# 2023 INSTRUCTIONAL ANNUAL PROGRAM PLANNING WORKSHEET

**CURRENT YEAR: 2023** **PROGRAM: MATHEMATICS**
**CLUSTER: STEM** **LAST YEAR CPPR COMPLETED: 2022**
**NEXT SCHEDULED CPPR: 2027** **CURRENT DATE: 2/3/2023**

The Annual Program Planning Worksheet (APPW) is the process for:

- reviewing, analyzing and assessing programs on an annual basis
- documenting relevant program changes, trends, and plans for the upcoming year
- identifying program needs, if any, that will become part of the program's Resource Plan (download from this folder) (Please review the Resource Allocation Rubric when preparing the resource plan)
- highlighting specific program accomplishments and updates since last year's APPW
- tracking progress on a Program Sustainability Plan if established previously

**Note**: Degrees and/or certificates for the ***same*** program ***may be consolidated*** into one APPW.

This APPW encompasses the following degrees and/or certificates:

**A.S.T. Mathematics**

## GENERAL PROGRAM UPDATE

Describe significant changes, if any, to program mission, purpose or direction. *If there are not any, indicate: NONE.*

The mission, purpose and direction of the Mathematics Division has not yet significantly changed since the previous evaluation cycle as the division is still committed to providing exceptional mathematics instruction to support a diverse student population in pursuit of their individual educational goals. For students who feel they need to develop their foundational algebra skills, for example, the division has been offering courses such as Intermediate Algebra and Applied Beginning and Intermediate Algebra. However, with the passage of AB1705 in the summer of 2022, the division will no longer be permitted to teach these courses after the Spring 2023 semester. The Mathematics Division, moving forward, will remain committed to providing exceptional mathematics instruction to a diverse student population, so long as the individual student's educational goals conform to the restrictions imposed by the state legislature. Since the State of California has made it illegal to teach pre-transfer level mathematics courses at community colleges within the state, the Mathematics Division will reluctantly remove these courses from the class schedule beginning in the Summer of 2023.

The Division will continue to teach a variety of transfer level courses including College Algebra,

Business Calculus, Intro to Statistics, Math for the Humanities, and Math for Elementary School Teachers. In the Fall of 2023, the Mathematics Division will introduce a newly developed course, Math 227: College Mathematics for Technical Fields. This course was developed in conjunction with divisions such as Nursing and Allied Health, and those leading CTE programs, to teach students the mathematical concepts required to be successful in those programs; concepts that will no longer be covered once algebra courses are outlawed in the state.

In addition to these courses, the Mathematics Division will continue to provide exceptional instruction in the sequence of STEM math courses including Precalculus, Trigonometry, Calculus I, Calculus II, Calculus III, and Differential Equations and Linear Algebra. It should be noted that AB1705 also includes vague language that may limit the division's ability to teach precalculus and trigonometry in the future. In fact, the bill could make it illegal to inform students that precalculus and trigonometry will help them be successful in calculus beginning in July of 2025.

## PROGRAM SUSTAINABILITY PLAN UPDATE

Was a Program Sustainability Plan established in your program's most recent Comprehensive Program Plan and Review?

Yes ☐ If yes, please complete the Program Sustainability Plan Progress Report below.
No ☒ If no, you do not need to complete a Progress Report.

If you selected yes, please complete the Program Sustainability Plan Progress Report below after you complete the Data Analysis section. That data collection and analysis will help you to update, if necessary, your Program Sustainability Plan.

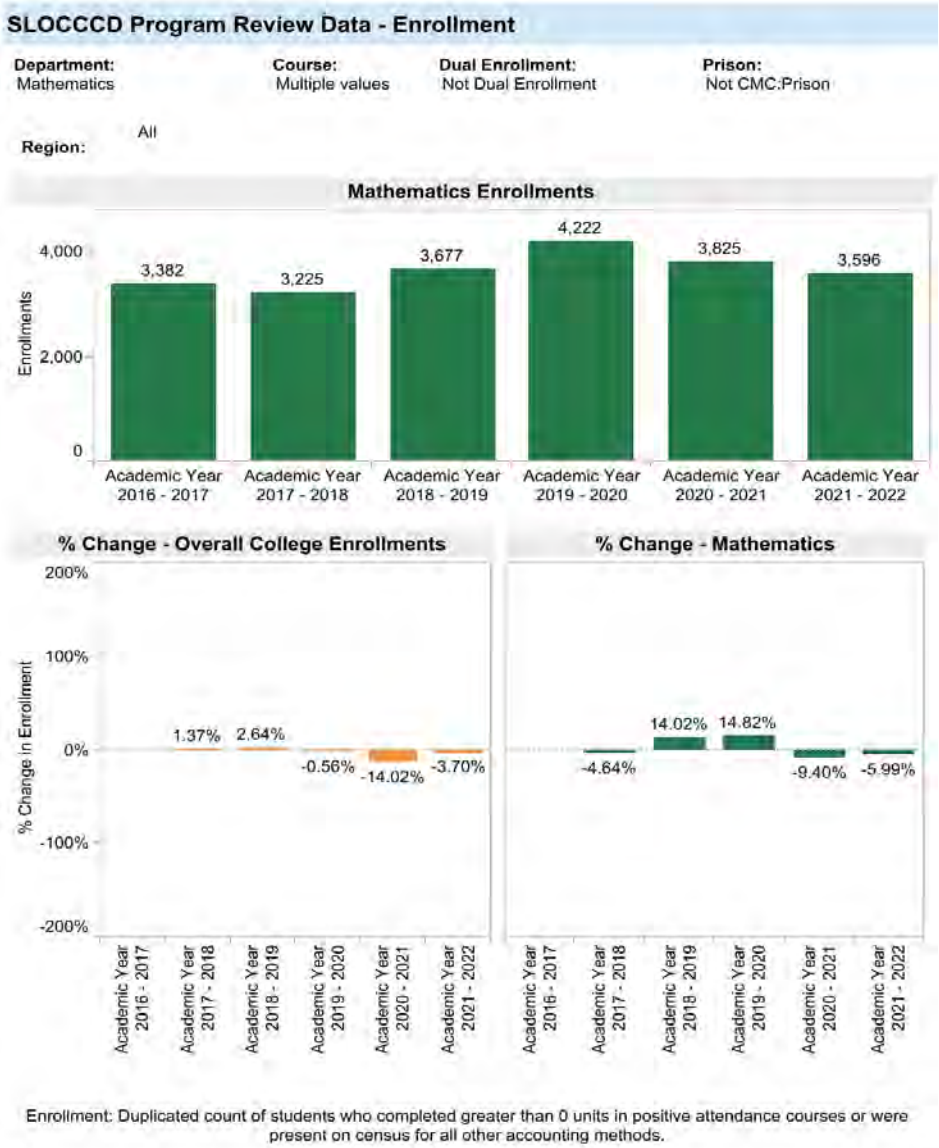
## DATA ANALYSIS AND PROGRAM-SPECIFIC MEASUREMENTS

Your responses to the prompts for the data elements below should be for the entire program. If this APPW is for multiple degrees and/or certificates, then you MAY want to comment on each degree and/or certificate or discuss them holistically for the entire program being sure to highlight relevant trends for particular degrees and/or certificates if necessary. Responses in this document need only reference the most recent year's available data.

A. General Enrollment (Insert Aggregated Data Chart)
   Insert the data chart and explain observed differences between the program and the college.

## Math Enrollment (Excluding CMC and Dual Enrollment for all Data)


## Transfer Level Math Enrollment




The previous two tables showing first, the significant decline in Math Enrollment overall, then the increase in Transfer Level Math Enrollment, particularly in the 2019-2020 academic year, are a good summary of the impacts of AB705. Taken with the table below that shows the dramatic decrease in Pre-Transfer Level Math Enrollment, we can see that AB705 was successful in getting students to enroll directly into transfer level courses. Certainly, the spike in transfer level enrollment in 2019-2020 can be attributed to students being given the opportunity to choose to enroll in transfer level math without pre-requisites. It should be noted that the Cuesta College Mathematics Division supported this opportunity for our students, and worked very hard to help students who might be underprepared for transfer level math to still be successful in these courses.

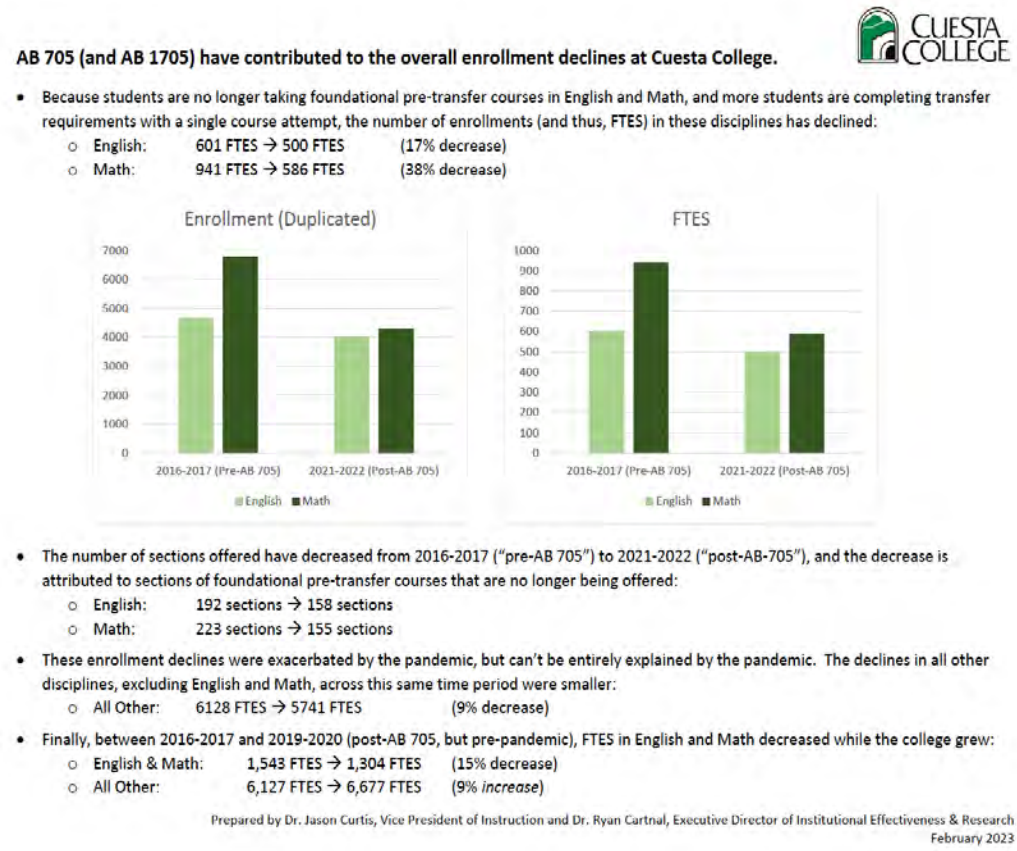
With the implementation of AB1705 in the summer of 2023, all pre-transfer level courses will be eliminated from the schedule, which will continue to reduce overall math enrollment.

## Pre-Transfer Level Math Enrollment (Math 003, 007, 123, 127, 128)


Through 2017 students were still placing into pre-transfer level classes based on multiple measures and an assessment test. In Fall 2018, MMAP placed more students at higher levels of math using their high school grades and coursework, so we started to see a drop, but the implementation of AB705 in Fall 2019 significantly reduced the number of students taking pre-transfer level math. Incoming students were able to enroll directly in transfer level courses. Over the last two years, as our messaging to students improved, we continued to see a decrease in pre-transfer enrollment. With the passage of AB1705 we eliminated all pre-transfer

classes except for Math 127 and 128, the Intermediate Algebra level classes, and will eliminate those offerings next year.

The students who currently choose to enroll in Intermediate Algebra are primarily those completing a requirement for Nursing and other CTE certificates and programs. About 10% are high school students trying to either get ahead so they can take AP Calculus or are making up a class, and there are students who want more preparation for a college or precalculus algebra class either because they don't feel confident to start at that level or because they tried and were unsuccessful. We also have returning students who want to start at Beginning or Intermediate Algebra and possibly go on to take more advanced classes for their own personal goals.



**AB 705 (and AB 1705) have contributed to the overall enrollment declines at Cuesta College.**

- Because students are no longer taking foundational pre-transfer courses in English and Math, and more students are completing transfer requirements with a single course attempt, the number of enrollments (and thus, FTES) in these disciplines has declined:
  - English: 601 FTES → 500 FTES (17% decrease)
  - Math: 941 FTES → 586 FTES (38% decrease)

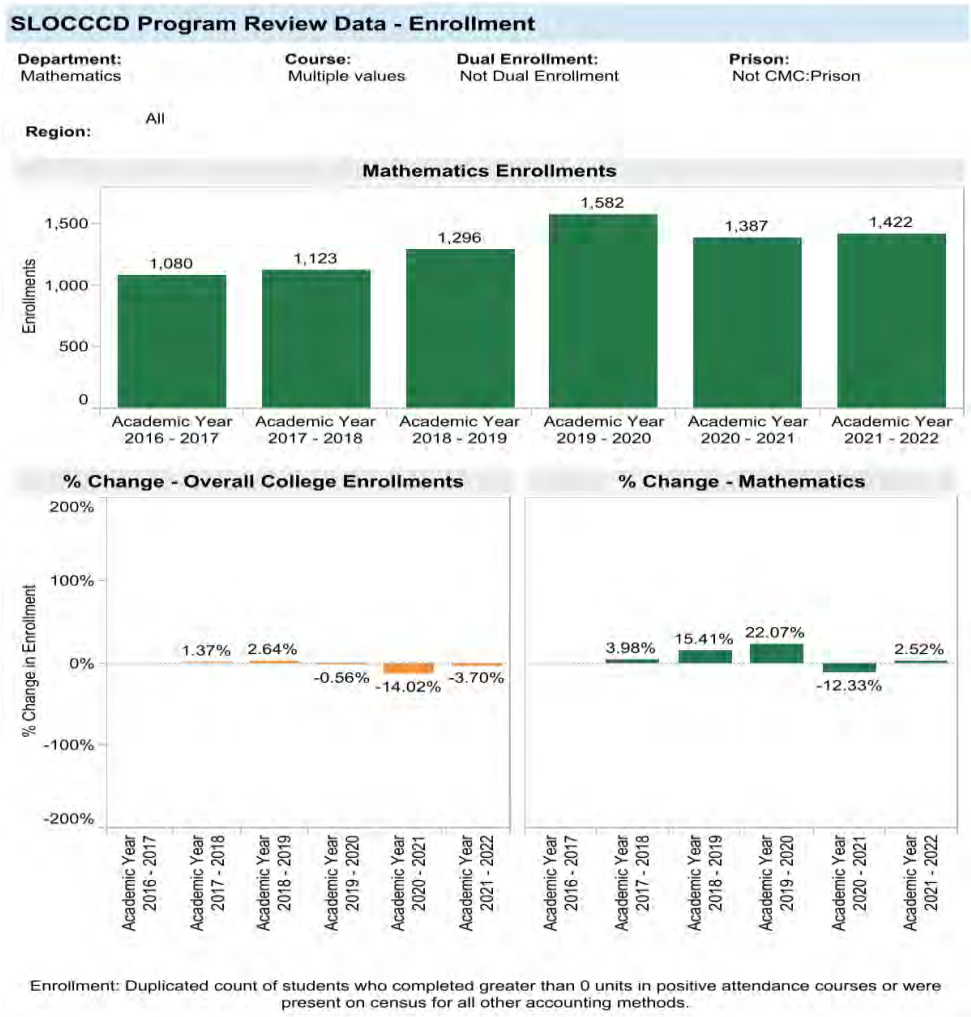


- The number of sections offered have decreased from 2016-2017 ("pre-AB 705") to 2021-2022 ("post-AB-705"), and the decrease is attributed to sections of foundational pre-transfer courses that are no longer being offered:
  - English: 192 sections → 158 sections
  - Math: 223 sections → 155 sections
- These enrollment declines were exacerbated by the pandemic, but can't be entirely explained by the pandemic. The declines in all other disciplines, excluding English and Math, across this same time period were smaller:
  - All Other: 6128 FTES → 5741 FTES (9% decrease)
- Finally, between 2016-2017 and 2019-2020 (post-AB 705, but pre-pandemic), FTES in English and Math decreased while the college grew:
  - English & Math: 1,543 FTES → 1,304 FTES (15% decrease)
  - All Other: 6,127 FTES → 6,677 FTES (9% *increase*)

Prepared by Dr. Jason Curtis, Vice President of Instruction and Dr. Ryan Cartnal, Executive Director of Institutional Effectiveness & Research
February 2023

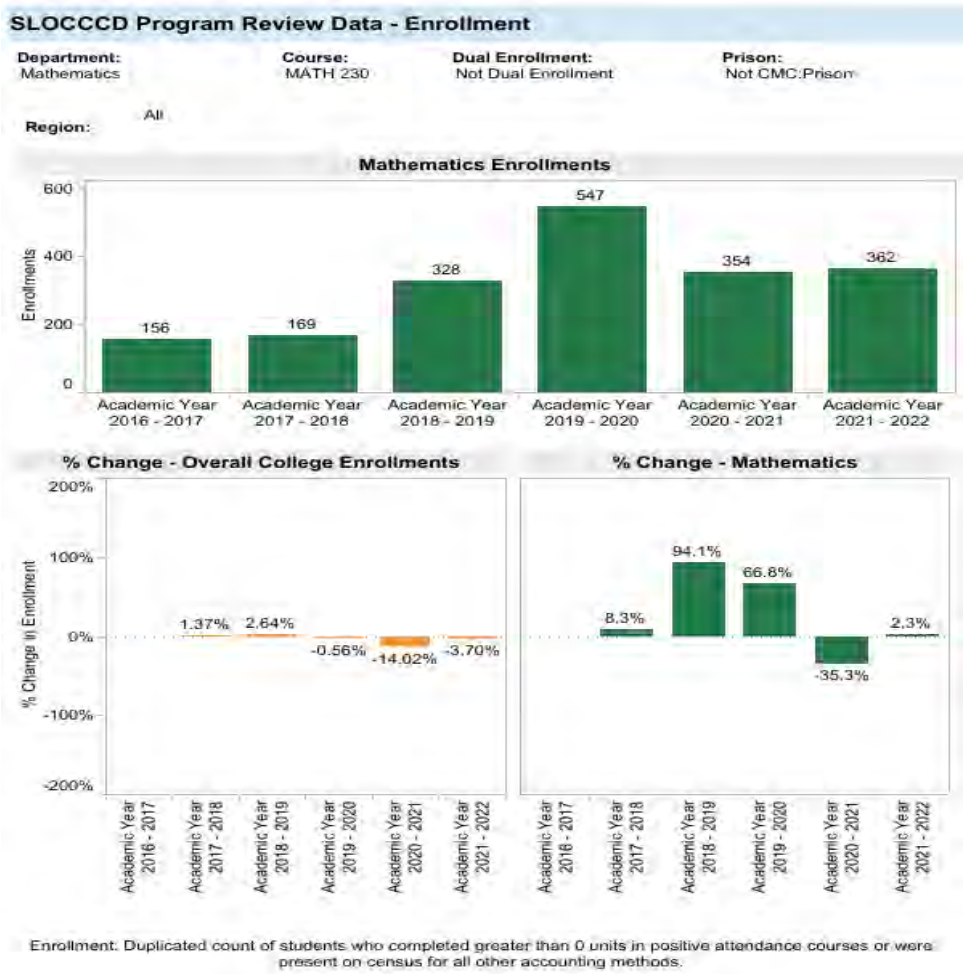
This information provided by Dr. Jason Curtis and Dr. Ryan Cartnal summarizes the impact AB 705 has had on FTES in both math and English, and subsequently, on the college as a whole.

## Statistics Enrollment (Math 247 and 236)




Math 247 saw a significant increase in enrollment in the 2019-20 academic year, after the passing of AB705, which allows all students to enter transfer-level math and English courses without satisfying the prerequisite courses. This one-year jump was likely due to a backlog of students who were working their way through the prerequisite courses suddenly being able to jump ahead and complete their transfer-level math courses. There has been a decline since the 2019-20 year, similar to the decline seen in total college enrollment, but enrollment remains higher than pre-AB705.

## Math for Humanities, Math 230




Math 230 hit a peak in 2019-2020. This was because AB705 allowed open enrollment starting in Spring 2019. Math 230 doesn't require as strong of foundational math skills as some other transfer level math courses, so there was a significant spike in enrollment. Additionally, some associate degrees that previously utilized Math 123 or Math 127 changed the math requirement to Math 230. In 2020-2021 there was a decline in Math 230 enrollment based on several factors. In Fall 2020, many popular non-STEM majors at Cal Poly were no longer required to take a second math class for admission. Due to the impact of Covid there was a significant decline in enrollment in the 2020-2021 for the entire college. Finally, if the spike in enrollment in 2019-2020 is discarded, the enrollment in Math 230 returned to pre-Covid levels. In 2021-2022, enrollment increased slightly in Math 230, even though enrollment decreased college wide. The enrollment numbers for Math 230 for 2020-2021 and 2021-2022 are still more than twice the numbers for any typical year before 2018-2019.

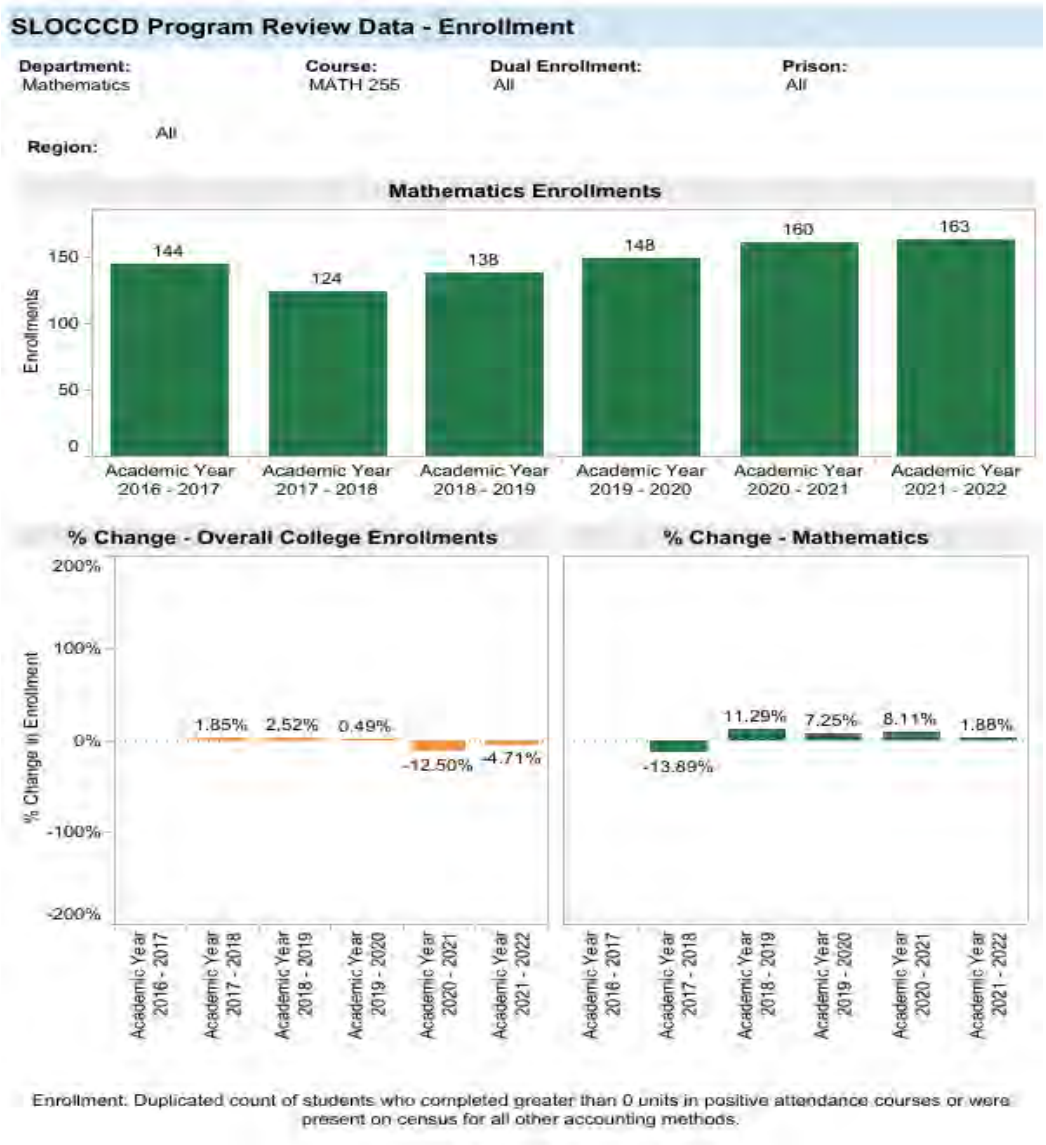
College Algebra, Math 232


Enrollment: Duplicated count of students who completed greater than 0 units in positive attendance courses or were present on census for all other accounting methods.

Although Math 232 experienced an increase in enrollment following its designation as a prerequisite for Math 255, the latest trends show the enrollment is now decreasing. In contrast, Math 255 has and is still experiencing an increase in enrollment. It is possible that more students are qualifying to go straight into Math 255, based on their high school course work. However, many Math 232 students continue to skip high-school algebra courses, such as Intermediate Algebra, and yet a growing proportion of these students have been successful in the course. Math 232 recently increased from three to four units to better accommodate these students with gaps in algebra. However, there are still some students with weak algebra backgrounds that drop the course before census

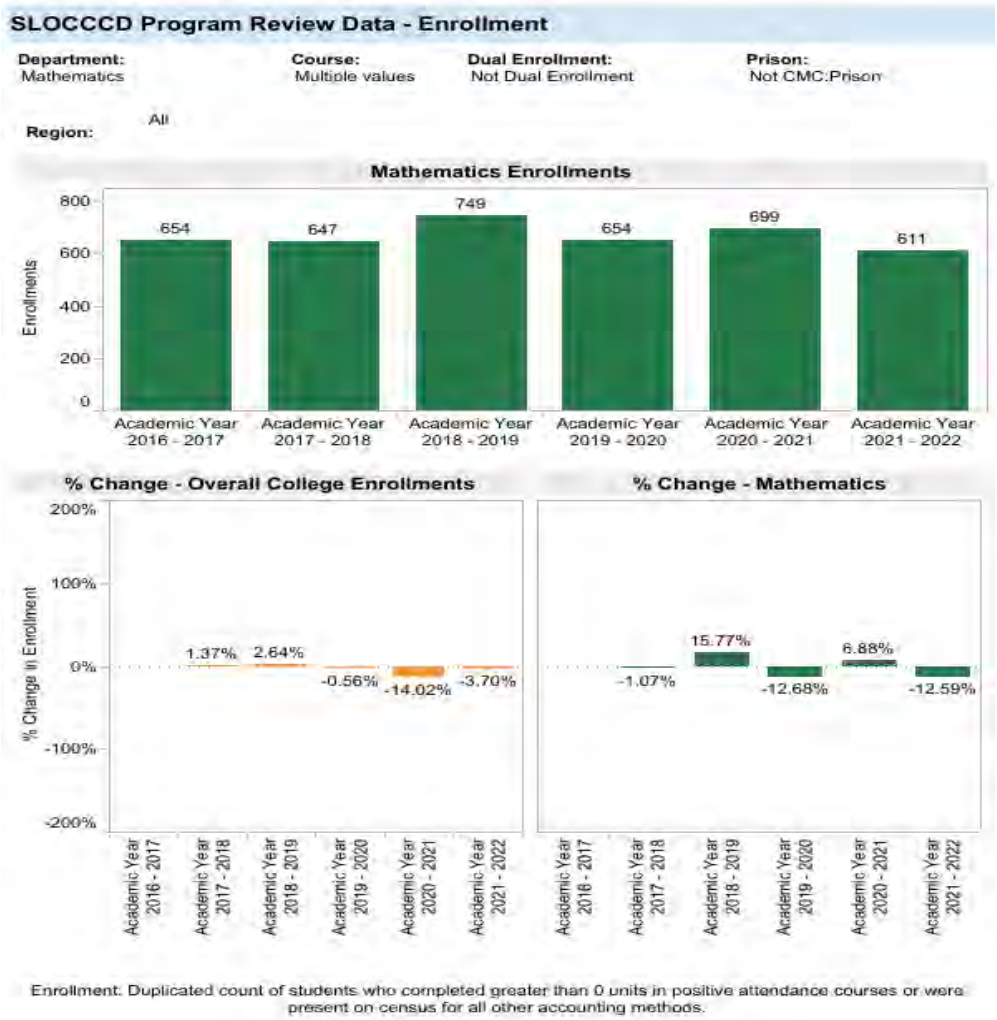
because they feel overwhelmed by the content and would rather take a lower-level course. Because lower-level courses have been significantly reduced, perhaps these underprepared students feel like they have no place to go and never resume their enrollment. As a result, there could be fewer students enrolling in Math 232.

## Business Calculus: Math 255



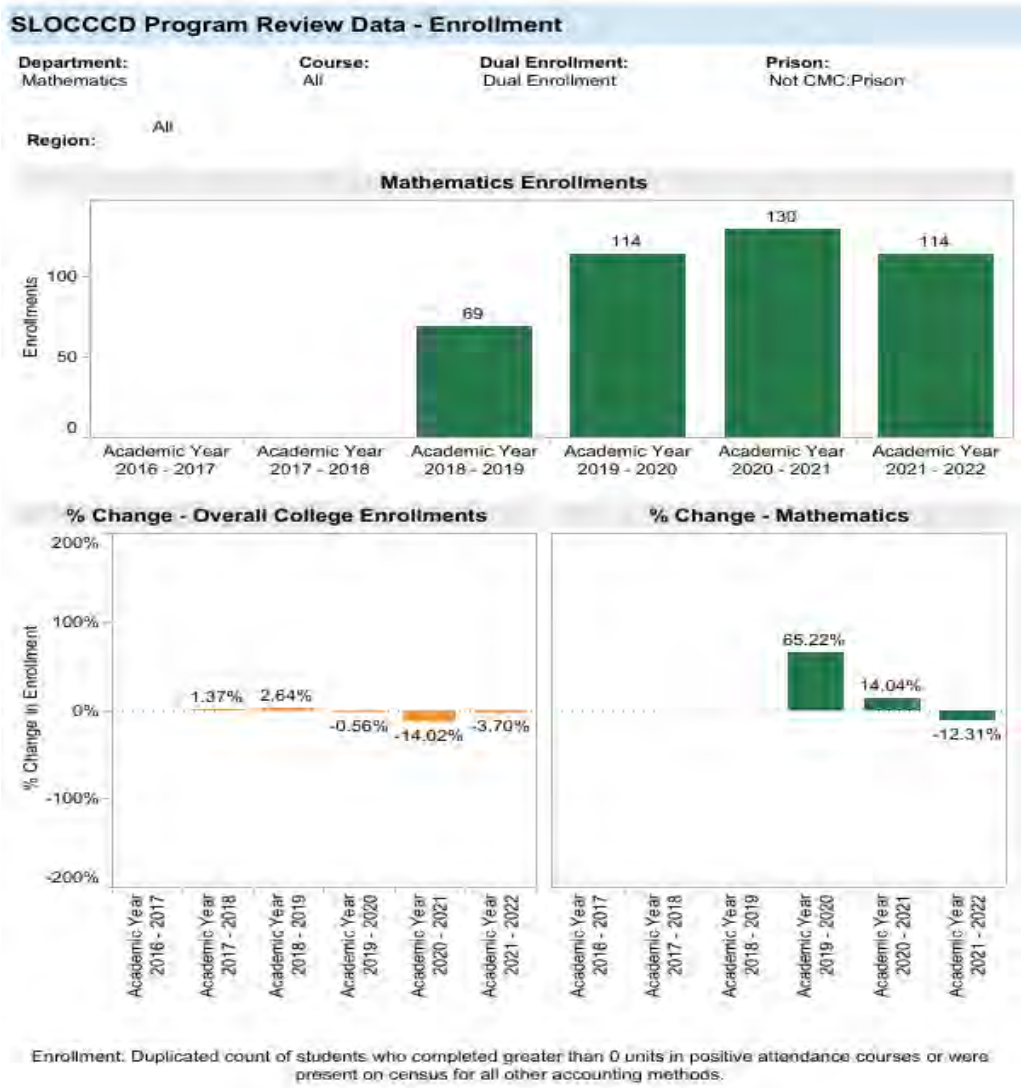

Despite the college wide decline in enrollment, Math 255 has had a steady increase in enrollment, which has allowed the Mathematics Division to increase the number of sections offered. Moving forward, the division will potentially offer a section on the North County Campus, to support an AS-T that can be obtained entirely on that campus.

## Calculus: Math 265A, 265B, 283, 287




The peak in 2018- 2019 in calculus enrollments was when MMAP was first implemented with no guidance about placement related to a student's major and so numerous students were taking calculus when it was not required for their major. Our guided self-placement tool was implemented Fall 2019 with AB705, and it made an impact in ensuring students were taking math courses that fit their intended educational goals. More recently, calculus enrollments have stabilized but show a slight downward trend. This trend mirrors what is happening with the enrollments in physics and engineering, the two programs that most correlate with calculus enrollments.

## Dual Enrollment



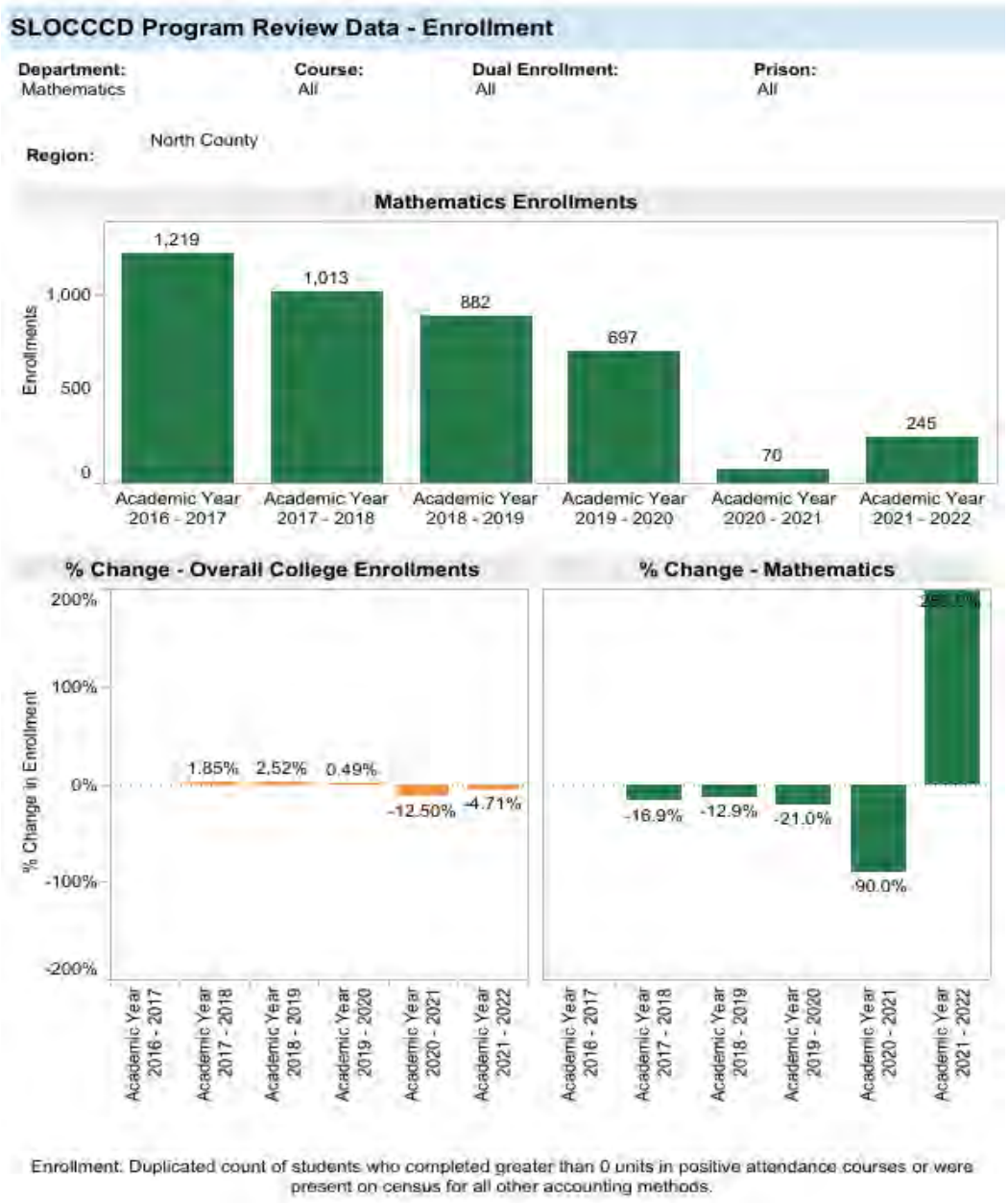

There was a significant increase in dual enrollment math courses from 2017-2018 to 2020-2021 due to the support of developing these courses within the division. The challenge with developing dual enrollment math courses has always been the requirement that high school instructors that teach dual enrollment classes must meet minimum qualifications, which very few high school instructors in the county meet. This also accounts for the decline in dual enrollment in 2021-2022, since the qualified instructor at Nipomo High School that was teaching dual enrollment math courses through Cuesta College moved on from that position.

The Math Division has recently been working on developing Cuesta-led Dual Enrollment courses with the support of Associate Director of Instruction; Dual Enrollment/CCAP, Kristina Vastine. Given that these courses do not require the high school instructor to meet minimum qualifications, there is significant potential for collaboration between the Cuesta College Math Division and local high school math instructors to develop these courses.

## CMC Enrollment


After the peak enrollment in 2020-2021, math enrollments at CMC declined in 2021-2022. This decline will likely continue since CMC is closing the West half of the facility, which will roughly cut the population of students in half. Mathew Green has indicated that we will only need one section of Math 247 per academic year and possibly 3 sections of Math 230 once CMC West is completely closed.

## North County Enrollment

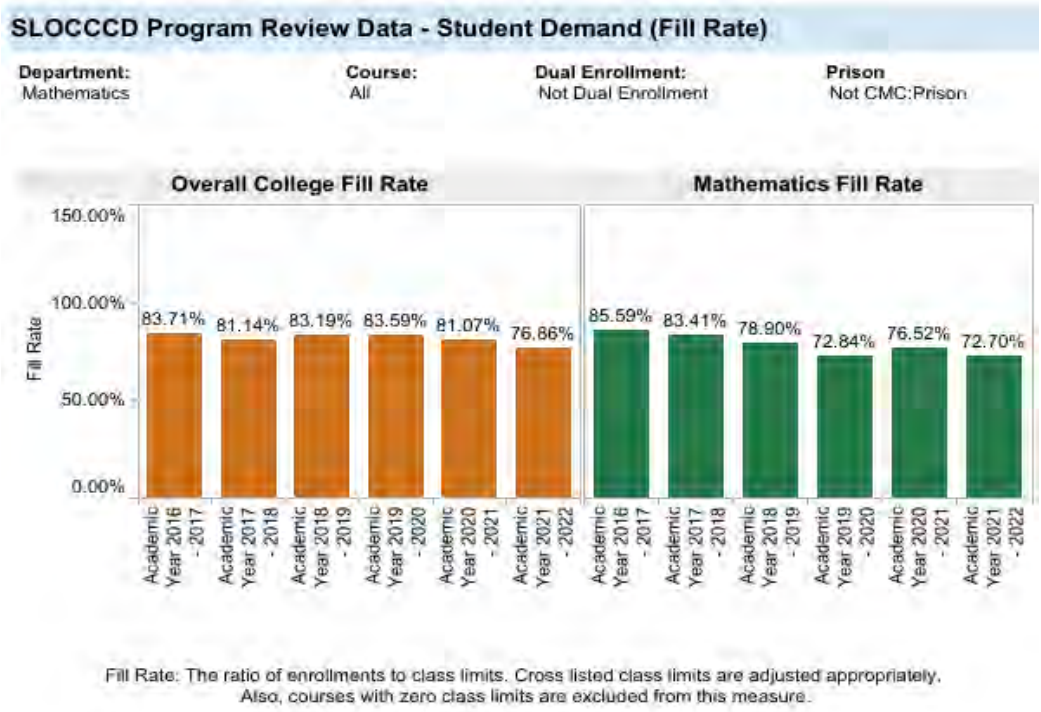



Enrollment: Duplicated count of students who completed greater than 0 units in positive attendance courses or were present on census for all other accounting methods.

The decline in enrollment in Math classes on the North County Campus, which started before the pandemic hit, has continued. Since the majority of the classes offered on the NC campus have historically been pre-transfer level classes, the implementation of MMAP and then the passage of AB705 and AB1705 resulted in us no longer being able to offer those classes. This left us with very few classes on the schedule. Then, as a result of the pandemic, there was a large increase in Distance Ed classes offered by the Math department, and we lost even more students due to the fact that many of them are now choosing to take their classes remotely.

Consequently, our NC enrollment has decreased from 1,219 in 2016-2017 to only 245 in 2021-2022. We are trying each semester to figure out which classes have the greatest likelihood of attracting students. In addition to Math 247, Statistics and Math 230, Math for Humanities, which we have always offered, we now offer Math 232, College Algebra, instead of Math 242, Precalculus. Additionally, we plan to offer Math 220, Math for Elementary School Teachers next year. Once we get the new Math 227 course going, we plan to offer that in the coming years. Our hope is that this will be a class that students in programs based on the NC campus (like LVN, EMT and Psych Tech) will be able to enroll in.

B. General Student Demand (Fill Rate) (Insert Aggregated Data Chart)
Insert the data chart and explain observed differences between the program and the college.

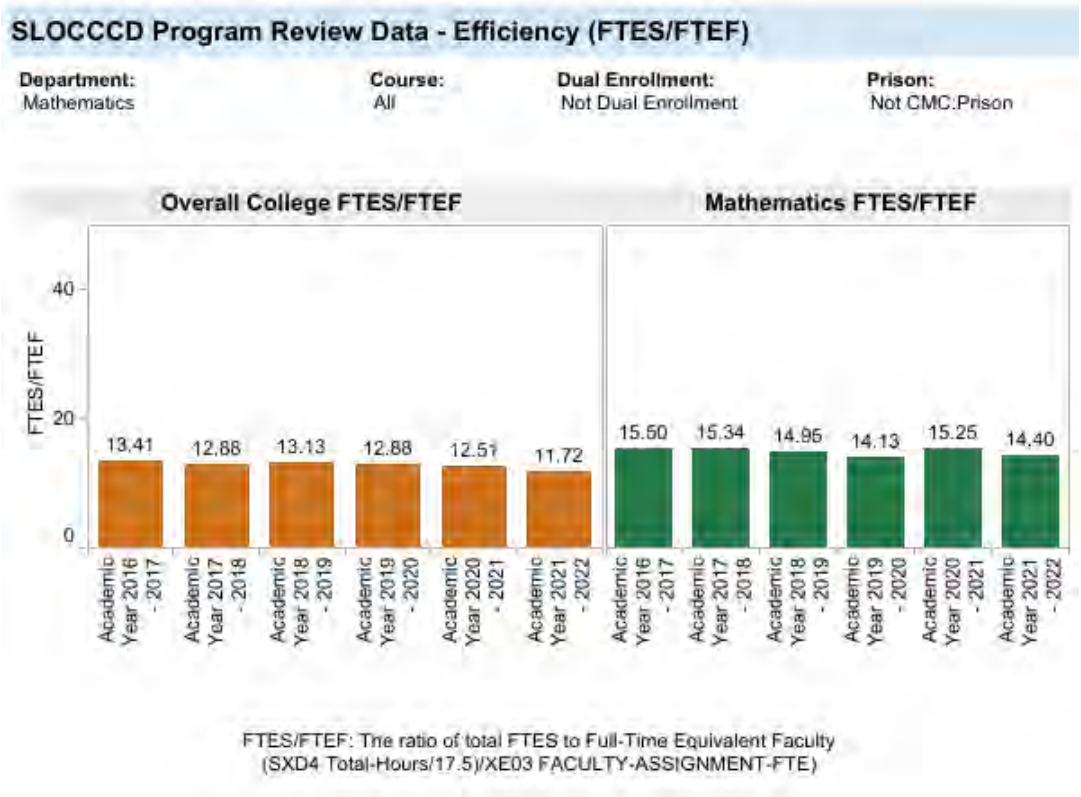



As the course caps for the majority of math courses were increased, the fill rates naturally declined. It should be noted that math classes generally have a cap of 40, which is much higher than many classes across the campus. Hence, this data is not as relevant as the FTES/FTEF.

There continues to be challenges in trying to create a schedule that meets the rapid changes in demand for the different types of math courses due to AB705. It is difficult to predict what math courses students will enroll in when they no longer have the option of enrolling in pre-transfer level courses. For example, returning students who may have been interested in pursuing a degree in a STEM field may no longer pursue that field, or even return to college, since they no longer have access to algebra courses. Students who did not master algebra in high school due to online learning during the Covid pandemic might decide that, since remediation is no longer an option, they are intentionally excluded from a college education. It is very difficult to predict which courses students will choose based on AB705, which is why we have seen a somewhat steady decline in fill rates for our math courses.

C. General Efficiency (FTES/FTEF) (Insert Aggregated Data Chart)

Insert the data chart and explain observed differences between the program and the college.




Despite the challenges with scheduling and implementation of AB705, the Mathematics Division significantly exceeds the efficiency levels of the overall college. In 2020-2021 the math division efficiency was 24% higher than the overall college and in 2021-2022 it was

23% higher. Although efficiency has not been a driving factor in college planning since the college is currently funded by the hold harmless previsions of the Student-Centered Funding Formula, it will be imperative that efficiency is maximized once the hold harmless provisions end. The Mathematics Division will continue to maximize efficiency through effective scheduling and course development.

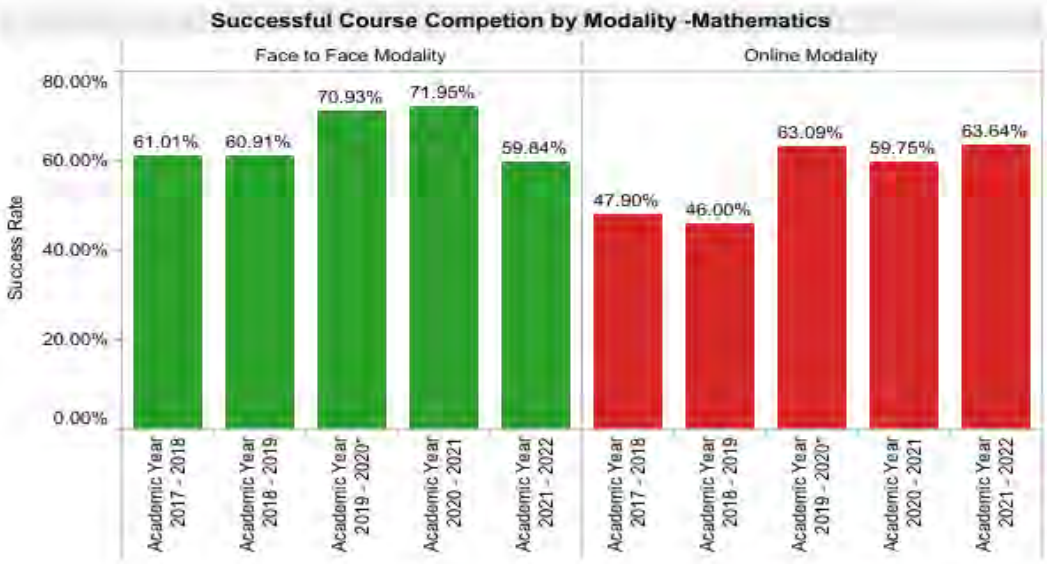
D. Student Success—Course Completion by Modality (Insert Data Chart)
Insert the data chart and explain observed differences between the program and the college.

**SLOCCCD Program Review Data: Successful Course Completion**

**Select Department:** Mathematics

**Course:** All

**Legend:** Face to Face Modality, Online Modality




**Successful Course Competion by Modality Table - Mathematics**

| | | Academic Year 2017 - 2018 | Academic Year 2018 - 2019 | Academic Year 2019 - 2020* | Academic Year 2020 - 2021 | Academic Year 2021 - 2022 |
|---|---|---|---|---|---|---|
| Face to Face Modality | Department Success Rate | 61.01% | 60.91% | 70.93% | 71.95% | 59.84% |
| | Total Department Enrollments | 5,372 | 5,096 | 4,701 | 476 | 1,998 |
| Online Modality | Department Success Rate | 47.90% | 46.00% | 63.09% | 59.75% | 63.64% |
| | Total Department Enrollments | 357 | 401 | 606 | 4,352 | 2,298 |

Prior to 2019-2020, we offered Math 123, 127, 232, and 247 online. After the acute stage of the pandemic, the Mathematics Division significantly increased online offerings, in line with the rest

of the college. This is indicated by the jump from 606 students online in 2019 to 2,298 in 2021-2022. We now have added and maintained online offerings of Math 229, Math 230, Math 242, Math 255, Math 265A, and Math 265B. Increased robust dialogue concerning online education has been a division wide focus that has led to shifts in teaching practices. We believe this led to a measured increase in success rates in the online modality from the academic year 2020-2021 to the academic year 2021-2022.

One point worth noting is that division wide, we have encountered significant issues with academic dishonesty in online courses. It is an increased concern from the past because, for example, we served more students online than face-to-face in the 2021-2022 year. While unacceptable in any course, academic dishonesty is especially problematic in sequential courses, such as Calculus. There is division wide concern that online success rates may be similar to the face-to-face success rates in our courses because of substantial academic dishonesty in online courses. As a division, we would like to put in place the structures that will help insure academic honesty in our online courses, such as face-to-face exams, particularly in our sequential courses.

To try to counter the observed issues with academic dishonesty but balance the need for student schedule flexibility, several division members answered the call from the Online Education Committee to join the Proctoring Center task force. The task force decided to pilot face-to-face proctored exams with two Calculus courses (the courses deemed by the taskforce to be most in need) and reported this back to the Online Education Committee. The findings of this pilot were that the academic dishonesty issues were resolved by face-to-face exams. Unfortunately, the administration has not replaced the Proctor Center administrator, Bob Whiteford, and has no plans to do so at this time. Students report that they need scheduling flexibility with when they can take their exams, beyond a single class session. We are concerned face-to-face exams without a Proctoring Center to give students scheduling flexibility might reduce enrollments in online courses in the future.

This leaves our division unsure of asynchronous online offerings in our STEM track courses – particularly Math 265A and above. We are exploring a software alternative, Gradescope, pending fund availability for licenses for math faculty.

E. Degrees and Certificates Awarded (Insert Data Chart)
   Insert the data chart and explain observed differences between the program and the college.

**SLOCCCD Program Review Data: Degrees and Certificates Awarded**

**Program:** Mathematics, General
**Award Type:** All
**Area of Study** All

**Program Awards**
Top Code Description(s): Mathematics, General
Award(s): Mathematics (AS) & Mathematics (AST)


**Program Awards Table**

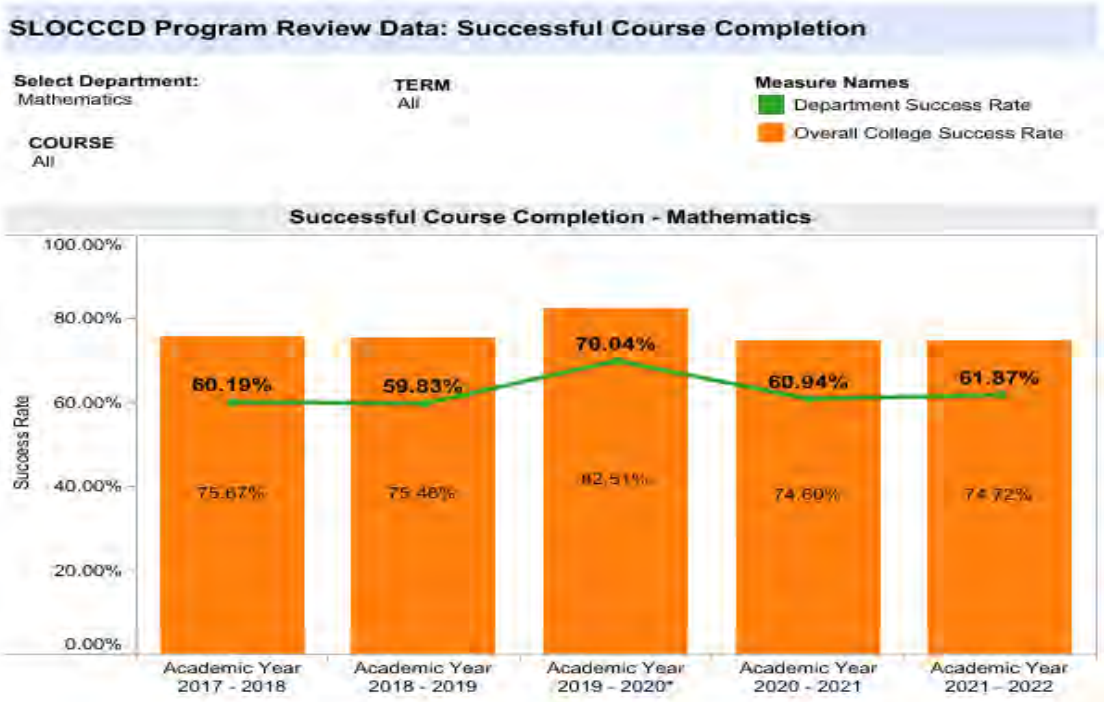
| Award Type | Award | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|
| AS | Mathematics (AS) | 10 | 12 | 13 | 13 | 8 | 1 | 1 |
| | **Total** | 10 | 12 | 13 | 13 | 8 | 1 | 1 |
| AST | Mathematics (AST) | 29 | 31 | 21 | 28 | 29 | 23 | 20 |
| | **Total** | 29 | 31 | 21 | 28 | 29 | 23 | 20 |
| **Grand Total** | | 39 | 43 | 34 | 41 | 37 | 24 | 21 |

Program Awards. The number of degress and certificates awarded by program type

Cuesta College gave out the following number of associate degrees (by year): 2473 (2020), 5294 (2021), and 4536 (2022). It should be noted that every one of these degrees requires students to take at least one mathematics course, which is one of the primary missions of the division. As we can see, the college had the largest amount in 2021 and had a percent decrease of 14.3% from 2021 to 2022. Math went from two associate degrees to just the AS-T (although there are a few lingering local AS due to catalog rights). Over that same time period, the following number of AS/AS-T for Math (by year) were: 37 (2020), 24 (2021), and 21 (2022). Our peak year was 2020 and we saw a percent decrease of 12.5% from 2021 to 2022. Our fill rates for Math 283 and 287 are also down (76% in 2021 and 46% in 2022) over the same period and both courses are required for an AS-T in Math. It is reasonable to assume that if the fill rates improve for those courses we should see an increase in Math AS-Ts. Additionally, with the support of Guided Pathways, more

students may pursue an AS-T in mathematics once they understand the employment opportunities and compensation associated with a degree in mathematics.

F. General Student Success – Course Completion (Insert Aggregated Data Chart)
Insert the data chart and explain observed differences between the program and the college.




**Mathematics Success Rate Table**

| | Academic Year 2017 - 2018 | Academic Year 2018 - 2019 | Academic Year 2019 - 2020* | Academic Year 2020 - 2021 | Academic Year 2021 - 2022 |
|---|---|---|---|---|---|
| Department Success.. | 60.19% | 59.83% | 70.04% | 60.94% | 61.87% |
| Total Enrollments | 5,729 | 5,497 | 5,307 | 4,828 | 4,296 |

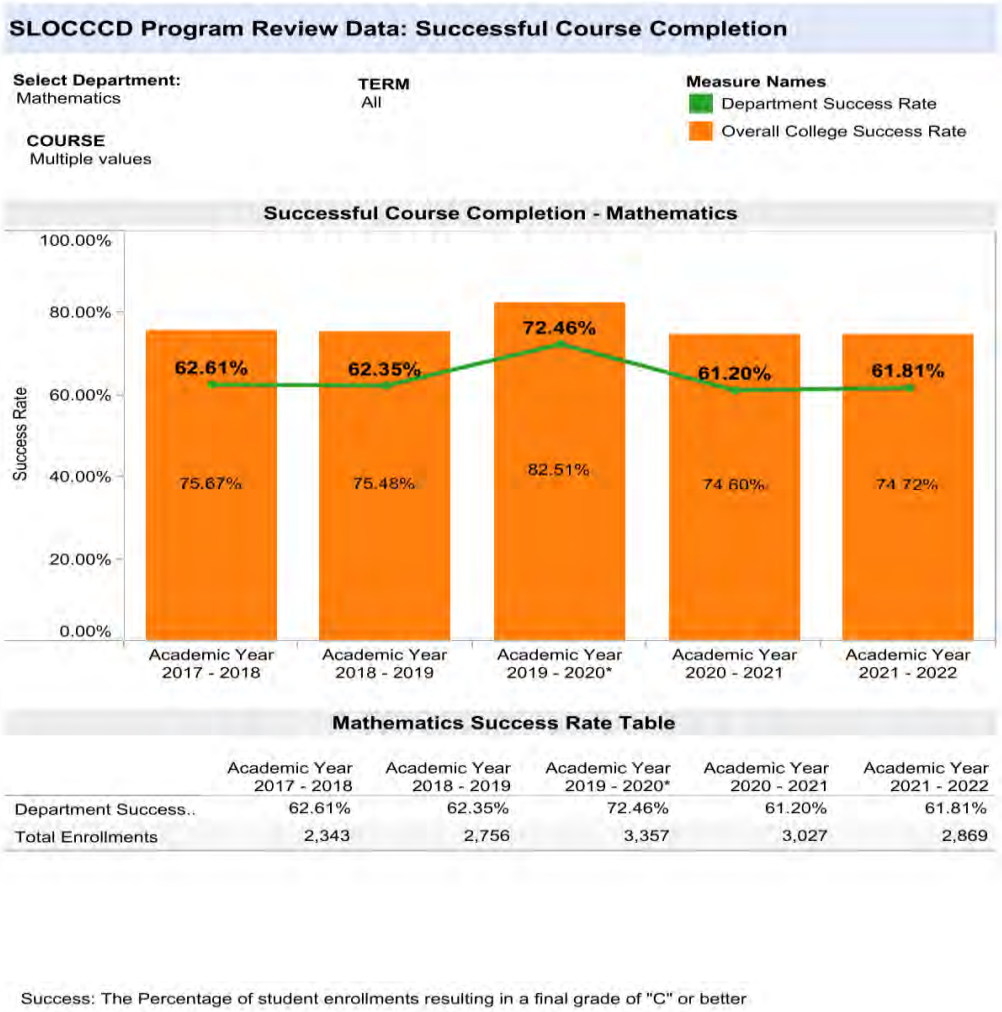
Success: The Percentage of student enrollments resulting in a final grade of "C" or better

The success rates for Mathematics have remained relatively steady from 2017-2018 through 2021-2022, between 60-62%, with the exception of the Spring 2020 semester where the school awarded large numbers of EW's due to the abrupt shift online with the pandemic. Historically, the Mathematics student success rate has consistently been approximately 13-15% below the overall college success rate, and that trend has continued. We have seen a small gain over the last year in closing this gap. The increase of focus in recent years on professional development related to equity minded teaching has likely helped contribute to student success. It is likely

that many students were more highly motivated to succeed in a single math course that counted toward their educational goal than trying to complete multiple pre-requisite algebra courses that overlapped in content from high school.

For Fall 2018 the new MMAP matrix was used for placement, and in Spring 2019 we transitioned to AB 705 placement which allowed open access to all first-tier transfer level math courses. It is impressive that the first year MMAP and AB 705 were implemented, 2018-2019, the success rates remained similar to the previous year, given that the bulk of students in 2018-2019 were starting directly in transfer level courses. Then, as part of the mandates within AB 705 and the pending AB 1705, the Mathematics Division began a process of eliminating developmental courses from our course offerings. Math 003 and Math 126 were last offered in 2018-2019. Math 126B and Math 123 were last offered the following year in 2020-2021. Math 007 was last offered the next year in 2021-2022. It is remarkable that, in spite of removing these developmental courses, our success rate remained steady. Given the increase in underprepared students in our courses, both in foundational math skills and college study skills, this is a testament to the extensive work done by Math faculty and the Success Center staff to support our students with the sweeping changes that resulted with AB 705. However, our enrollment also significantly declined over the last two years, so it could be that some underprepared students, facing the loss of developmental courses they felt were necessary to be ready for the more challenging transfer level courses, simply chose not to take a math course and either changed their academic program of study or left the college altogether.

**Successful Course Completion, Math 220, 229, 230, 231, 232, 242, 247**



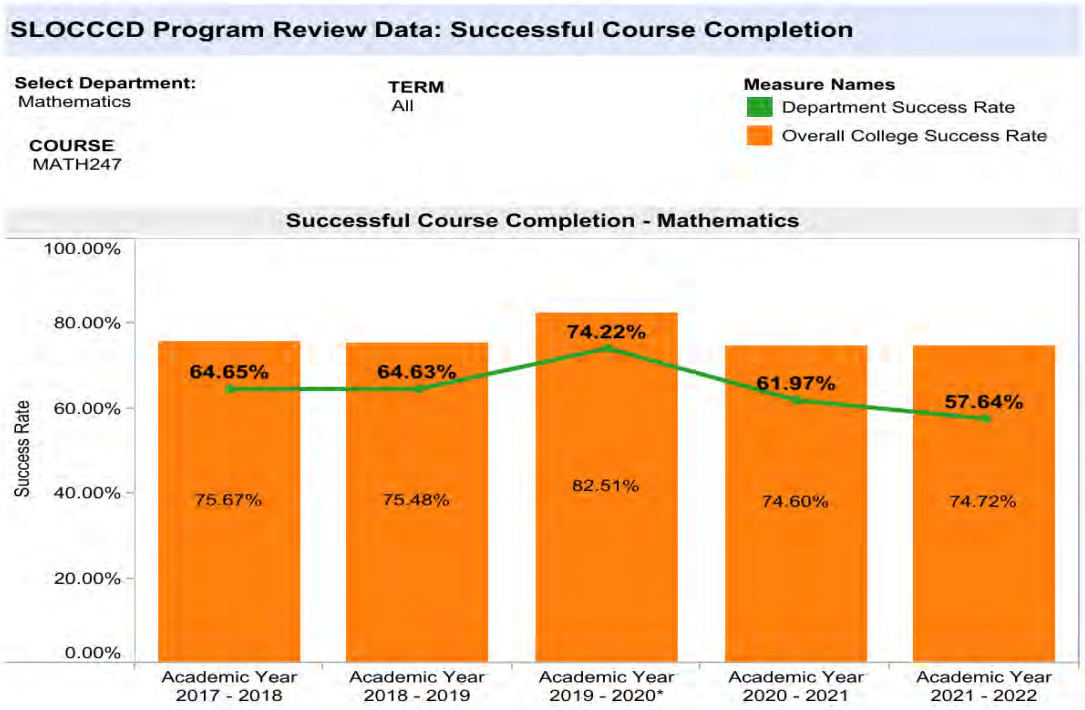

Success: The Percentage of student enrollments resulting in a final grade of "C" or better

For our first-tier transfer level courses, the success rate mirrors the rate for the division as a whole, with a persistent rate of around 62% (not counting 2019-2020) and a gap of roughly 13% between the division rate and the overall college rate. There has been a very slight decrease in the last two years (less than 1%), and this is likely due to the effects of AB 705 which has resulted in higher numbers of underprepared students taking transfer level courses.

In looking at statewide data for the past five years, the average overall success rate for California community colleges varies from 79.44-81.83%, and the average Mathematics success rate varies from 66.46-71.62%. The gap between the overall success rate and the Mathematics success rate varies between 10.31-14.71%. In comparison, we can see that Cuesta's success rates (both overall and Mathematics) typically fall about 5% below the state average. Also, the gap between the two rates has not been as great as 14.71% at Cuesta, but it could certainly be improved given that the state average has been as low as 10.31%. In summary, the data shows

that Cuesta is fairly consistent with most other state community colleges. The Mathematics Division is not satisfied with our lower success rate as compared to the college as a whole, in spite of the fact that this is seen across the state. Even though this gap has been stubbornly persistent over the years, we have always striven to find new ways to improve our success rate, and we will continue to assess and create plans for improvement in collaboration with the Success Center to continue to improve student success in light of AB 705 and the recently passed AB 1705.

**Successful Course Completion, Math 247**




**Mathematics Success Rate Table**

| | Academic Year 2017 - 2018 | Academic Year 2018 - 2019 | Academic Year 2019 - 2020* | Academic Year 2020 - 2021 | Academic Year 2021 - 2022 |
|---|---|---|---|---|---|
| Department Success.. | 64.65% | 64.63% | 74.22% | 61.97% | 57.64% |
| Total Enrollments | 1,123 | 1,296 | 1,678 | 1,471 | 1,451 |

Success: The Percentage of student enrollments resulting in a final grade of "C" or better

Looking at statistics specifically, the success rate was relatively steady at 64.6% with a gap of only 11% between the Math Division and the college, prior to the implementation of

AB 705 and the pandemic. In the 2019-20 academic year, the world experienced COVID-19, which had the effect of automatically changing all non-passing grades to EW grades, which may have been the primary reason we experienced a jump in success rates that year. In the years since, success rates have dropped below pre-pandemic levels. There could be numerous reasons for this: (1) With the passing of AB705 we are seeing more underprepared students in transfer level courses. Statistics is required in many academic programs; therefore, a large percentage of underprepared students are choosing to enroll in Math 247 as their first math class at Cuesta. (2) During the pandemic, education suffered. Students were suddenly forced into online education with a very low risk of failing. High school seniors were graduating while missing out on a significant amount of material they would have ordinarily covered. This has increased the overall proportion of students underprepared for college. (3) Instructors have become more adept at detecting academic dishonesty in online courses, and students practicing such methods have not been able to pass the course. (4) The pandemic has had the effect of normalizing online education, this means that more students enjoy the flexibility of online courses, and more of them are self-selecting to enroll in these online courses. An online course requires that students be self-motivated, and perhaps many of these students in online courses should be in face-to-face courses instead.

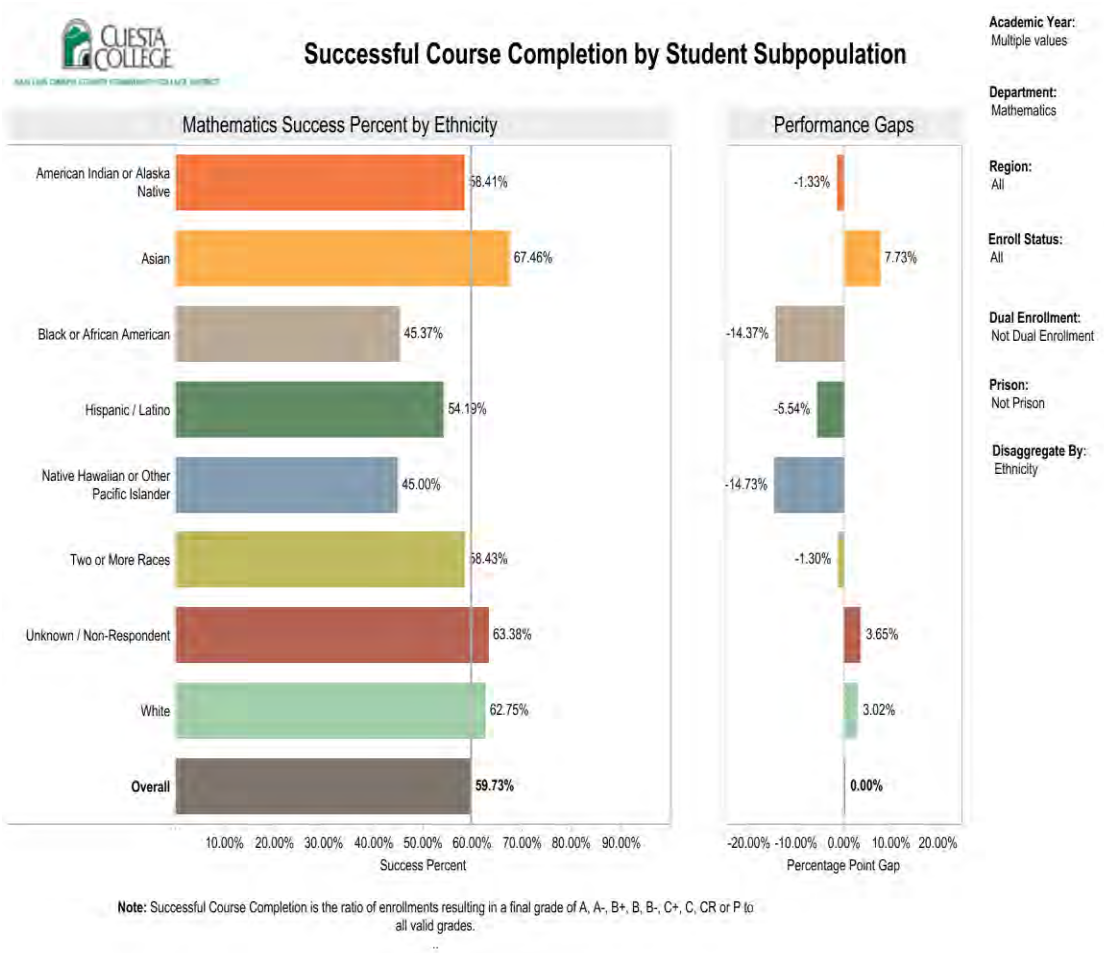
In response to the increase in number of underprepared students, the Math Division may need to revisit how the Math 147S support course is being utilized, including the potential of making the course a true corequisite, where students are required to take the course based on multiple measure assessments including high school GPA. Math 247 instructors will also meet and discuss how just-in-time review could be embedded in all Math 247 courses for students not captured in Math 147S.

G. Review the Disaggregated Student Success charts; include any charts that you will reference. Describe any departmental or pedagogical outcomes that have occurred as a result of programmatic discussion regarding the data presented.

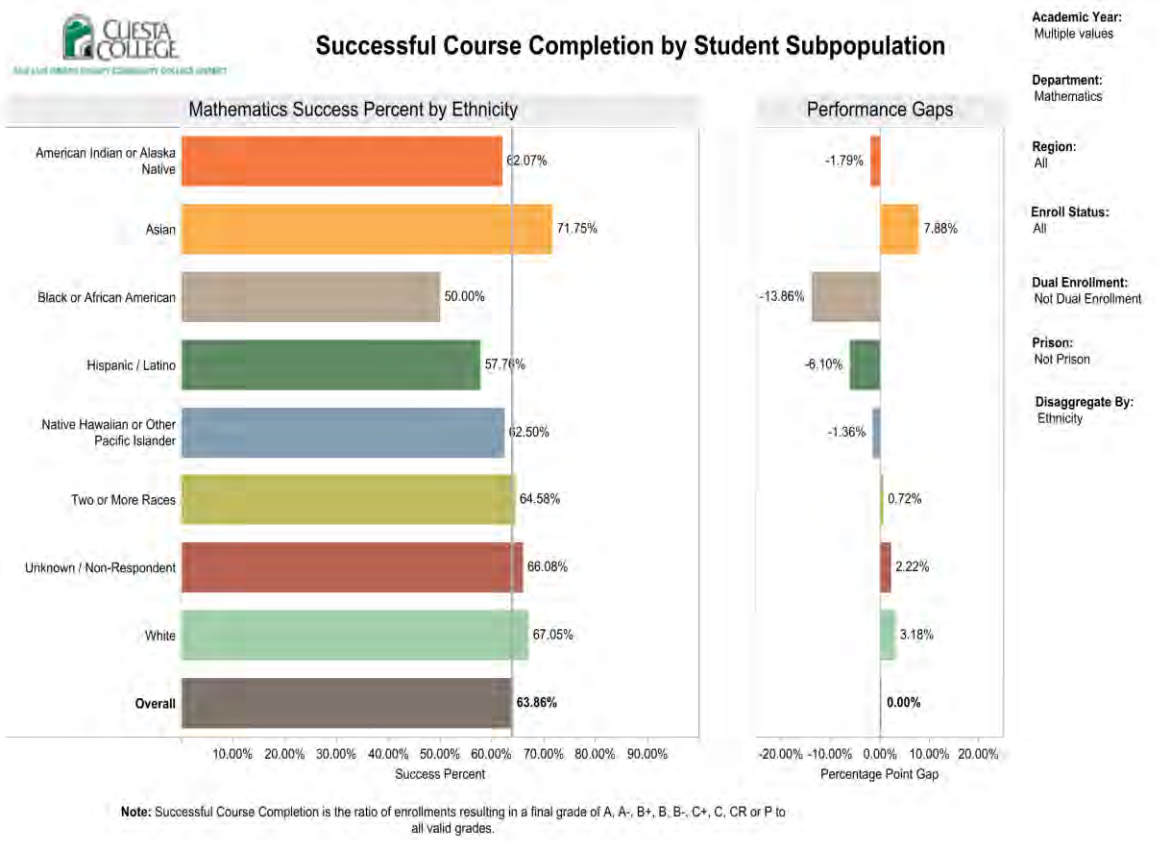
The following are some questions you might want to consider:

- What specific groups are experiencing inequities? What patterns do you notice in the data? How have the equity gaps changed since the previous academic year?
- What professional opportunities are your program faculty participating in to address closing equity gaps?
- What strategies, policies and/or practices in your program have you implemented or what could be improved to better support students who experience equity gaps?

## Successful Course Completion Before Full AB705 Implementation (2016-2017, 2017-2018, 2018-2019)




## Successful Course Completion After Full AB705 Implementation (2019-2020, 2020-2021)




The Mathematics Division has continued its work towards closing and addressing equity gaps. Several instructors, including the Division Chair, have completed the college's Justice, Equity, Diversity, and Inclusion academy and have made changes to their teaching methodology and pedagogy to affirm all students that they are welcomed and that they belong in STEM courses and fields. The division has also been an active participant in the LSAMP (Louis Stokes Alliance for Minority Participation in STEM). The LSAMP program is a grant funded program that is part of the C6 LSAMP alliance of eight community colleges who together are building a community to support underserved students in STEM. The goal of the alliance is to help students succeed and transfer to a four-year university in a STEM field. The program provides both academic and non-academic support systems such as:

- Tutoring: Embedded tutors are placed in the following gateway courses Physics 208A, Chemistry 201A, Math 242 and Math 265A.
- Transfer support: In addition to providing transfer workshops, the program also provides one on one support with all the steps of the transfer process.
- Scholarship and internship support: In addition to providing workshops on applying to scholarships and internships, we also provide one-on-one support in finding and applying to these types of opportunities.
- Research opportunities: In addition to guiding students to research opportunities, the program also provides funding for on campus research internships.

- Social Support and Community: Participants in the program have biweekly group luncheon gatherings on Friday afternoons.
- Professional Development and Networking: The program provides opportunities to attend conferences and mentorship workshops which include industry partners.
- Non-academic support: In addition to workshops, the program refers students to basic needs resources at Cuesta.

The following are some of Cuesta's LSAMP program first full semester of implementation accomplishments during the Fall of 2022:

- Supported 6 students in attending the HACU annual conference.
- Participated in the first annual C6 Student Research Symposium at Cal Poly.
- Placed embedded tutors in chemistry and physics.
- Supported LLN (Latina Leadership Network) in the Día de los Muertos celebration.
- Gathered in community every other week on Fridays.
- Hosted multiple C6 workshops related to academic and professional success.

One of the major successes of the program so far is that students who have traditionally been underserved in STEM have a space where they feel welcomed, supported and celebrated.

## OTHER RELEVANT PROGRAM DATA (OPTIONAL)

Provide and comment on any other data that is relevant to your program such as state or national certification/licensure exam results, employment data, etc. If necessary, describe origin and/or data collection methods used.

## PROGRAM OUTCOMES ASSESSMENT CHECKLIST AND NARRATIVE

### CHECKLIST:

☐ X - SLO assessment cycle calendar is up to date.
☐ X - All courses scheduled for assessment have been assessed in eLumen.
☐ Program Sustainability Plan progress report completed (if applicable).

### NARRATIVE:

Briefly describe program changes, if any, which have been implemented in the previous year as a direct result of the Program or Student Services Learning Outcomes Assessment. *If no program changes have been made as results of Program or Student Services Learning Outcomes Assessment, indicate: NONE.*

The Mathematics Division completed the CPPR cycle during that last academic year and therefore, based on the SLO Assessment Calander, did not do any SLO assessments or make changes based on the assessments. However, the division did rewrite the Mathematics Program Learning Outcomes (PLOs) as follows:

- Formulate and solve math problems using calculus and linear algebra.

- Apply advanced mathematical methods to solve problems in STEM related fields.

- Analyze and interpret mathematics using words, symbols, data, and graphs.

## PROGRAM PLANNING / FORECASTING FOR THE NEXT ACADEMIC YEAR

Briefly describe any program plans for the upcoming academic year. These may include but are not limited to the following: *(Note: you do not need to respond to each of the items below)*. *If there are no forecasted plans for the program, for the upcoming year, indicate: NONE.*

A. New or modified plans for achieving program-learning outcomes
B. Anticipated changes in curriculum, scheduling or delivery modality
C. Levels, delivery or types of services
D. Facilities changes
E. Staffing projections
F. Other

B. The primary change to curriculum in the upcoming academic year will be the elimination of all pre-transfer level mathematics courses from the course schedule beginning in the Summer 2023 semester. It is important to note that last summer's Math 127 course had 53% enrichment students who's goal was to "level up" so they would be on track to take calculus their senior year. Local high school students will unfortunately no longer have that option.

One step the division has taken to mitigate the negative impacts of AB705 and AB1705 is to delop ALEKS based support courses for students who are underprepared for transfer level math courses. ALEKS is a computer based system that first evaluates what basic skills students need to work on, and then provides guided examples to help students work on

those skills. Once students show proficiency in that subject, the program will move on to the next topic that students need to work on. Last Spring, the Mathematics Division applied for and received equity funds that allowed the division to purchase 50 ALEKS course codes, which we have then been able to frovide to students free of charge.

For Fall 2023, the division will be offering Math 227, College Mathematics for Technical Fields in both the face-to-face and online modalities. The Mathematics Division worked very hard to expedite the development of this course to mitigate the negative impacts of eliminating our algebra courses. For example, by offering Math 227 in Fall 2023, there will not be a single cohort of nursing students at Cuesta College that were unable to take a math class that includes critical topics such as ratios, percents, and unit conversion. The division will potentially offer a section of the course on the North County Campus as early as Spring 2024, in support of North County students who are pursuing degrees or certificates in nursing or CTE.

The division is also developing a new course, Math 248: Foundations of Data Science. Data Science is a rapidly expanding field of study, and this course will introduce Cuesta College students to the fundamental concepts of the field. The division has worked closely with faculty from UC Berkeley and CCSF in the development of a course outline of record that will be presented to the Curriculum Committee in early March 2023. The goal is to get the course through the curriculum process and to teach the first section in Spring 2024.

The Mathematics Division will continue to adjust the ratio between face-to-face and online math courses in consultation with the Dean, based on what faculty determine is best for student learning, student enrollment patterns and the divisions committement to academic integrity. Given the massive changes in the number of online math courses offered due to the pandemic; 606 online enrollments in 19-20, 4351 in 20-21, and 2298 in 21-22, it is difficult to predict when these numbers will stabalize, and at what level. One observable pattern in online math enrollments was that non-STEM online courses filled more quickly than STEM online courses relative to the corresponding face-to-face courses. To help support the divisions committement to academic integrity, we have increased the number of courses that require face-to-face or proctored exams. Unfortunately, since the Cuesta Proctor Center has recently been closed, the division has had to manage all proctored exams scheduled outside of the established face-to-face exam times. The division is working with other divisions and the Academic Senate to find a college wide proctoring solution.

D. There are not any anticipated facilities changes for the division, other than our continued efforts to get the two North County Classrooms upgraded to the technology standards established for Cuesta College classrooms.

E. Given the decline in FTES based on AB705 and AB1705, the Mathematics Division contiues to see a decline in the number of full-time faculty in the division. We had a full-time faculty member, Greg Lewis, retire in the Fall of 2023, but the division elected not to pursue a replacement for that faculty member. That is the third full-time faculty member to recently retire without replacement. There continues to be a significant difference between the number of courses offered in the Fall semester versus the Spring semester. Currently, the larger number of courses demanded in the Fall semester can be accommodated by our part-time faculty, but the division will need to make sure this is still the case moving forward.

## PROGRAM SUSTAINABILITY PLAN PROGRESS REPORT

**This section only needs to be completed if a program has an existing Program Sustainability Plan. Indicate whether objectives established in your Program Sustainability Plan have been addressed or not, and if improvement targets have been met.**

| **Area of Decline or Challenge** | **Identified Objective (Paste from PSP)** | **Planning Steps (Check all that apply)** | **Has the Improvement Target Been Met?** |
|---|---|---|---|
| Enrollment | | ☐ Identified<br>☐ Resources Allocated<br>☐ Implemented | Select one |
| Student Demand (Fill Rate) | | ☐ Identified<br>☐ Resources Allocated<br>☐ Implemented | Select one |
| Efficiency (FTES/FTEF) | | ☐ Identified<br>☐ Resources Allocated<br>☐ Implemented | Select one |
| Student Success – Course Completion | | ☐ Identified<br>☐ Resources Allocated<br>☐ Implemented | Select one |
| Student Success — Course Modality | | ☐ Identified<br>☐ Resources Allocated<br>☐ Implemented | Select one |
| Degrees and Certificates Awarded | | ☐ Identified<br>☐ Resources Allocated<br>☐ Implemented | Select one |

**If Program Sustainability Plan is still necessary, provide a brief description of how you plan to continue your PSP and update your PSP to remove any objectives that have been addressed and include any new objectives that are needed.**