's success rate standard. Set a standard for your program.)

The college's preliminary success standard is set as 57.6%, according to the data file. Figure 7 (on the next page) contains the success of the CM1 courses. The success rates for Math 170 (Trigonometry) and Math 180 (Pre-Calculus), the two courses which lead into the calculus sequence, are 6.14% and 3.82%, respectively, below this standard. This may be due to Math 170 being one of the first courses for students beyond algebra that presents predominantly new material, whereas Math 180 has content from previous courses, including Math 170. Additionally, AB 705 is allowing more students to take Math 170, and the variability of the ability levels of these students is much larger, possibly contributing to more students needing to retake this course and creating lower success rates. This could be true for Math 180 as well, but with less variability.

For the calculus sequence, courses Math 190 through 270, the annual success rate for Math 190 and Math 191 slightly sit 0.03% and 2.11% below standard but, for each successive course, the success rate rests above standard and climbs slowly to over a 81.59% success rate by the end of the sequence.

CM1 Program Success Rates *(Yearly)*					
	2017-18	**2018-19**	**2019-20**	**2020-21 (up to WI21)**	**Course Success Rate**
MATH 170	54.40% 625/1149	50.46% 603/1195	49.13% 383/917	52.19% 528/892	51.46% 2139/4153
MATH 180	57.57% 559/971	46.35% 489/1055	58.20% 542/921	54.49% 334/613	53.88% 1924/3560
MATH 190	50.30% 505/1004	53.42% 563/1054	62.95% 702/1112	63.57% 606/947	57.57% 2376/4117
MATH 191	54.07% 372/688	52.04% 382/734	61.80% 435/699	53.71% 277/512	55.49% 1466/2633
MATH 210	65.41% 87/133	55.04% 71/129	69.72% 77/109	60.66% 38/61	62.73% 273/432
MATH 220	73.17% 270/369	78.96% 274/347	80.43% 302/373	74.73% 204/273	76.95% 1050/1362
MATH 270	77.94% 212/272	77.69% 188/242	87.20% 218/250	85.06% 131/154	81.59% 749/918
Program Success Rate	57.35% 2630/4586	54.04% 2570/4756	61.27% 1957/3269	59.86% 2118/3452	57.96% 9275/16063

Figure 7: CM1 – Yearly Success Rates

Figures 8 and 9 (on the next two pages) compare the success rates, by course, for each of the fall and spring semesters. For Math 220, and 270, the success rates are consistently above the standard for both fall and spring. From the success rates for Math 170, 180, 190, 191 and 210, it is apparent that a sizable percentage of students who are entering the calculus sequence are in need of better preparation to pass these courses. Also notice that the success rates for Math 170, 180, 190, 210 of Spring and Fall 2019 semesters are lower when compared to other years and this is the year when the pandemic began.

CM1-College Level Math Program Success Rates – Fall Terms						
Course	**2017**	**2018**	**2019**	**2020**	**2021**	**Course Success Rate**
MATH 170	53.60% 240/448	51.30% 238/464	37.50% 242/646	47.41% 192/405	N/A	**46.46%** **912/1963**
MATH 180	60.80% 234/385	47.90% 195/407	46.50% 212/456	51.50% 206/400	N/A	**51.40%** **847/1648**
MATH 190	47.80% 194/406	54.90% 261/475	48.10% 253/526	61.82% 387/626	N/A	**53.86%** **1095/2033**
MATH 191	57.10% 141/247	57.90% 150/259	59.60% 158/265	61.54% 160/260	N/A	**59.07%** **609/1031**
MATH 210	53.10% 34/64	61.80% 34/55	48.90% 23/47	62.30% 38/61	N/A	**56.83%** **129/227**
MATH 220	71.90% 100/139	81.10% 103/127	85.30% 133/156	85.50% 144/165	N/A	**81.26%** **477/587**
MATH 270	78.90% 90/144	77.30% 75/97	70.60% 60/85	76.90% 60/78	N/A	**76.20%** **285/374**
PROGRAM SUCCESS RATE	57.29% 1033/1803	56.05% 1056/1884	49.56% 1081/2181	59.35% 1184/1995	N/A	**55.37%** **4354/7863**
MATH DEPT SUCCESS RATE	54.01% 5156/9547	52.30% 4891/9351	48.08% 3699/7694	59.63% 6702/11239	N/A	**54.05%** **20448/37831**
COLLEGE SUCCESS RATE	69.32% 44167/63718	69.97% 44387/63441	69.20% 43318/62594	66.87% 36999/55328	N/A	**68.90%** **168871/245081**

Figure 8: CM1 – Fall Success Rates

CM1-College Level Math Program Success Rates – Spring Terms						
Course	**2017**	**2018**	**2019**	**2020**	**2021**	**Course Success Rate**
MATH 170	N/A	51.92% 216/416	38.37% 170/443	79.22% 183/231	N/A	**52.20%** **569/1090**
MATH 180	N/A	59.84% 219/366	48.84% 210/430	80.00% 220/275	N/A	**60.60%** **649/1071**
MATH 190	N/A	44.38% 158/356	43.44% 139/320	90.17% 266/295	N/A	**57.98%** **563/971**
MATH 191	N/A	55.27% 131/237	51.30% 158/308	81.61% 182/223	N/A	**61.33%** **471/768**
MATH 210	N/A	76.81% 53/69	50.00% 37/74	87.10% 54/62	N/A	**70.24%** **144/205**
MATH 220	N/A	72.90% 113/155	72.73% 112/154	94.21% 114/121	N/A	**78.84%** **339/430**
MATH 270	N/A	73.85% 96/130	76.64% 82/107	94.40% 118/125	N/A	**81.77%** **296/362**
PROGRAM SUCCESS RATE	N/A	57.03% 986/1729	49.46% 908/1836	85.36% 1137/1332	N/A	**61.90%** **3031/4897**
MATH DEPT SUCCESS RATE	52.47% 4575/8719	54.12% 4580/8462	48.97% 3647/7447	82.48% 3263/3956	53.48% 3172/5931	**55.74%** **19237/34515**
COLLEGE SUCCESS RATE	69.30% 40659/58668	70.34% 41324/58747	70.93% 41504/58517	86.33% 37175/43062	69.54% 33360/47971	**72.68%** **194022/266965**

Figure 9: CM1 – Spring Success Rates

Success Rates by Gender

Figures 10 and 11 demonstrate no appreciable difference in the success rate of CM1 math classes by gender. Female students had a higher rate of success in four of the seven semesters, but the differences either way were very small with none exceeding 5% except for fall 2020.

Demographic Success Characteristics by Gender – Fall Semesters								
	Fall 2017		Fall 2018		Fall 2019		Fall 2020	
Gender	**N**	**Success**	**N**	**Success**	**N**	**Success**	**N**	**Success**
Male	X	57.90%	X	56.80%	X	49.50%	X	56.90%
Female	X	55.80%	X	54.50%	X	49.60%	X	63.50%
Total	1803		1884		2747		2428	

Figure 10: Demographic Success Characteristics by Gender (Fall Semesters)

Demographic Success Characteristics by Gender – Spring Semesters								
	Spring 2017		Spring 2018		Spring 2019		Spring 2020	
Gender	**N**	**Success**	**N**	**Success**	**N**	**Success**	**N**	**Success**
Male	N/A	N/A	X	56.20%	X	48.20%	X	85.40%
Female	N/A	N/A	X	59.10%	X	52.20%	X	85.20%
Total	1729		1836		2146		1913	

Figure 11: Demographic Success Characteristics by Gender (Spring Semesters)

Success Rates by Ethnicity

Figures 12 and 13 depict the demographic success characteristics by ethnicity. The highlighted sectors indicate areas of concern, namely groups that achieve a rate at less than 50% of the reference group. African-Americans and Latinos each fall into this category in 5 of the 7 semesters studied. Additionally, the success rates for these groups were significantly lower than the other two major groups, Asian and White, in the other four semesters. The school is attempting to address this equity issue with several special programs. In our department, we should do a better job of making all groups aware of the resources available to them, such as MESA and the tutoring center. We suggest increasing the funding for these programs, so that the capacity of MESA can be increased and more advanced tutors can be hired, in addition to a full-time tutoring coordinator. Also, Supplemental Instruction (SI) could be added to STEM courses. We could also look for grant money to hold special workshops for these courses.

Demographic Success Characteristics by Ethnicity – Fall Semesters								
	Fall 2017		Fall 2018		Fall 2019		Fall 2020	
Ethnicity	**N**	**Success**	**N**	**Success**	**N**	**Success**	**N**	**Success**
African-American	N/A	47.67%	N/A	47.50%	N/A	37.60%	N/A	52.00%
Amer. Ind /Alask. Native	X	100%	X	67%	X	100.00%	X	100%
Asian	N/A	69.30%	N/A	68.70%	N/A	62.90%	N/A	70.30%
Latino	N/A	47.10%	N/A	45.00%	N/A	42.00%	N/A	52.40%
Pacific Islander	X	25.00%	X	66.70%	X	0.00%	X	55.60%
Two or More	N/A	68.30%	N/A	60.60%	N/A	53.80%	N/A	53.10%
Unknown or Decline	N/A	80.00%	N/A	100.00%	N/A	43.00%	N/A	60.90%
White	N/A	62.00%	N/A	65.70%	N/A	64.40%	N/A	65.60%
Total	1803		1884		2747		2428	

Figure 12: Demographic Success Characteristics by Ethnicity (Fall Semesters)

N/A: Detailed data are not available

X: Counts are suppressed for groups with less than 10 students.

Shaded regions indicate groups achieving at a rate less than the 80% of the reference group

Demographic Success Characteristics by Ethnicity – Spring Semesters								
	Spring 2017		Spring 2018		Spring 2019		Spring 2020	
Ethnicity	**N**	**Success**	**N**	**Success**	**N**	**Success**	**N**	**Success**
African-American	N/A	N/A	N/A	44.00%	N/A	44.30%	N/A	71.30%
Amer. Ind /Alask. Native	N/A	N/A	X	0%	X	67%	X	67%
Asian	N/A	N/A	N/A	71.40%	N/A	55.00%	N/A	87.10%
Latino	N/A	N/A	N/A	47.10%	N/A	42.00%	N/A	83.20%
Pacific Islander	N/A	N/A	X	100.00%	X	12.50%	X	66.70%
Two or More	N/A	N/A	N/A	58.00%	N/A	53.10%	N/A	90.60%
Unknown or Decline	N/A	N/A	N/A	50.00%	N/A	44.40%	N/A	91.70%
White	N/A	N/A	N/A	67.30%	N/A	57.90%	N/A	90.30%
Total	1729		1836		2146		1913	

Figure 13: Demographic Success Characteristics by Ethnicity (Spring Semesters)

d) Retention rates

In Figures 14 and 15 (on next two pages), the retention rates for CM1 courses are consistent with the overall rates for the math department. It is not surprising that the highest rates occur in courses such as Math 220 and 270, since the students who get to these courses are sufficiently prepared and ready, having run the gamut of previous courses in the calculus sequence. That the lowest retention rates occur in Math 190 and 191 is not surprising either – these courses introduce students to many new ideas and at a higher level of rigor than they may be used to. The introduction of more resources, such as SI sessions, could potentially raise these retention rates.

CM1-College Level Math Program Retention Rates – Fall Terms					
Course	**2017**	**2018**	**2019**	**2020**	**Course Retention Rate**
MATH 170	74.30% 333/448	67.90% 315/464	60.80% 393/646	68.40% 277/405	**67.14%**
MATH 180	75.80% 292/385	67.10% 273/407	67.50% 308/456	72.75% 291/400	**70.63%**
MATH 190	60.60% 246/406	70.90% 337/475	68.40% 360/526	74.28% 465/627	**69.26%**
MATH 191	72.90% 180/247	77.20% 200/259	74.70% 198/265	71.92% 187/260	**74.20%**
MATH 210	67.20% 43/64	78.20% 43/55	63.80% 30/47	68.90% 42/61	**69.60%**
MATH 220	84.90% 118/139	89.00% 113/127	93.60% 146/156	93.90% 155/165	**90.63%**
MATH 270	81.60% 93/114	87.60% 85/97	82.40% 70/85	85.90% 67/78	**84.22%**
PROGRAM RETENTION RATE	72.38% 1305/1803	72.51% 1366/1884	69.01% 1505/2181	76.20% 1484/1995	**71.98%**
MATH DEPT RETENTION RATE	74.87% 7148/9547	74.92% 7006/9351	69% 5289/7694	74% 8312/11239	**73.37%**
COLLEGE RETENTION RATE	83.21% 53019/63718	84.31% 53488/63441	84% 52465/62594	82% 45205/55328	**83.31%**

Figure 14: CM1-College Level Math Program Retention Rates (Fall Semesters)

CM1-College Level Math Program Retention Rates – Spring Terms						
Course	**2017**	**2018**	**2019**	**2020**	**2021**	**Course Retention Rate**
MATH 170	N/A	71.15% 296/416	64.56% 286/443	98.70% 228/231	N/A	**74.31%** **810/1090**
MATH 180	N/A	75.96% 278/366	69.07% 297/430	98.55% 271/275	N/A	**78.99%** **846/1071**
MATH 190	N/A	59.55% 212/356	59.69% 191/320	100.00% 295/295	N/A	**71.88%** **698/971**
MATH 191	N/A	68.35% 162/237	62.34% 192/308	99.55% 222/223	N/A	**75.00%** **576/768**
MATH 210	N/A	79.71% 55/69	66.22% 49/74	100.00% 62/62	N/A	**80.98%** **166/205**
MATH 220	N/A	78.06% 121/155	83.77% 123/154	99.17% 120/121	N/A	**86.05%** **370/430**
MATH 270	N/A	84.62% 110/130	85.05% 91/107	100.00% 125/125	N/A	**90.06%** **326/362**
PROGRAM RETENTION RATE	N/A	71.37% 1234/1729	67.27% 1235/1836	99.32% 1323/1332	N/A	**77.44%** **3792/4897**
MATH DEPT RETENTION RATE	73.22% 6384/8719	73.04% 6181/8462	68.77% 5121/7447	99% 3899/3956	70% 4131/5931	**74.51%**
COLLEGE RETENTION RATE	82.54% 48426/58668	82.82% 48657/58747	83.69% 48972/58517	99% 42645/43062	83% 39808/47971	**85.59%**

Figure 15: CM1-College Level Math Program Retention Rates (Spring Semesters)

d) A comparison of success and retention rates in face-to-face classes with distance education classes

There were no CM1 distance education classes and face-to-face classes offered in the same semester during the period studied. However, we will be able to do this in the future, because we started offering both in the same semester in Spring 2022.

e) *Fill rate:* Percentage of actual students enrolled in a term in relation to total seats offered

CM1 includes Math 170, 180, 190, 191, 210, 220 and 270.

Table 1 (below) shows the number of students enrolled in CM1 courses for the four academic years (Summer 2017 to Spring 2021). During these semesters there were two significant transitions worthy of special mention for analysis:

i. Fall 2019 - the introduction of AB705 placement requirements permitting students to register in certain CM1 courses regardless of prerequisite completion
ii. Spring 2020 – the online transition mid-semester in response to the Covid-19 pandemic which closed campus, shifting all CM1 courses online.

Table 1: CM1 Enrollment Per Course (seats filled) Sum '17 through Spring '21										
Semester	M170	M170S	M180	M180S	M190	M191	M210	M220	M270	**Totals**
Sum17	147	0	121	0	174	139	0	75	28	**684**
F17	448	0	385	0	406	247	64	139	114	**1803**
W18	138	0	99	0	68	65	0	0	0	**370**
S18	416	0	366	0	356	237	69	155	130	**1729**
Sum18	155	0	119	0	172	105	0	66	38	**655**
F18	464	0	407	0	475	259	55	127	97	**1884**
W19	133	0	99	0	87	62	0	0	0	**381**
S19	443	0	430	0	320	308	74	154	107	**1836**
Sum19	160	0	120	0	172	131	0	73	40	**696**
F19 (AB705 Intro)	646	369	456	197	526	265	47	156	85	**2747**
W20	111	35	70	0	119	80	0	23	0	**438**
S20 (Online transition) *	231	92	275	58	295	223	62	121	125	**1482**
Sum20	145	68	143	29	202	172	0	85	76	**920**
F20	405	266	400	165	626	260	61	165	78	**2426**
W21**										**367**
S21	320	154	322	56	364	347	71	128	150	**1912**
Totals	**4362**	**984**	**3812**	**505**	**4362**	**2900**	**503**	**1467**	**1068**	**20330**

Table 1: CM1 Enrollment per Course (seats filled)

Table 2 (below) shows the number of sections offered per semester as well as the seats available (number of sections times 35) and the fill rate percentage (seats filled divided by seats available).

Table 2 : Sections and Fill Rates Sum '17 through Spring '21				
Semester	**Total Students Enrolled**	**Sections Offered**	**Seats Available (Sections * 35)**	**Fill Rate % (Seats Filled / Seats Available)**
Sum17	684	22	770	**88.8**
F17	1803	50	1750	**103**
W18	370	12	420	**88.1**
S18	1729	50	1750	**98.8**
Sum18	655	21	735	**89.1**
F18	1884	54	1890	**99.7**
W19	381	12	420	**90.7**
S19	1836	54	1890	**97.1**
Sum19	696	21	735	**94.7**
F19 (AB705 Intro)	2747	85	2975	**92.3**
W20	438	15	525	**83.4**
S20 (Online Transition) *	2146	64	2240	**95.8**
Sum20	920	29	1015	**90.6**
F20	2426	76	2660	**91.2**
W21 **	367	13	455	**80.7**
S21	1912	71	2485	**76.9**
Totals	**20994**	**649**	**22715**	**92.4**

Table 2: Fill Rates for CM1 Courses

* The course-by-course data for Spring 2020 (Table 1) only includes students who received grades at the end of the semester. However, the total students enrolled in Spring 2020 (Table 2) is the total number as of the census date. The difference in the Spring 2020 totals (2146 – 1482 = 664) is due to the online transition in March 2020 as a result of the Covid-19 pandemic. This transition (which occurred after census) ultimately led to students being permitted to withdraw without receiving a grade at the end of the semester (an excused withdrawal).

** The current (as of 1/30/22) Winter 2021 enrollment data per course on the Institutional Research page is identical to the Winter 2020 enrollment data (as well as grade count data and success rates). https://www.elcamino.edu/about/institutional-research/reports-and-briefs.aspx
However, the recorded total students enrolled in Winter 2021 (367) and the number of sections (13) are different than Winter 2020 (438 and 15 respectively). As a result of what appears to be duplicate data, we have included here the total students and sections (see Table 2) but not the course-by-course data (Table 1) for Winter 2021.

Analysis of Enrollment and Fill Rate Percentage:

(i) Fall 2019: AB705 Introduction

A significant change in enrollment numbers in CM1 courses can be attributed to support courses (Math 170S and 180S) which were introduced in the Fall 2019 semester and the changes in placement requirements according to AB705.

- Beginning Fall 2019, students enrolled in 170S were concurrently enrolled in 170, and students enrolled in 180S were concurrently enrolled in 180.
- Enrollment (total seats filled) from Fall 2018 to Fall 2019 increased by 863 students, a percentage increase of 45.8%.
- However, since students in Math 170S and 180S were simultaneously enrolled in Math 170 and 180 sections respectively, we may also want to consider that the number of 'unique students' enrolled in CM1 courses during Fall 2019 was more accurately: 2747 – (369 + 197) = 2181.
- Hence, enrollment of unique students across all CM1 courses from Fall 2018 to Fall 2019 increased by 297 students, a percentage increase of 15.8%. Much of this increase can be attributed to the AB705 adjustment to placement requirements, allowing for more students to enter M170 without having necessarily satisfied the prerequisites previously required.

Since Math 170 became the "gateway course" for many BSTEM and general education students in the Fall 2019 semester, we draw attention to the specific increase in Math 170 students from 2018 to 2019.

- The increase in enrollment from Fall 2018 to Fall 2019 in Math 170 was 182 students, a percentage increase of 39.2% from fall to fall. There was a significant increase in the number of seats filled in Math 170 (and the number of sections offered), mainly due to the introduction of AB705 placement.

(ii) Spring 2020 – Online Transition due to Covid-19 Pandemic

Enrollment numbers for Spring 2020 were affected by the online transition due to the Covid-19 pandemic. At the start of the Spring 2020 semester, there were 64 sections of CM1 courses with 2146 students: a Fill Rate of 95.8%. The online transition occurred in March 2020. At the end of the Spring 2020 semester, only 1482 students received grades (including official W withdrawal grades). The remaining 664 students who did not receive any grade for Spring 2020 made up approximately 31% of the students who began the Spring 2020 semester. These 664 students were most likely granted excused withdraws (after census) due to the online transition. Hence, no grades were recorded for these students.

Table 3 (below) displays enrollment and fill rate data comparing online and on-campus math sections for Fall 2020 and Spring 2021 (during the Covid-19 pandemic).

Table 3: Online Versus On-Campus Enrollment F20-S21												
	M170	M170S	M180	M180S	M190	M191	M210	M220	M270	Totals	Sections	Fill Rate %
F20 (Online)	373	234	367	165	561	188	61	165	63	**2177**	58	**107.2**
F20 (On Campus)	32	32	33	0	65	72	0	0	15	**249**	18	**39.5**
S21 (Online)	187	89	165	0	286	210	71	33	67	**1108**	39	**81.2**
S21 (On Campus)	133	65	157	56	78	137	0	95	83	**804**	32	**71.8**
Totals	**725**	**420**	**722**	**221**	**990**	**607**	**132**	**293**	**228**	**4338**	**147**	**84.3**

Table 3: Online versus On-Campus Enrollment (Fall 2020-Spring 2021)

During Fall 2020 and Spring 2021 semesters, there were more online sections (97) versus on-campus sections (50). Also, the Enrollment and Fill Rates were significantly higher for online sections, likely due to pandemic related issues (e.g. social distancing requirements on-campus and the implicit desire or need for students to take online courses).

Table 4 (below) shows enrollment data comparing fall semesters 2017-2020.

Table 4: FALL CM1 Enrollment F17 through F20												
Semester	M170	M170S	M180	M180S	M190	M191	M210	M220	M270	Totals	Sections	Fill Rate %
F17	448	0	385	0	406	247	64	139	114	**1803**	50	**103**
F18	464	0	407	0	475	259	55	127	97	**1884**	54	**99.7**
F19 (AB705 Intro)	646	369	456	197	526	265	47	156	85	**2747**	85	**92.3**
F20	405	266	400	165	626	260	61	165	78	**2426**	76	**91.2**
Totals	**1963**	**635**	**1648**	**362**	**2033**	**1031**	**227**	**587**	**374**	**8860**	**265**	**95.5**

Table 4: Fall CM1 Enrollment (Fall 2017 to Fall 2020)

There are significant details to identify, including:

1. Enrollment increased 4.5% from Fall 2017 to Fall 2018. The number of sections increased by 8% from 50 to 54 sections. The fill rate decreased by 3.2%.

2. From Fall 2018 to Fall 2019, in response to the introduction of AB705 placement changes, enrollment increased by 45.8% for CM1 courses (see Figure 1). From Fall 2018 to Fall 2019, the number of sections increased by 57.4% from 54 to 85 sections. The fill rate decreased by 7.4%. The number of sections should be expected to increase as enrollment and demand for these courses increase. The decrease in fill rate is an appropriate response to the need to provide more individualized support to these students whose needs vary according to levels of support needed.

3. If we consider that Math 170S and Math 180S students (566) were concurrently enrolled in Math 170 and Math 180 respectively, the increase in unique students from Fall 2018 to Fall 2019 was 15.8% (see Figure 2). The removal of pre-requisite requirements allowed many more students to enroll in these courses than would be typically expected prior to AB705. This increase might represent more normalized enrollment numbers moving forward under AB705 and we should prepare to offer enough sections to support these students.

4. Enrollment decreased from Fall 2019 to Fall 2020 by 11.7%. The number of sections decreased by 10.6% from 85 to 76 sections. The fill rate decreased by 1.2%. The decrease can mostly be attributed to the Covid-19 pandemic. As the pandemic restrictions ease, enrollment should be expected to rise again and additional sections should be made available to compensate for the increase.

5. Considering that math 170S and Math 180S students (431) were concurrently enrolled in math 170 and Math180, enrollment of unique students decreased by 8.5%. Much of this decrease can be attributed to the transition to primarily online learning beginning in the Spring 2020 semester. As the pandemic restrictions ease, enrollment should be expected to rise again and additional seats should be made available to compensate for the increase.

6. The fill rate decreased for each successive fall semester versus the previous fall from 2017 to 2020. The overall fill rate across all fall semesters 2017-2020 was 95.5%. A decrease in fill rate should correspond to more individualized support for students due to a lower ratio of students to instructors. Instructors should be prepared to address student concerns due to their individualized support needs.

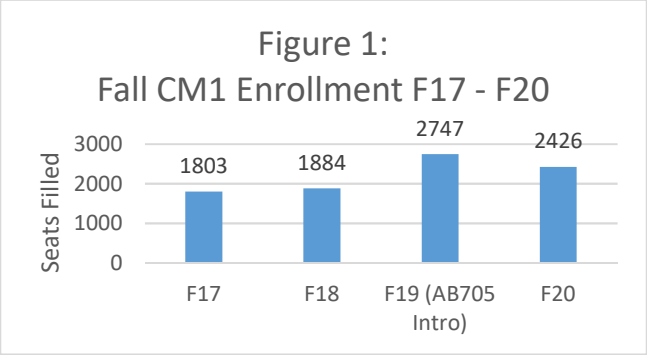


Figure 1: Fall Semester CM1 Enrollment (2017-2020)

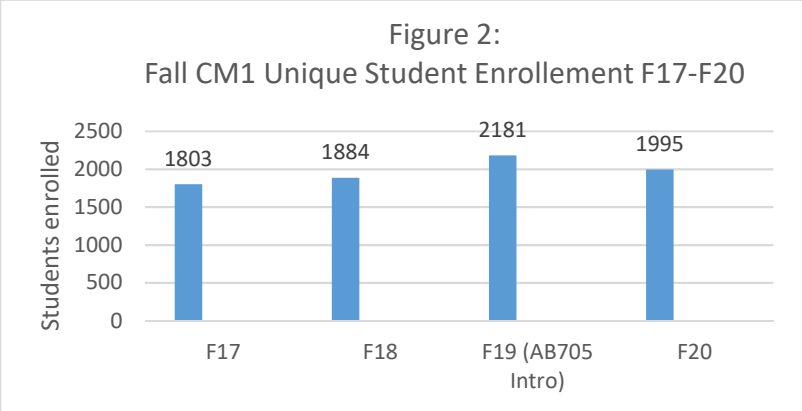


Figure 2: Fall Semester Unique Student Enrollment (2017-2020)

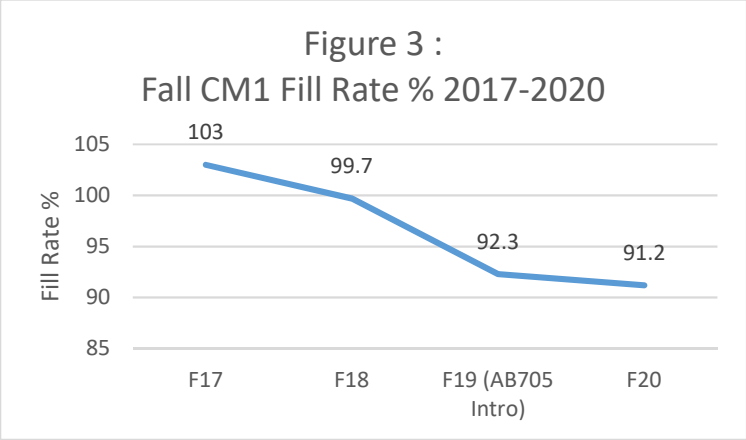


Figure 3: Fall Semester CM1 Fill Rate (2017-2020)

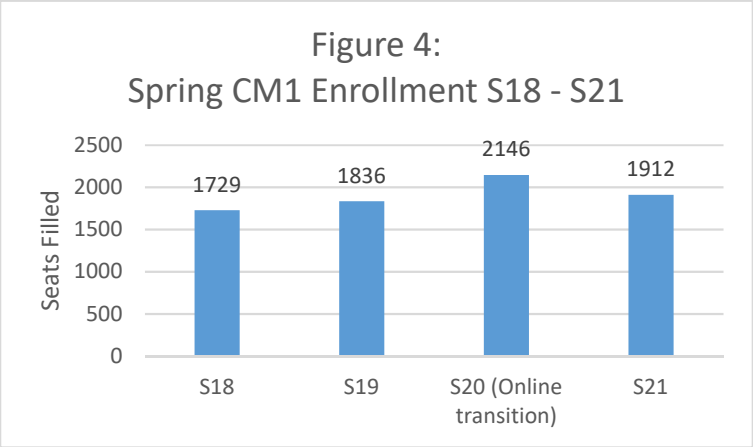


Figure 4: Spring Semester CM1 Enrollment (2018-2021)

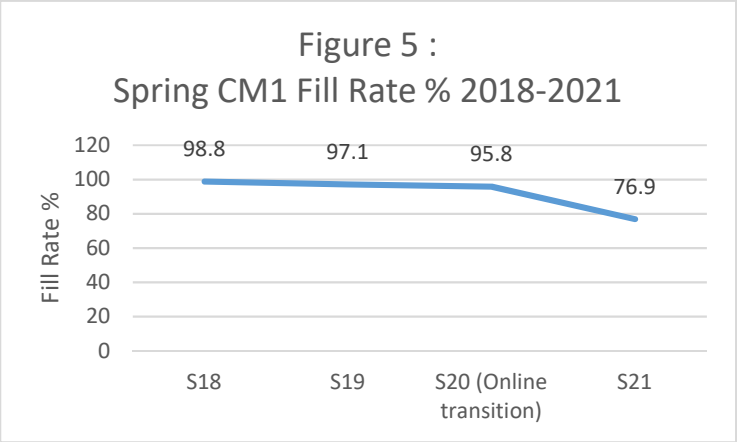


Figure 5: Spring Semester CM1 Fill Rate (2018-2021)

The significant decrease in fill rate from S20 to S21 may be attributed to a couple of factors:

1. Decreased enrollment numbers during the Covid-19 pandemic while needing to create enough sections to satisfy instructor load requirements.
2. An expectation that students new to working at home, asynchronously and isolated would need increased individualized attention from instructors (virtual office hours, tutoring and email communications for example) to stay motivated and on track.

The effectiveness of online learning and decreased fill rates can be examined using success rates during the pandemic era. For future semesters, promotion of both on-campus and online CM1 courses (in response to student demand) can satisfy the needs of students according to enrollment data.

Table 5 (below) shows enrollment data comparing spring semesters 2018-2021.

Table 5: SPRING CM1 Enrollment S17 through S21												
Semester	**M170**	**M170S**	**M180**	**M180S**	**M190**	**M191**	**M210**	**M220**	**M270**	**Totals**	**Sections**	**Fill Rate %**
S18	416	0	366	0	356	237	69	155	130	**1729**	50	98.8
S19	443	0	430	0	320	308	74	154	107	**1836**	54	97.1
S20 (Online transition)	231	92	275	58	295	223	62	121	125	**2146**	64	95.8
S21	320	154	322	56	364	347	71	128	150	**1912**	71	76.9
Totals	**1410**	**246**	**1393**	**114**	**1335**	**1115**	**276**	**558**	**512**	**7623**	**239**	**91.1**

Table 5: Spring CM1 Enrollment (Spring 2017 to Spring 2020)

Actual Spring 2020 enrollment was 2146 students (rather than 1482 which is the sum of course tallies here for S20). The missing 664 students likely received excused withdraws after census and hence are not included here in the course-by-course tally.

Table 6 (below) shows enrollment data comparing academic years 2017-2021 (summer to spring).

Table 6: CM1 Enrollment by Academic Year (summer to spring) 2017-2021												
Academic Year	**M170**	**M170S**	**M180**	**M180S**	**M190**	**M191**	**M210**	**M220**	**M270**	**Totals**	**Sections**	**Fill Rate %**
2017-2018	1149	0	971	0	1004	688	133	369	272	**4586**	134	**97.8**
2018-2019	1195	0	1055	0	1054	734	129	347	242	**4756**	141	**96.4**
2019-2020	1148	496	921	255	1112	699	109	373	250	**5363**	185	**82.8**
2020-2021 [1]	870	488	865	250	1192	779	132	378	304	**5625**	189	**85**
Totals	**4362**	**984**	**3812**	**505**	**4362**	**2900**	**503**	**1467**	**1068**	**20330**	**649**	**89.5**

Table 6: CM1 Enrollments by Academic Year (Summer to Spring 2017-2021)

[1] Winter 2021 data per course is not included since it was not available, although the Winter 2021 total enrolled is included in the 5,625 frequency. Hence, the final column is correct. And, we can still examine the distribution of values in the final row as it is representative of the proportion of enrolled students per CM1 course across all semesters except Winter 2021.

The impact of AB705 and the Covid-19 pandemic on enrollment numbers in CM1 courses make it particularly and unusually challenging to normalize the numbers across the academic years 2017 – 2021. Enrollment can be expected to normalize over the coming years as a new normal emerges. Students at and below the college level have experienced unprecedented effects of math education during the pandemic (learning virtually, asynchronously and isolated).

f) ***Grade Distribution:*** **Percentage of students in a course receiving each of the possible grades that can be awarded**

CM1 (Math for Majors) includes Math 170, 180, 190, 191, 210, 220 and 270.

Table 1 (below) shows the grade distribution for students enrolled in CM1 courses for the four academic years (Summer 2017 – Spring 2021). During these semesters there were two significant transitions worth mentioning:

1. Fall 2019 - the introduction of AB705 placement requirements permitting students to register in certain CM1 courses regardless of prerequisite completion.

2. Spring 2020 – the online transition mid-semester in response to the Covid-19 pandemic which closed campus, shifting all CM1 courses online.

Table 1: Grade Distribution Sum17 - S21									
	A	B	C	D	F	P	NP	W	**Totals**
Sum17	152	143	105	65	59	0	0	160	**684**
F17	333	403	297	99	173	0	0	498	**1803**
W18	73	70	68	33	39	0	0	87	**370**
S18	336	346	304	107	141	0	0	495	**1729**
Sum18	146	142	103	45	68	0	0	151	**655**
F18	394	372	290	120	190	0	0	518	**1884**
W19	74	64	77	22	38	0	0	106	**381**
S19	310	303	295	114	213	0	0	601	**1836**
Sum19	129	140	117	67	96	0	0	147	**696**
F19 (AB705 Intro)	356	370	355	156	268	245	107	890	**2747**
W20	88	85	65	21	39	11	5	124	**438**
S20 (Online transition)	549	357	215	64	115	137	33	12	**1482**
Sum20	262	155	93	41	65	76	8	220	**920**
F20	485	396	298	103	192	271	58	623	**2426**
W21[1]									**0**
S21	417	278	236	73	150	90	33	635	**1912**
Totals	**4104**	**3624**	**2918**	**1130**	**1846**	**830**	**244**	**5267**	**19963**

Table 1: Grade Distributions: Summer 2017-Spring 2021

[1]As of the writing of this report, the Winter 2021 grade data per course on the Institutional Research & Planning page is identical to the Winter 2020 grade data (although total enrollment numbers differ). Hence, the grades posted to IRP for Winter 2021 are worth questioning as of the writing of this report. This is why the Winter 2021 row is empty.

The number of withdraws recorded in the Success Data for Spring 2020 were significantly lower than Spring 2019, likely due to the online transition in Spring 2020 where excused withdraws were granted after the census date. In Spring 2020, there were a total of just 12 withdraws (W) out of the 1482 students who received grades that semester. This was a withdrawal rate of 0.8%. By comparison, in Spring 2019 there were 601 withdraws (W) out of the 1836 students who received grades that semester. This was a withdrawal rate of 32.7%.

If we assign withdrawal grades (excused) for the remaining 664 students who did not receive any grade for Spring 2020, then there would have been a total of 676 withdraws in Spring 2020. That would be a withdrawal rate of 31.5%.

Table 2 (below) shows grade distribution data comparing academic years 2017-2021 (summer to spring).

Table 2 : Grade Distribution - Academic Years 2017-2021									
	A	B	C	D	F	P	NP	W	**Totals**
Sum17-S18	894	962	774	304	412	0	0	1240	**4586**
Sum18-S19	924	881	765	301	509	0	0	1376	**4756**
Sum19-S20	1122	952	752	308	518	393	145	1173	**5363**
Sum20-S21*	1164	829	627	217	407	437	99	1478	**5258**
Totals	**4104**	**3624**	**2918**	**1130**	**1846**	**830**	**244**	**5267**	**19963**

Table 2: Grade Distribution: Academic Years 2017-2021

*Winter 2021 grades not included.

Table 3 (below) shows grade distribution data comparing fall semesters 2017-2020.

Table 3 : Grade Distribution - Fall Semesters 2017-2020									
	A	B	C	D	F	P	NP	W	**Totals**
F17	333	403	297	99	173	0	0	498	**1803**
F18	394	372	290	120	190	0	0	518	**1884**
F19 (AB705 Intro)	356	370	355	156	268	245	107	890	**2747**
F20	485	396	298	103	192	271	58	623	**2426**
Totals	**1568**	**1541**	**1240**	**478**	**823**	**516**	**165**	**2529**	**8860**

Table 3: Grade Distribution: Fall Semesters 2017-2020

Table 4 (below) shows grade distribution data comparing spring semesters 2018-2021.

Table 4 : Grade Distribution - Spring Semesters 2018-2021									
	A	B	C	D	F	P	NP	W	**Totals**
S18	336	346	304	107	141	0	0	495	**1729**
S19	310	303	295	114	213	0	0	601	**1836**
S20 (Online transition)	549	357	215	64	115	137	33	12	**1482**
S21	417	278	236	73	150	90	33	635	**1912**
Totals	**1612**	**1284**	**1050**	**358**	**619**	**227**	**66**	**1743**	**6959**

Table 4: Grade Distribution: Spring Semesters 2018-2021

Table 5 (below) displays grade distribution data comparing Online and On-Campus CM1 sections for Fall 2020 and Spring 2021 (during the Covid-19 pandemic).

Table 5 : Grade Distribution : Online versus On-Campus F20 and S21									
	A	B	C	D	F	P	NP	W	**Totals**
F20 (Online)	450	327	255	93	169	253	50	580	**2177**
F20 (On Campus)	35	69	43	10	23	18	8	43	**249**
S21 (Online)	233	178	146	46	73	46	12	374	**1108**
S21 (On Campus)	184	100	90	27	77	44	21	261	**804**
Totals	**902**	**674**	**534**	**176**	**342**	**361**	**91**	**1258**	**4338**

Table 5: Grade Distribution: Online versus On-Campus Fall 2020 to Spring 2021

g) Course Success: Percentage of students enrolled at census who complete the course with a grade of A, B, C, or P

In CM1, all but Math 210 form a sequence: Math 170, 180, 190, 191, 220, 270.

Figures 24 and 25 show the success rates for the six courses in the sequence from Fall 2017 to Fall 2020. Student success was based on the premise that a grade of A, B, C, or P was earned. This particular program has a very high set of standards for our students in order to meet the requirements of the four-year colleges and universities. According to the data, it appears that the success rates improved in later courses of the sequence. This may be due in part to the students having a better understanding of the material as they progressed through the math sequence of courses, and being more committed to their academic goals. It is important to note that the success rates drastically increased for the Spring 2020 semester. This may be due to the fact that all courses were taught online most of the semester due to COVID-19 and students may have been allowed to use resources to complete the assignments (homework, exams, quizzes, etc.) that would otherwise not have been allowed in the classroom.

CM1 Program Success Rates - FALL TERMS					
Course	***2017***	***2018***	***2019***	***2020***	***Course Success Rate***
MATH 170	53.6%	51.3%	37.5%	47.4%	46.5%
MATH 180	60.8%	47.9%	46.5%	51.5%	51.4%
MATH 190	47.8	54.9%	48.1%	61.8%	53.9%
MATH 191	57.1%	57.9%	59.6%	61.5%	59.1%
MATH 220	71.9%	81.1%	85.3%	85.5%	81.3%
MATH 270	78.9%	77.3%	70.6%	76.9%	76.2%

Figure 24

General Mathematics Education Program Success Rates - SPRING TERMS				
Course	***2018***	***2019***	***2020***	***Course Success Rate***
MATH 170	51.9%	38.4%	79.2%	52.2%
MATH 180	59.8%	48.8%	80.0%	60.6%
MATH 190	44.4%	43.4%	90.2%	58.0%
MATH 191	55.3%	51.3%	81.6%	61.3%
MATH 220	72.9%	72.7%	94.2%	78.8%
MATH 270	73.8%	76.6%	94.4%	81.8%

Figure 25

h) ***Unit Accumulation:*** **Number of units accumulated by students working towards a program degree/certificate. Discuss whether students who take units beyond the requirements for their educational goals serve educational purposes or not. Focus on general trends, not on particular courses within the program.**

Below you will find the average number of units earned by students seeking an AA/AS program degree or an Associate Degree of Transfer (ADT).

Year	AA/AS	ADT
2016-2017	89	93
2017-2018	92	93
2018-2019	80	91
2019-2020	80	88

Number of Units Earned by Students Seeking Degrees

El Camino College offers the Associate of Science (A.S.) and the Associate Degree of Transfer (A.D.T) in Mathematics. Students pursuing either of these options are typically expected to earn between 64 and 76 units. Students who earn more than these number of units do so for various reasons. Some students intend to have a double major or a minor, may have changed majors along their academic career path, or possibly wanted to acquire certain skills and knowledge, and so they earned more units beyond the requirements for their educational goals.

Curriculum and Outcomes Assessment

a) **Examine the program curriculum using an equity lens by responding to the following questions: To what extent does the curriculum:**

- **Prepare students to actively engage in a diverse society?**

The STEM Calculus curriculum at ECC gives all students the mathematical foundation needed to participate in the many growing STEM industries in the United States. Additionally, the courses have been designed to prepare students for other STEM courses and to articulate with the major transfer universities in California.

The program curriculum covers fundamentals that apply to various disciplines such as biology, chemistry, and physics, and also delves deeper into specific applications of these STEM fields, such as population models, radioactive decay, and the equations of motion. Many of these specific applications have models and use techniques that cross over several disciplines. For example, an exponential growth model for a population resembles the model for continuously compounded interest, so covering specific cases will be of use to students in any STEM field they choose to pursue. In some cases, this curriculum can serve as an introduction to these fields and better prepare students for future classes that are focused solely on these topics. Gaining experience in a myriad of fields under the umbrella of STEM will set students up to better succeed, regardless of their background, in their chosen field of study. The CM1 courses also attract students from a wide range of disciples and backgrounds, and allow them to interact with each other in class and experience aspects of disciplines that extend beyond just their major.

- **Include multicultural content?**

Mathematics is a universal language. We seek to help all students see the beauty and the utility of mathematics. Given the way these courses are structured logically in that they build upon each other, the content should be accessible to students coming from any background. The content does historically have ties to different cultures across the globe and instructors can frame the formulas and methods in terms of the cultures and regions from which they originated. Many of the textbooks used in the STEM track also contain supplemental information, in the form of short history lessons, on the originator(s) of the formula or method being covered and how it has evolved into the form that we employ today. This includes contributions from such diverse historical figures such as Ada Lovelace, Isaac Newton and Srinivasa Ramanujun. And it includes the historical development of various ideas such as the use of “zero” being developed separately by both the Mayans and the Mesopotamians.

- **Respond to diverse students' learning needs?**

There are numerous resources available to students: The Math Study Center, MESA, Supplemental Instruction (SI), and the Special Resources Center. Additionally there are calculator loan programs and there have been laptop loan programs during the lockdowns. Each instructor has the freedom and responsibility to address other issues as they arise. Starting in the Spring 2022 semester we will likely be offering at least one section of each CM1 course in an online format, which may suit some student schedules better.

The current structure of the initial courses in the STEM track, Trigonometry (Math 170) and Precalculus (Math 180), allows students to take them as stand-alone courses or with a support course, primarily aimed at building up the algebra skills of the students to help them better find success in these classes. The support courses are flexible enough to allow an instructor to focus on what they deem is most needed for their unique class while still offering guidelines for where students generally need additional instruction. This takes the form of a 1-unit course for Math 170 and is a 2-unit course for Math 180. These options let students choose the path that is right for them and learn at the same pace as a student in just the parent course. Due to AB 705 removing the option for college students to start in developmental classes, many students struggle with fundamental topics such as adding fractions, manipulating expressions and solving basic algebraic equations, so these support courses provide students additional time with their instructor to fill any gaps in their knowledge or refresh their understanding of these essential topics. These two support courses help set the stage for students entering the calculus sequence, regardless of background. From there, short refreshers can be given to remind students of the methods and approaches they have already learned as they become relevant along the calculus sequence. We are considering adding a support course to Math 190 as well.

- **Encourage instructors and students to investigate their own views, biases and values and discuss multiple perspectives different from their own?**

Instructors are encouraged to be professional and open-minded. However, it's also important to maintain the same standards of excellence for all students.

The underlying skill that is developed throughout CM1 courses is problem solving and, more specifically, learning how to use the tools available to approach and solve problems. In line with problem solving is the idea that there can be multiple ways to reach a valid conclusion, but sometimes there may only be one way. Thus, in developing problem solving skills, students begin to understand that they must assess whether they are on the right or wrong track in pursuit of a solution. Learning to determine when you are the right or wrong path towards a solution is a valuable and time saving skill to develop. It's also important to develop the ability to explain processes and methods, not just to focus on the final answer. Math instructors spend a good deal of time developing proof techniques, either formally or informally. These skills can then translate to areas outside the realm of mathematics and allow students to make the connection that different views can exist and some may be equally valid, while others should be subject to deeper scrutiny. In these classes, students encounter alternative approaches to problems and they can then learn essential skills to determine which may work and which may not.

For instructors, teaching these classes presents the unique challenge of presenting a problem or concept and then, based on student questions or comments, having to generate an alternate approach or explanation to help aid in student comprehension. Many times, students will suggest some novel approach to a problem that may or may not work. Then, as a class, the students and instructor can explore this approach and see if it works and if not, why not. This impromptu explorative learning helps students better see that there may not be just one path to go down with some problems, math-related or otherwise. Being open to new ideas and beliefs, and being willing to explore them, and accept them or abandon them as logic and rationality dictates, demonstrates to students the importance of taking time to understand various methods and points of view.

- **Use critical/equity-oriented pedagogy?**

In the math department we attempt to treat all students the same as humans, providing equality of opportunity for each student, and individual help as needed in a human context. For example, the structure of the support courses for Math 170 and 180 allows them to be accessible to students from all backgrounds. These support courses focus on getting students up to speed with not only basic skills, but reviewing skills that are useful in the parent courses and throughout the calculus sequence. In particular, precalculus is set up to prepare students for their first semester of calculus all the way through linear algebra and differential equations. The curriculum is built with the sequencing of the courses in mind and therefore spends time at the start of sequence to develop and refine the students' algebra skills, knowing that it will pay dividends later on.

- **Ensure creating an empowering classroom environment?**

Many of the CM1 classes are taught in a way that allows students the opportunity to be active participants in the learning process. Examples of this include instructors spending time to answer content-related questions in a thorough manner, discussing student-requested problems from the homework, allowing students time to work in groups to expedite the learning process, having activities based on discovery where students can form their own conclusions through experimentation and analysis, and student projects that let them explore the material and its applications. Out of necessity, many of these classes are very interactive since the topics covered in them are best learned through practice and application rather than rote memorization.

- **Use multiple evaluation techniques sensitive to the diverse ways students can demonstrate understanding?**

Instructors in the CM1 classes employ a variety of methods to evaluate a student's understanding of the material covered. These range from having students solve standard problems, to exploring their understanding of applications through a project, to asking them to explain concepts in simple terms either in written or oral form. For many of the CM1 classes, it is not only important for students to comprehend how to solve a problem, but also to understand what they are doing and why they are doing it. The former falls under practical skills and the latter under conceptual understanding. Evaluating students in both areas is fundamental to assessing whether or not students have truly learned the material and have not just memorized the steps to solve a problem.

b) Summarize SLO and PLO assessment results over the past four years for key/gateway courses.

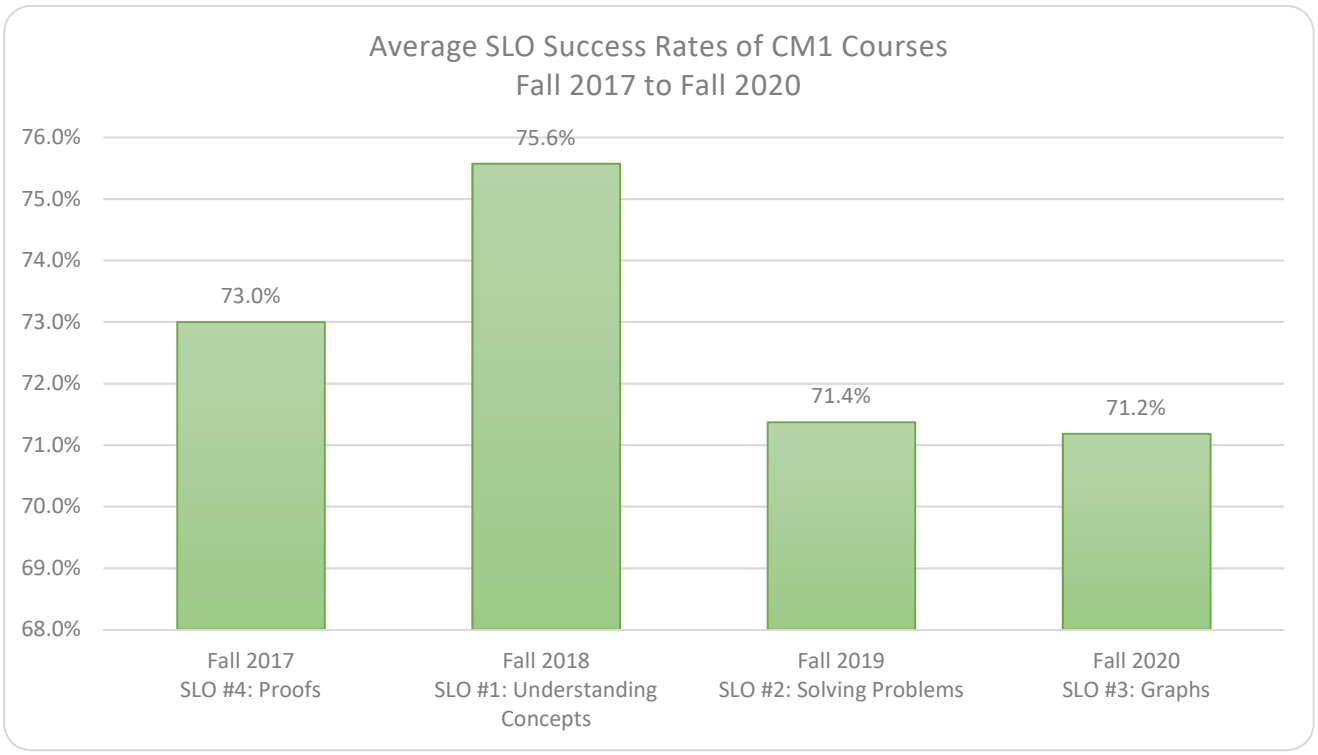


Figure 1: Average SLO Success Rates for CM1: Fall 2017-Fall 2020

CM1 offers some of the key gateway courses in the campus wide STEM meta-major. We see a lot of benefit in not only analyzing the course by course SLO data, but also the Program Level Outcome (PLO) data over the past four years.

From the Fall 2017 to the Fall 2018 semesters, we see success rates between 73% and 75%. That is, about 73% to 75% of students scored a 2 or 3 on the rubric scale used on all our assessments. The lower success rate in the Fall 2017 semester is expected as our PLO focused on proofs and abstraction in our STEM level math courses. Students can often struggle, especially in the Math 170/180 courses leading to the calculus sequence, with this kind of abstract problem solving and we expect success rates to improve as students advance through the sequence.

We continue by comparing the Math 170 and 180 SLO success rates to the Math 170S and 180S supported courses to see if there are significant differences. The Fall 2018 success rate is definitely higher and could be due to a number of factors. The corresponding PLO statement focuses on student understanding of concepts rather than construction of proofs and should assess student understanding of the main ideas of the course. At their core, our STEM coursework focuses on training students to understand mathematical concepts and bolster critical

thinking and analysis. We expect to see higher success rate (in this case, a rather high 75.6%) in this area, which is good to see.

While a bit lower at 71.4%, we continue to see promising success rates for our Problem Solving PLO assessed in the Fall 2019 semester. We saw slightly higher success rates in the past on this PLO so our assessment coordinators decided to collect data on some slightly more difficult problem solving exercises from students. We continue to monitor these results (especially with the Math 170 and math 180 classes with support) to spot any trends and areas of concern. As we continue to grapple with the new support coursework for our entry transfer level STEM courses of trigonometry and precalculus, we hope to separate more of the data from the regular Math 170 and Math 180 classes from the support sections to see if there are any connections or ways to improve success rates in the support versions of the courses.

The lower success rate for Fall 2020 could be due to a few factors. One plausible reason is the onset of the Covid-19 pandemic. Forcing all of our STEM coursework online (previously exclusively taught in-person prior to the onset of the pandemic) makes the collected data difficult to compare to previous years and trends of the program learning outcome. We also have less collected data than usual as instructors scrambled to re-invent their instruction strategies and modalities. The overarching PLO topic being graphical methods also can contribute to a lower success rate.

While a very important aspect of STEM coursework, graphical methods can prove challenging for our students. Some instructors believe that incorporating more calculator-related activities and software packages such as *MatLab* and *Wolfram* can improve success rates in these areas and help students see the ideas visually. Incorporating such software packages into the curriculum can also serve our students as they transfer into university STEM programs or the workplace.

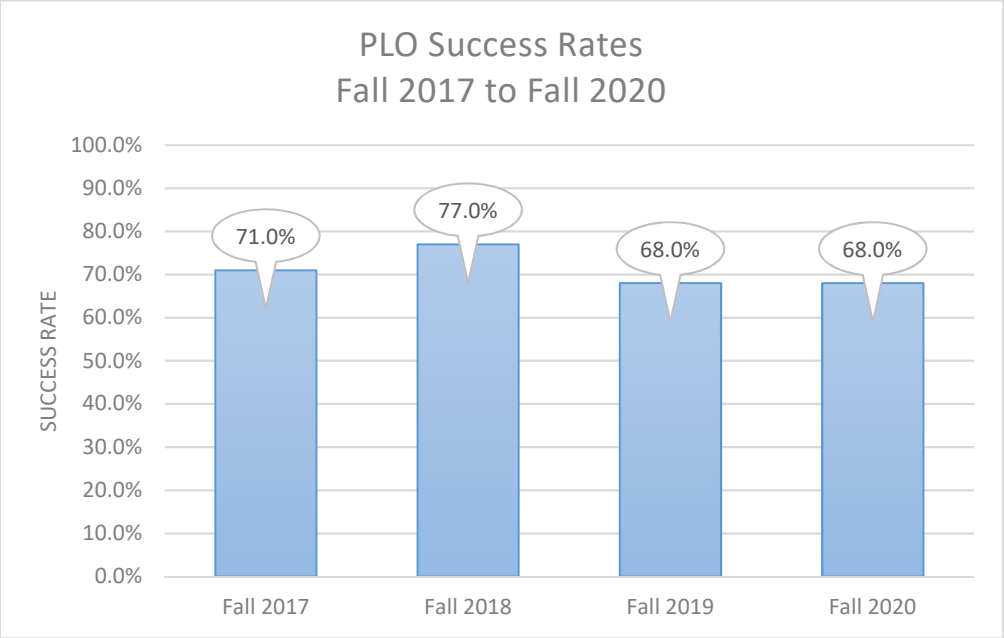


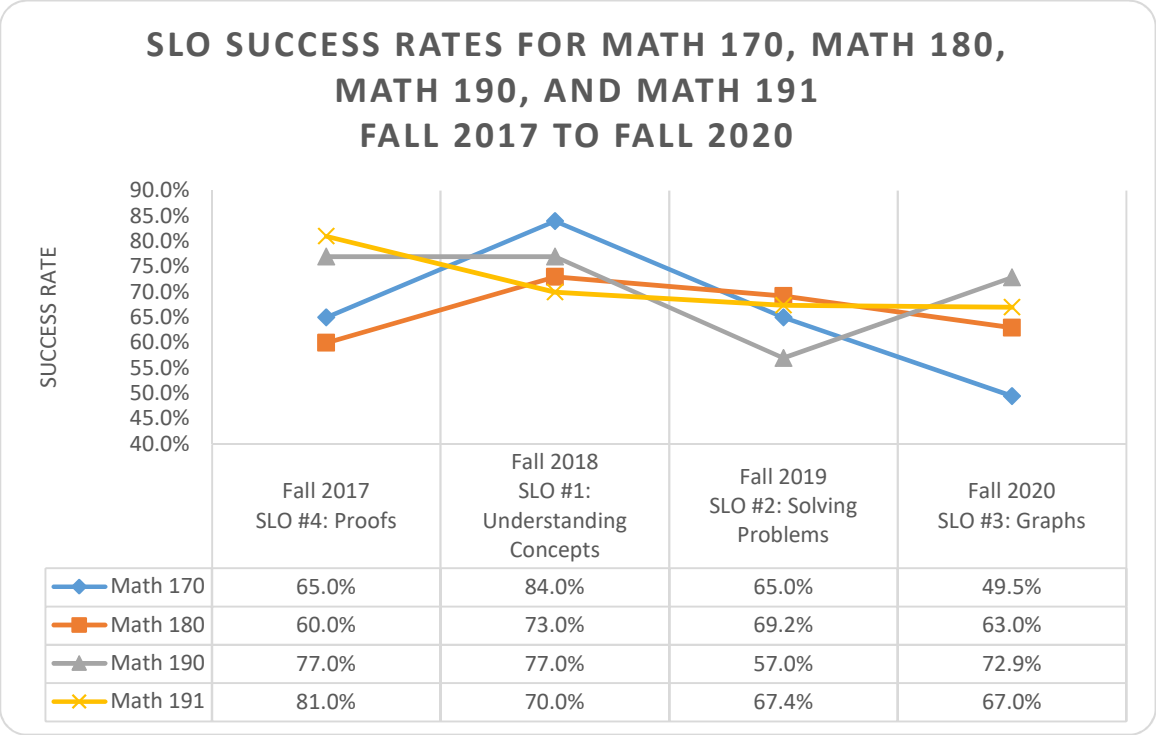
Figure 2: PLO Success Rates – Fall 2017-Fall 2020

Looking at our Program Learning Outcome success rates, we see typical success rates of 71% and a rather high success rate of 77% in the Fall 2018 semester. As mentioned with the corresponding SLO assessments, studying proofs in the trigonometry and pre-calculus courses can be a challenging topic for many STEM students, especially if placing into the Math 170 and 180 courses without sufficient high school preparation. Seeing lower success rates there is not surprising. We typically set a 70% success rate threshold for our assessments meeting our standard and we fall slightly below this on the recent fall semesters. Again, less data to work with for Fall 2020 and the onset of the pandemic definitely contributed to these results. A semester of re-inventing our STEM coursework for the online modality definitely makes it harder to use the recent data when comparing to other semesters.

We continue to look toward instructor feedback when analyzing our SLO and PLO results. Many instructors cite a need for students to continue seeking out tutoring (provided by our Math Study Center – now staffed by a full-time coordinator), more homework assignments for students to practice their skills, students visiting office hours, and more incorporation of technology in the classroom.

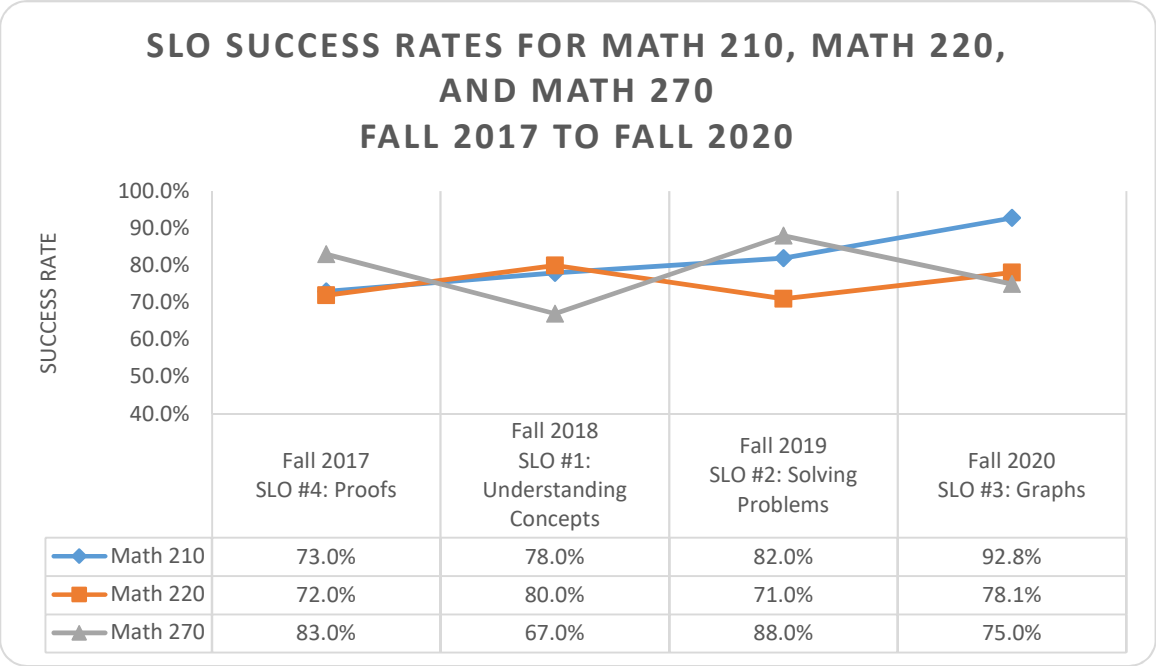
Examining results disaggregated by course, we see more consistency in success rates in the Fall 2017 to 2018 semesters and then more dispersion in the Fall 2019 semester and especially in 2020. As expected, the data from the pandemic will be the most sporadic as instructors converted coursework to an online modality. We will look a little closer at this disparity, in particular a decline in success rates for trigonometry and precalculus students during the pandemic.

c) Discuss programmatic factors contributing to constant, increasing or decreasing trends in the results for SLO and PLO assessment within the previously examined courses.



	Fall 2017 SLO #4: Proofs	Fall 2018 SLO #1: Understanding Concepts	Fall 2019 SLO #2: Solving Problems	Fall 2020 SLO #3: Graphs
Math 170	65.0%	84.0%	65.0%	49.5%
Math 180	60.0%	73.0%	69.2%	63.0%
Math 190	77.0%	77.0%	57.0%	72.9%
Math 191	81.0%	70.0%	67.4%	67.0%

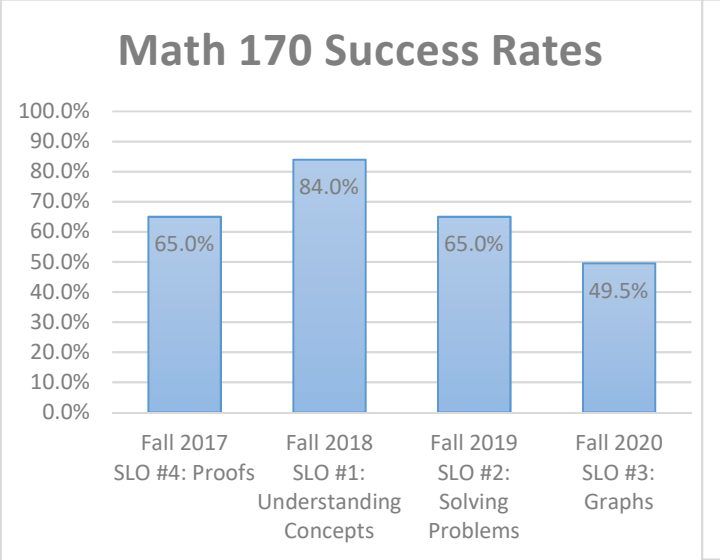
Figure 3a: Course SLO Success Rates Part I – Fall 2017-Fall 2020

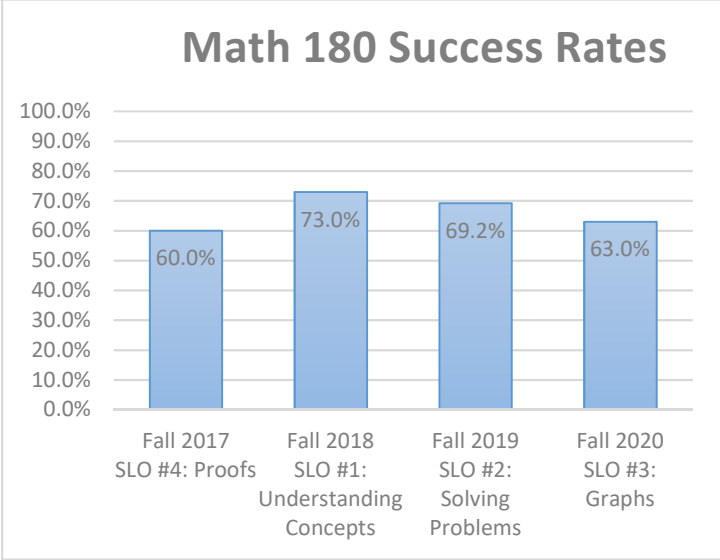


	Fall 2017 SLO #4: Proofs	Fall 2018 SLO #1: Understanding Concepts	Fall 2019 SLO #2: Solving Problems	Fall 2020 SLO #3: Graphs
Math 210	73.0%	78.0%	82.0%	92.8%
Math 220	72.0%	80.0%	71.0%	78.1%
Math 270	83.0%	67.0%	88.0%	75.0%

Figure 3b: Course SLO Success Rates Part II – Fall 2017-Fall 2020

We now look more closely at success rates in the individual courses.

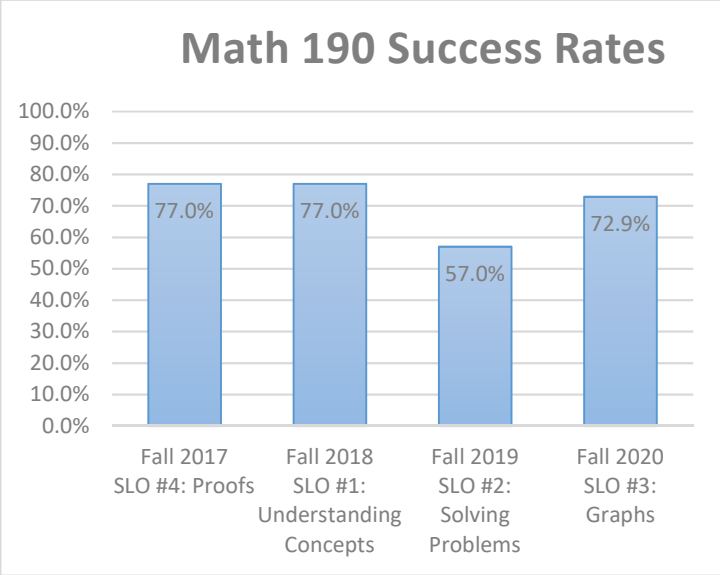


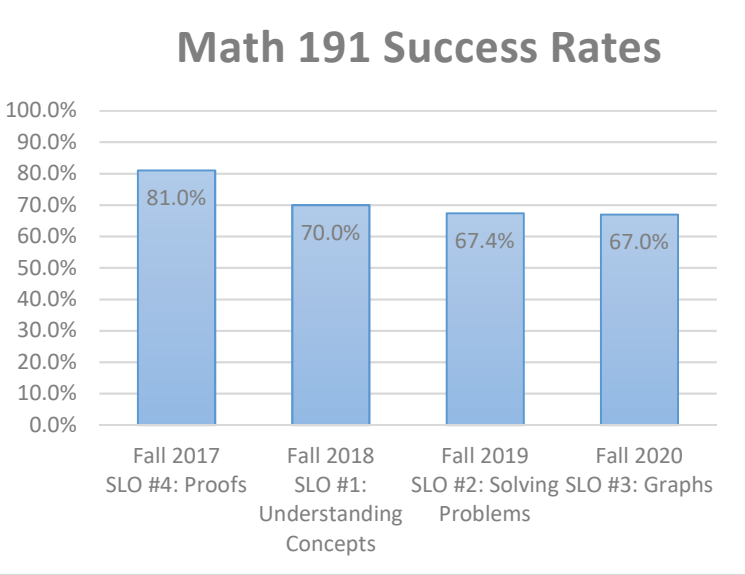


Looking closer at our entry level classes in the STEM sequence, we observed success rates on the SLO assessments reaching into the mid-60%s to below 50%. As aforementioned, it is difficult to compare the Fall 2020 data to any of the previous semesters due to the uniqueness of the situation.

The SLO success rates tend to fall in the mid-upper 60%s in Math 170/180 – forming a crucial foundation for the calculus sequence. We emphasize in depth understanding of trigonometric functions, identities, the basic families of functions, function domains, ranges, equations, and the beginnings of abstract proof with mathematical induction. Concepts such as the conic sections and partial fractions are challenging for the entry level STEM student but serve as an essential foundation of the calculus sequence. With the onset of the AB705, we continue to explore ways to bolster success rates in our foundational Math 170/180 courses.

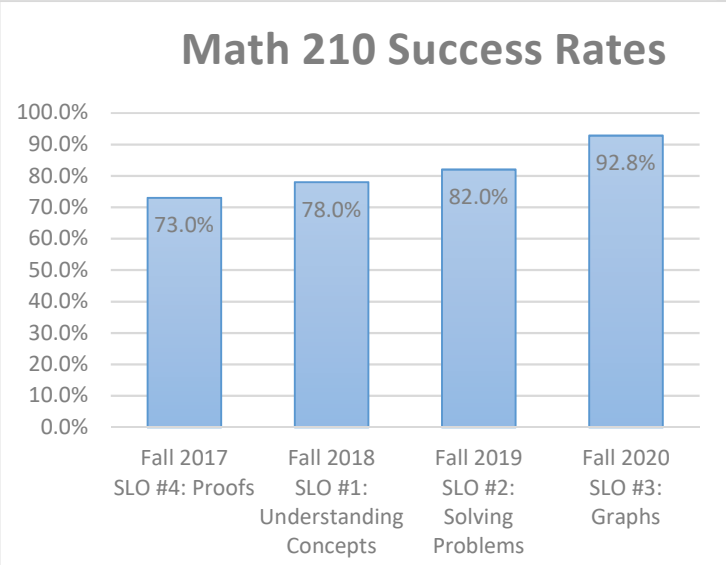
Examining the specific skills for each SLO, Proofs and constructing graphs show high need for improvement. This is to be expected as the concept of generalizing results is a challenging task for students at the start of their STEM mathematics journey. Mathematics relies on an interaction of understanding of computational, conceptual and visual interpretations. We continue to explore ways to improve student understanding of graphical behavior including use of CAS and visualization software in the classroom.

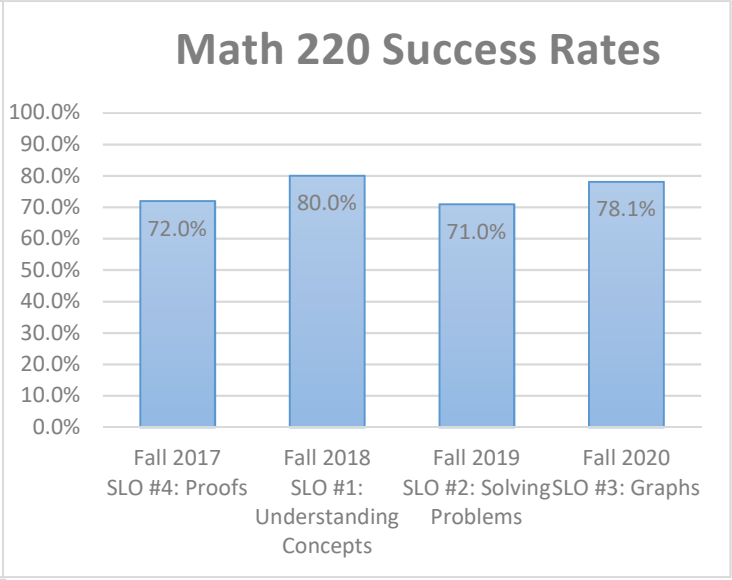


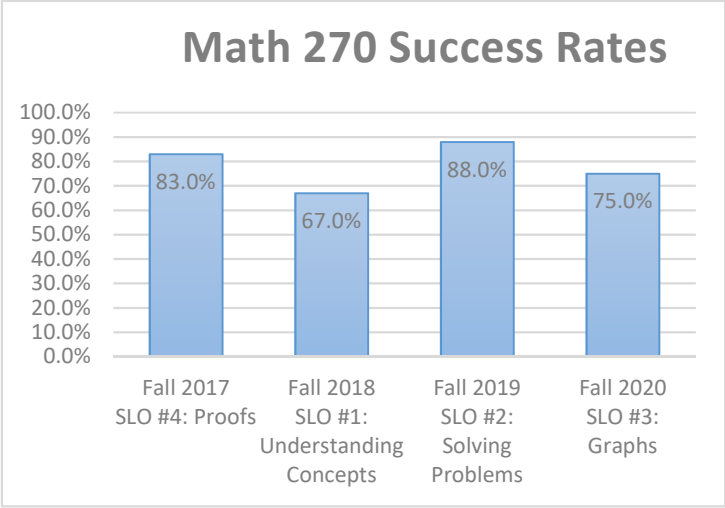


Seeing success rates in the high 60-70%s is expected for the first few courses in the calculus sequence. Students are beginning to learn mathematics on a deeper level. In Fall 2019, we assess student understanding of problem solving techniques looking at optimization problems, volume/surface area, and sequences and series. To prepare students sufficiently for 4-year STEM programs, instructors suggested continuing to challenge students and actively engage them in collaborative problem solving activities to bolster competency.

Breaking down performance in the individual SLOs for our core STEM calculus courses, we see a need to help students with problem solving techniques. This can range from topics such as differentiation and integration in the Math 190 course to integration techniques and applications such as volume and hydrostatic pressure in Math 191. A 57% success rate in Math 190 could be an effect of the AB 705 measure as we are finding more and more students without foundational skills enrolled in the course. This has become an evolving issue that we hope to address in the near future. Performance in abstraction / proofs seems more consistent which is promising and conceptual understanding sitting at the 70% mark is about where we expect it to be.



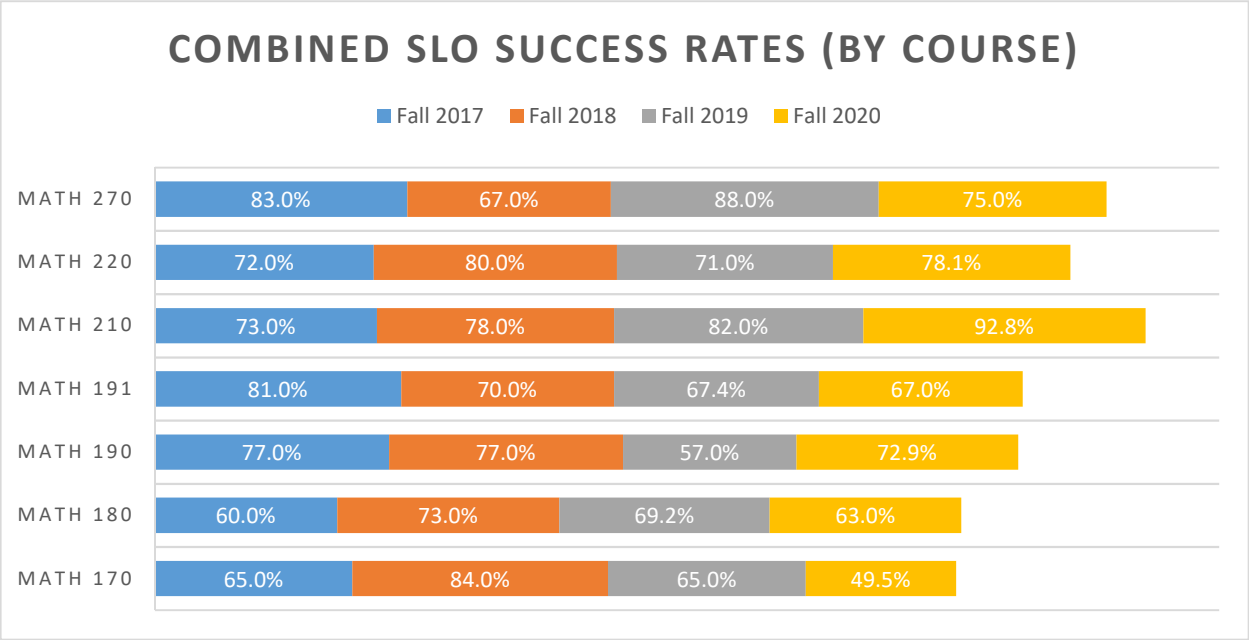




Taking a closer look at the Discrete Math, Multivariate Calculus and Differential Equations/Linear Algebra data, we see similar success rates. However, some trends depend on the topics assessed. Discrete mathematics trains students to think abstractly and focuses on a lot of proof techniques (success rate on proofs 73%) with higher success rate on graphical problem solving. Success rates continue to hover between 75% and 80% in our Multivariate Calculus and Differential Equation/Linear Algebra courses. We still hope to possibly split the 270 course into separate Differential Equations and Linear Algebra courses so we may further explore the topics deeper in the curriculum.

Taking these observations into account, we think about ways to bolster success rates in the SLO/PLO assessments in our program. Instructors continue to emphasize the importance of tutoring services and technology available on campus for students and instructors.

b) Highlight equity gaps found in SLO and PLO assessment results among different groups of students.



Without any substantial data comparing SLO and PLO assessments among different groups of students, we can still look course by course and compare a combined success rate over the past four years to highlight potential equity related issues worth addressing. In particular, we still see a clear lower success rate in the foundational Math 170 and 180 courses. This trend is to be expected and we hope to look closer at data separating the Math 170S and 180S courses versus the standard course offerings. Without the foundational intermediate algebra coursework required to take transfer level math (required prior to AB705), instructors continue to grapple with the need to bring students lacking in their foundational math up to speed for placement into transfer level STEM mathematics coursework.

Students without substantial high school preparation in mathematics may find themselves in more need of campus support services such as counseling, the Math Study Center and instructor office hours. To address this, faculty should continue to emphasize the need for communicating information about these support services to students. We believe the pandemic and coming to college for the first time created a uniquely challenging environment for new students. As a division, we will continue to communicate the availability of these free services to students to help close achievement gaps.

SECTION 3
Program Vision and Future Planning

Program Vision

A) Describe the vision of the program for the next four years considering the assessment reported in the previous section, student groups that are underrepresented in the program's field, and any relevant changes within the program field/industry. A vision statement describes the desired future state of the program.

In 2011, the U.S. Department of Commerce's Economics and Statistics Administration released an article entitled *STEM: Good Jobs Now and For the Future*, detailing the state of STEM jobs over the first decade of the 21st century. In it, they found that the "growth in STEM jobs was three times as fast as growth in non-STEM jobs." In terms of earnings, "STEM workers command higher wages, earning 26 percent more than their non-STEM counterparts." Interestingly, they found that having a degree in a STEM field led to increased wages "regardless of whether they work in STEM or non-STEM occupations".

The common thread is that a STEM education, which comes in part from classes such as those present in CM1, leads to increased job opportunities and higher wages *even for those who choose not to pursue a career in a STEM field*. In turn, the demand for a quality STEM education is likely to be on the rise. The skills gained in taking and succeeding, for example, in higher level math courses permeates other areas that are vital to future success, such as critical thinking and problem solving.

As mathematics instructors, we play a vital role in assuring that the students that we educate receive quality instruction that will not only prepare them for future math courses, but for other fields of education, STEM-related or otherwise. With the ever-changing landscape in regard to technology, non-traditional teaching strategies, and student needs, we as instructors at the community college level need to look ahead and be prepared to best serve our population of students and guide them toward future success in life.

The 2020 Federal STEM Education Strategic Plan of the US Office of Science and Technology Policy focuses on these three overarching goals:
1) **Build Strong Foundations for STEM Literacy** by ensuring that every American has the opportunity to master basic STEM concepts and to become digitally literate.
2) **Increase Diversity, Equity, and Inclusion in STEM** and provide all Americans with lifelong access to high-quality STEM education, especially those historically underserved and underrepresented in STEM fields and employment.

3) **Prepare the STEM Workforce for the Future** – both college-educated STEM practitioners and those working in skilled trades that do not require a four-year degree – by creating authentic learning experiences that encourage and prepare learners to pursue STEM careers.

We believe that the courses that comprise the CM1 program address these issues very well. Student Learning Outcomes (SLO) provide an assessment tool for understanding student learning and teaching methods can be fine-tuned in response to the results. As mentioned earlier, a STEM education broadens the horizons for students, for whichever career they may choose to pursue. Technology is used in many of the CM1 courses, be it graphing calculators or even software packages such as *Mathematica*. These resources are made available to students and allow everyone to learn on equal footing, regardless of other factors such as socioeconomic status. We will continue to explore new ways to incorporate all of these ideas so as to help increase student learning and success.

The primary vision of the CM1 Program is to provide the community with a comprehensive and dynamic mathematics curriculum that will not only strengthen the math skills of our students, but will also bolster their efforts in all STEM courses. This will lead to higher success rates, graduation rates, and transfer rates. We must strive to be a department that will attract students from near or far. The local area population is aging and there are expected to be fewer school-aged children in future. CM1 will respond to this vision by maintaining our high standards, by continuously reviewing our curriculum, and by keeping up with educational trends both at local colleges and nationally.

Our vision is a teaching environment that encourages faculty and students to share ideas and explore. Some teachers do this by offering student projects that go beyond course content and allow interested students to learn more than what is in the course outline. The use of *Mathematica* for projects, for example, allows students the opportunity to investigate mathematical concepts on their own. This also has the added benefit of introducing students to basic computer programming, which may aid them in future courses or introduce them to related fields such as computer science that they may have not considered studying before. Encouraging faculty to share their ideas, student projects, or teaching ideas at Brown Bags, which are talks given by faculty to their peers during the college hour, would foster a more stimulating educational atmosphere.

Our vision is that more students get involved in national math associations such as the Mathematics Association of America (MAA) or AMATYC. One way to do this is for math faculty to encourage greater participation in and better preparation for the AMATYC Math Competition. Since such competitions deal largely in problem solving and critical thinking skills, participating in them can foster an interest in math that students may not have found in merely experiencing math in a classroom setting.

Future Planning

GOALS

1) **Increase student preparedness for STEM calculus classes**

Project #1: Create a Summer/Winter Academy prep course for Math 190/191
Project #2: Reorganize the Math 170/180 (Trig/Precalculus) Curriculum
Project #3: Explore adding an additional unit to the Math 170S and/or 180S courses.

2) **Increase student success and retention and close equity gaps in STEM calculus classes**

Project #1: Create Interactive Calculus Modules that can be used on a Just-In-Time basis assigned by instructors or accessed by students in need of help.
Project #2: Expand Math Study Center services, such as longer hours and online access.
Project #3: Increase MESA funding and fund a MESA Program Advisor to help students.
Project #4: Increase the funding and use of Supplemental Instruction (SI) in CM1 courses.

3) **Increase student access to CM1 courses.**

Project #1: Offer at least one online or hybrid version of each CM1 course each Spring and Fall semester.
Project #2: Explore ways to promote and insure student integrity online.
Project #3: Explore OER (Open Education Resources) available for each course and make students and instructors aware of what is available.
Project #4: Explore the efficacy of creating a Math 190S support course.
Project #5: Revisit the idea of splitting Math 270 into two courses, allowing students more flexibility and transferability when they take courses beyond Math 191.

4) **Increase the number of students who get the Math A.S. degree or a related STEM degree.**

Project #1: Create a flyer each year to remind students to get their A.S. degree even if they are transferring.
Project #2: Increase funding for math brown bags or outside speakers on topics that will invigorate student interest in math.
Project #3: Help to increase awareness of the STEM Guided Pathways program.

5) **Increase student participation in departmental extracurricular activities.**

Project #1: Increase funding for math brown bags or outside speakers on topics such as NASA or SPACE-X.
Project #2: Increase participation in the AMATYC math contest and other math related clubs.
Project #3: Create a STEM week program with possible contests and speakers and student projects.

When the next program review is due, how will the program determine if the goals have been met? Please specify at least one quantitative target or qualitative accomplishment for each goal.

We will hopefully establish a more reliable baseline in 2022/2023 of success and retention and degree rates. We will compare these to the rates in 2024/2025 before the next program review and hope to see at least 20% improvement in all measures.

Program Resources

a) Staffing

We compared the number of sections taught by full time and part time faculty. The staffing data is obtained from published schedules of classes and should therefore be considered approximate since changes to the official schedule are often made after the publication of the schedule. See table on next page.

College Level Mathematics Program

	M170/S		M180/S		M190		M191		M210		M220		M270		Total
	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	FT	PT	Sections
Summer-16	4	3	3	2	4	1	4	0	0	0	2	0	0	0	**23**
Fall-16	6	4	7	4	8	2	6	1	2	0	4	0	3	0	**47**
Winter-17	0	3	2	1	2	1	2	0	0	0	0	0	0	0	**11**
Spring-17	9	3	10	0	9	2	6	1	2	0	3	2	4	0	**51**
Summer-17	4	1	2	2	3	2	4	0	0	0	3	0	1	0	**22**
Fall-17	8	4	8.5	2.5	9	2	7	0	2	0	3	1	2	1	**50**
Winter-18	2	2	1	2	1	2	1	1	0	0	0	0	0	0	**12**
Spring-18	7	4	9	2	8	2	6	1	1	1	4	1	3	1	**50**
Summer-18	2	3	3	1	3	2	3	1	0	0	2	0	1	0	**21**
Fall-18	6	7	10	2	10	3	7	0	1	1	3	1	2	1	**54**
Winter-19	1	3	3	0	2	1	2	0	0	0	0	0	0	0	**12**
Spring-19	6	6	11	2	8	1	9	0	2	0	4	1	4	0	**54**
Summer-19	3	2	3	1	5	0	4	0	0	0	2	0	0	1	**21**
Fall-19	5 6	4 5	7 1	5 1	12	4	8	0	2	0	4	1	3	0	**55** **13**
Winter-20	3 1	0 0	2 0	0 0	3	1	3	0	0	0	1	0	0	0	**14** **1**
Spring-20	7 4	0 1	11 3	0 0	8	1	8	1	2	0	5	0	4	0	**47** **8**
Summer-20	2 0	1 2	3 1	0 0	5	1	6	0	0	0	3	0	2	0	**23** **3**
Fall-20	2 6	2 2	7 3	0 2	19	0	8	0	2	0	4	1	2	1	**48** **13**
Winter-21	3 1	0 0	2 1	0 0	3	1	3	0	0	0	1	0	0	0	**13** **2**
Spring-21	7 4	0 1	11 2	0 1	8	1	8	1	2	0	5	0	4	0	**47** **8**
Summer-21	1 1	1 1	1 1	0 1	5	0	4	0	1	0	3	0	2	0	**18** **4**
Fall-21	0 6	4 3	7 4	2 0	17	1	8	0	2	0	4	0	3	0	**48** **13**
Winter-22	1 2	0 0	2 1	0 0	3	0	3	1	0	0	1	0	0	0	**11** **3**
Full Time/ Part Time	**120**	**72**	**142.5**	**33.5**	**155**	**31**	**120**	**8**	**21**	**2**	**61**	**8**	**40**	**5**	**819**
Course Totals	**192**		**176**		**186**		**128**		**23**		**69**		**45**		
% FT	**62.5**		**81.0**		**83.3**		**93.8**		**91.3**		**88.4**		**88.9**		**80.5**

The number of sections offered by the College Level Mathematics Program is up 46% from 2016 to 2021, and the ratio of full-time to part-time faculty meets California Community College requirements.

Given the uncertainty about enrollment in math courses we recommend that no full-time math faculty hiring be done in the near future. Despite an increase in the number of sections, the fill-rates have been lower, so enrollment is tough to predict in the near future. We have no staffing recommendations.

b) Facilities and Equipment

The current Mathematics Department consists of 35 full-time mathematics faculty members and 64 part-time instructors, and has 25 classrooms and 3 laptop computer labs available to use per semester. In the MBA building, 24 offices are designated for full-time faculty, 7 additional offices for part-time faculty, and 2 faculty workrooms. Each workroom is equipped with 3 computers, 2 printers, and only two scanners are available for 116 instructors to use.

During the Pandemic the CM1 faculty relied on technology more than ever. Even with the return to the classroom we anticipate a greater reliance on technology than we had before the Pandemic. Faculty laptops should be updated on more regular basis, because most courses will be on Canvas, regardless of modality, and there will likely be a permanent online presence for each of our course offerings.

We recommend that several large magnetic whiteboards (8 ft. by 4 ft.) be installed in each of the hallways of the MBA building. These whiteboards would be placed in the middle of the hallway facing each other. The large boards can be designated as a place where important math department/college announcements for the day or week will be posted, as well as the place where the students are able to work on mathematics before and after class.

Each of the two math faculty workrooms is equipped with only three computers and two printers, but unfortunately, the printers keep getting jammed and become inoperable. It is highly recommended that a better HP printer be added in each of the workrooms.

It is imperative to update our scanners. Scanners offer various uses such as being able to email the students the answer key to exams/quizzes/projects and other assignments, sending notes to students who are absent, or scanning students' exams for record keeping.

Moreover, the mathematics faculty greatly recommends that a copy machine be available in the workrooms of the second and third floor since the copier in the Division Office often breaks down due to overuse. Faculty have shared their disillusionment when they have wanted to share great material with their students the next morning but were not able to do so since requesting copies of materials from the Copy Center requires a week turnaround. This creates additional stress on faculty members who want to improve student success. Also, most community colleges offer a more lenient copy quota in their math department and a faster turnaround time than ECC.

It is recommended that SMART boards be installed in some classrooms, as well as in the Mathematics Study Center. SMART boards will allow faculty and students to foster both collaboration and innovation. It is important for the students to keep up with the demands of today's world.

c) Technology/Software

Many math teachers integrate technology and software into their teaching. This includes the use of Excel, Mathematica, Texas Instruments graphing software, and Webassign/eBook/online homework. Consequently, all classrooms must have the appropriate technology equipment and software installed, but there is also a need for faculty to have such software installed on their computers. It will also be necessary to maintain and update this technology and software regularly. There are computer laptop carts available for our classrooms for individual student use, so a strong WiFi availability should be created and maintained.

Wolfram Mathematica (current version 11) is a robust computer algebra system enabling teachers and students to solve math problems and interactively explore math concepts using technology. While on campus, Mathematica is available for teachers in each math classroom and for students in the MBA computer lab and computer classrooms.

Priority List
1) Renew Mathematica license.
2) Purchase copy machine for each faculty workroom.
3) Replace faculty issued laptops every two years.
4) Place Whiteboards in hallways
5) Purchase new scanners for each faculty workroom.
6) Purchase and install SMART boards in some classrooms.

*** Below is the completion of the section from Section 1 ***

Program Overview - Part D

Discuss the status of recommendations from your previous program review.

If more than ten recommendations were presented in the previous program review, expand the enumerated list below as needed.

1. **Recommendation:** Hire five new faculty members over the next four years.
   Status: Abandoned
   Notes/Comments: Due to the drop in enrollment and uncertainty we don't recommend any new faculty hiring.

2. **Recommendation:** Increase the number of Math 80 sections
   Status: Forbidden
   Notes/Comments: The state forbids us from offering this essential and foundational STEM course.

3. **Recommendation:** Increase the CM1 evening program
   Status: Active
   Notes/Comments: This is in flux due to unpredictable enrollment.

4. **Recommendation:** Hire a full-time Tutoring Coordinator for the Math Study Center
   Status: Active
   Notes/Comments: There is an ongoing discussion about how to classify this position.

5. **Recommendation:** Funds for tutor training
   Status: Active
   Notes/Comments: Funding should be allocated each year for this.

6. **Recommendation:** Winter Schedule increase from 23 days to six weeks
   Status: On Hold
   Notes/Comments: We are reassessing all aspects of scheduling due to AB 705 and the lingering effects of the lockdowns.

7. **Recommendation:** Increase SI (supplemental instruction support) for Math 170 and 180
   Status: Active
   Notes/Comments: This is a successful program that should be extended to other STEM math courses.

8. **Recommendation:** Purchase four document scanners for the faculty workrooms.
   Status: Partially completed – we got two
   Notes/Comments: We recommend that we get two more.

9. **Recommendation:** Purchase two new HP printers for the faculty workrooms.
   Status: Active
   Notes/Comments: We still recommend this.

10. **Recommendation:** Purchase five backup document cameras
    Status: Active
    Notes/Comments: We still recommend this.

11. **Recommendation:** Purchase two copying machines for faculty workrooms.
    Status: Active
    Notes/Comments: We still recommend this.

12. **Recommendation:** Reduce the turnaround time for documents submitted to the Campus Copy Center from 1 week to 1 day
    Status: Active
    Notes/Comments: We still recommend this.

13. **Recommendation:** Additional computer labs and stations for STEM students
    Status: Abandoned
    Notes/Comments: Laptop carts were purchased that can be used for this purpose.

14. **Recommendation:** Increase the number of sections of all CM1 courses.
    Status: Abandoned
    Notes/Comments: Due to enrollment issues we withdraw this for now.

15. **Recommendation:** Renew Mathematica license each year.
    Status: Active
    Notes/Comments: We still recommend this.

16. **Recommendation:** Renew Scientific Notebook license each year.
    Status: Active
    Notes/Comments: We still recommend this.

17. **Recommendation:** Increase funding for MESA.
    Status: Active
    Notes/Comments: We still recommend this.

18. **Recommendation:** Move Math 80 (Intermediate Algebra) to CM1
    Status: Abandoned
    Notes/Comments: With AB-705 this is no longer relevant.

19. **Recommendation:** Increase units for Math 170 (Trigonometry) from 3 to 4.
    Status: Active
    Notes/Comments: We may still pursue this.

20. **Recommendation:** Increase the offerings of Math 210
    Status: Completed

Notes/Comments: Two sections in Fall and two sections in Spring is sufficient now.

21. **Recommendation:** Funding for student math clubs
    Status: Active
    Notes/Comments: We still recommend this. As we return to campus we will revisit this.

22. **Recommendation:** Increase the salary of tutors in the Math Study Center
    Status: Active
    Notes/Comments: We still recommend this.

23. **Recommendation:** Increase Math 210 from four to five units.
    Status: Completed.
    Notes/Comments: The course now articulates and meets the CI-D requirements.

24. **Recommendation:** Faculty should be given access to student plan data for planning purposes.
    Status: Active
    Notes/Comments: We still recommend this.

25. **Recommendation:** Conduct two part-time hiring panels each year
    Status: Abandoned
    Notes/Comments: We no longer recommend this due to enrollment declines and AB 705 eliminating our basic skills classes.

26. **Recommendation:** Allocate more MBA building classroom to the Math Division.
    Status: Abandoned.
    Notes/Comments: We no longer recommend this due to enrollment declines an AB 705 eliminating our basic skills classes.

27. **Recommendation:** Place more tables and chairs for students in common areas.
    Status: Active
    Notes/Comments: We still recommend this.

28. **Recommendation:** Install white boards in hallways for student and tutoring use.
    Status: Active
    Notes/Comments: We still recommend this.

29. **Recommendation:** Increase faculty participation in SLOs
    Status: Active.
    Notes/Comments: This is ongoing.

30. **Recommendation:** Allocate money for faculty training, such as for Mathematica.
    Status: Active
    Notes/Comments: We still recommend this.

31. **Recommendation:** Install SMART boards in some classrooms.
    Status: Active

Notes/Comments: We still recommend this.

32. **Recommendation:** Replace faculty laptops every three years.
Status: Active
Notes/Comments: We still recommend this.

33. **Recommendation:** Provide funds or flex time for AMATYC math contest trainers.
Status: Active
Notes/Comments: The contest was cancelled due to the lockdowns, but it will be back in the Fall 2022 semester. So, we still recommend this.