

PROGRAM REVIEW Fall 2018

Program: Mathematics

Division: STEM

Date: October 22, 2018

Writer(s): Mathematics Department Faculty

SLO/SAO Point-Person: Jennie Graham

Audience: Deans, Vice Presidents of Student Services and Academic Services, All Planning and Allocation Committees. This document will be available to the public.

Uses: This Program Review will be used to inform the campus and community about your program. It will also be used in the processes of creating Division Summaries, determining College Planning Priorities and allocating resources. A final use is to document fulfillment of accreditation requirements.

Time Frame: This Program Review should reflect on program status during the 2017-18 academic year. It should describe plans starting now and continuing through 2018-19. This document also provides the opportunity to describe more long-term plans (optional).

Sections: The first section of this Program Review focuses on general program reflection and planning. The second section has specific questions to be filled out by all programs this year. The third section is an SLO/SAO update. The fourth section is a review of curriculum. Only programs with curriculum need to complete Section 4.

Topics: A list of topics of particular interest to Program Review readers can be found here:

<https://goo.gl/23jrxt>

Help: Contact Karin Spirm: kspirm@laspositascollege.edu

Instructions:

- 1) Please respond to each question as completely as possible.
- 2) If the requested information does not apply to your program, write "Not Applicable."
- 3) Optional: Meet with your dean to review this document before _____.
- 4) Send an electronic copy of this form to Karin Spirm and your Dean by _____.

Links:

Program Review Home Page: <https://goo.gl/XATqjJ>

Fall 2017 Program Review Updates : <https://goo.gl/pkv76m>

Frequently Asked Questions: <https://goo.gl/ilhRtt>

Section One: Program Snapshot

No Significant Changes Option

Contact person: _____

By marking an X in the box above, the writers of this Program Review indicate that there have been no significant changes to their program or their program's needs in the past year. In this case, programs may opt not to complete Program Review Section One: Program Snapshot.

Programs must still complete all other sections (as applicable).

Please note: Choosing this option means that your program's information may not be included in the yearly Division Summary.

The No Significant Changes Option may only be used for two years in a row; after two years, programs must complete a full Program Review including the Program Snapshot. Our program's most recent Program Review was submitted in the following semester: Fall 20_____.

A. Program Description: Briefly describe your program, including any information or special features of your program that will provide helpful context for readers of this Program Review.

The Mathematics Department serves many students at LPC with courses from Prealgebra (Math 107) through Differential Equations (Math 5), and various options for transfer-level courses (Math 47, 40, 30, 33, 34, 39, 1, 2, 3, 5, 7, 10). Our courses are requirements for general education for AA/AS and transfer, as well as prerequisites for other disciplines in sciences and business with some intensive mathematical understanding. As a department, we offer students a variety of math classes, modes of offering courses and learning supports. Below are some of things we offer students each semester:

- A huge marketing campaign happened last year, as the Math Department redesigned our math pathways and promoted based on academic goals - receive an AA/AS, Transfer STEM or non-STEM fields or Math for Trades in Automotive and Welding. Concurrent support courses starting Fall 2018 allowed students to receive formal support during the semester and also accelerate their pathway by registering for a level higher in a basic skills math class with the concurrent support course. Then AB 705 happened... more on that later!
- Our AD-T in Mathematics continues to offer students the ability to earn an AS on their way to a transfer school.
- Variety of Learning Modes for our basic skill courses: From face-to-face classes to Emporium to Hybrid, students have a choices in how they want to complete a course. Some of our face-to-face instructors have focused on infusing their sections with more active learning and Growth Mindset language and attend monthly Friday Math Initiative Meetings. The Emporium mode, recently redesigned, includes streamlined learning that focuses on each student individually and customizes the work to what they need to master while infused with learning supports such as Growth Mindset and study strategies. Our hybrid mode offers students with a one-day a week, flipped class offering.
- Our new Math for Trades pathway started Fall 2018, offering students in Automotive and

Welding a 7-unit math pathway to an Associate's Degree by completing a series of courses heavily in context of their trade. Offered in the newly redesigned Emporium mode, this sequence is streamlined to the student's individual needs.

- Math Jam is currently grant funded and serves around 220 students each Fall and again each Spring. Half of the students have a goal to prepare for their upcoming math class and the other half to retake the ACCUPLACER Test with the goal of "jumping" a level or more in Math. Levels are offered from Prealgebra to preparing for Calculus I and include daily SMART SHOPS during lunch around Growth Mindset, Study Strategies, Test Preparation, Career Awareness and more.
- The Math Learning Center, located in the Integrated Learning Center in Room 601 is a space where students with a no-unit lab hour are required to complete their TBA Lab assignments for Math 110, 55, 30, 39, 33 and 34. Students can also come in for just-in-time learning support for any math course from a math faculty member.
- SMART Shops are now encouraged by many of our math instructors, for credit or extra credit. Math offers several in our discipline - Math Test Preparation, Conquering Math Anxiety, Math Note Taking, Problem Solving, How to use a Graphing Calculator and Excel for Statistics.
- The Math Department is dedicated to Middle College and ensuring that these high school aged students have a positive experience in our math classes. As AB 705 gets implemented in the Fall, we will continue to work with the Middle College coordinator to provide quality education to all of our students.
- New this past year, our department teamed up with local Livermore High Schools to offer free one-on-one tutoring for high school students in math on our campus. Since these high school students are now enrolled LPC students, they get access to our library and Wheels-Bus Free Ride program.
- We meet regularly with our local Tri-Valley High School Math Teachers and Coaches to discuss alignment of curriculum, pathways, placement and success and retention.
- We are also offering a section of Calculus III at our local Amador Valley High school. This class may move around to any of the local Livermore/Pleasanton/Dublin High Schools. This class is open to any student but marketed to our local high school students as concurrent enrollment.
- Engineering Tech Cohort has an accelerated math component where students complete Intermediate Algebra, Trigonometry with Geometry, and Precalculus in two semesters. This section has also been heavily contextualized in STEM applications and has a strong learning community component. It has been highly successful in terms of success and retention.
- Our student Math Club/Honor Society is highly engaged. Our president was a keynote speaker at the Tahoe CMC³ conference last Spring and 12 students attended - more than any other out of the area school! They meet twice a month. Last year they hosted a series of Math Public Lectures with speakers from local industry.
- Honors Projects are available to students in transfer level math courses, allowing students the opportunity to complete a challenging application in their target course, earn honors credits that are transcribed and transferable.
- AMATYC Exams are offered each Fall and Spring semester and approximately 150 students participate. Last year we as a school placed 7th in the Nation!
- Math Department Scholarships are awarded from donations by our math faculty and our calculator rental program (more below) to students ranging in math sophistication that have shown true academic integrity and passion. We also offer a Math Jam Excellence in Tutoring Scholarship.
- Calculator Rental Program allows students to rent a graphing calculator, worth around \$120, for \$30 for the semester. Income from this program goes directly into student scholarships.

B. Changes to Program and Needs: Describe any significant changes to your program or your program's needs since the previous Program Review Update (Fall 2017).

Enrollment Pattern Changes: The department has seen significant changes in enrollment with our courses; primarily more students wanting to take our STEM Pathway and transfer classes and fewer students needing basic skills. We have had to add sections of statistics (Math 40) and Calculus 1 (Math 1) to accommodate the increase, and cancel a section each of Intermediate Algebra (Math 55) and Core Intermediate Algebra (Math 50). Much of this shift can be attributed to the more significant use of High School Data to place students into their classes. (Discussed in detail in the data section.)

New Courses or Changes in Courses: Core Intermediate Algebra (Math 50) has been offered for a year with a 3-hour lab. (Success is discussed in data.) Due to inconsistent support in the Math Learning Center for Math for Liberal Arts (Math 47) students, the no-unit lab for Math 47 is now scheduled in the classroom with the instructor (beginning fall 2018). College Algebra for STEM (Math 30) will replace our Precalculus (Math 20) course in the calculus prerequisite, and provide more flexibility to students in that they can take Math 30 or Math 39 Trigonometry concurrently or in any order to get to calculus 1.

Corequisite and Fast Track: This semester (fall 2018) the department is piloting corequisite support courses for Math 55 and Math 110 (Elementary Algebra) for students who were eligible for that class's prerequisite (that is, a student eligible for 110 could take a specific section of 55 with a corequisite support course, 55C). In the spring, we will be piloting two Fast-Track paths: a STEM cohort of Math 30 followed by Math 39 in two 8-week sessions, and a non-STEM cohort of Math 50 followed by Math 40 in two 8-week sessions.

AB 705: In October 2017 AB 705 was signed into law that greatly affects Math, English and ESL disciplines. Placement tests will no longer be used, and starting fall 2019 ALL students are allowed to enroll in first-level transfer math and/or English courses (colleges can only require maximum one semester of remediation, and if they do, they must prove that that semester of remediation is more successful than direct placement, which is extremely difficult to show). Our department has attended many workshops, conference breakouts, and webinars, as well as collaborated with many other math departments across the state to plan for this massive redesign. We are submitting curriculum for a "concurrent support course" that is intended to help students with the just-in-time remediation they will need as well as student skills, growth mindset, affective domain activities to prepare them to be better students all-around. In fall 2019, the Math Learning Center will house these support courses, that will be similar in structure and design to our highly successful Math Jam, running the courses mirrored (students choose credit or noncredit and both types of students are in the same classroom with the same experience).

We will no longer offer face-to-face sections of Prealgebra (Math 107) as this course will only be offered in Emporium; face-to-face sections of Math 110 will be severely reduced, and Math 50 and 55 will also see reduction in lecture offerings. Starting spring 2019 the Emporium mode will have the same courses offered during all 8 sections (last year there were 4 sections devoted to Math 107 and the Technical Math sequence - 72A, 72B, 72C, 72D, 52A, 52B, 53A, 53B; and 4 sections devoted to Math 55 and Math 110), providing our students with more time options.

In fall 2019, we expect our student population to be rougher and more underprepared than what we are used to, and we may see success rates plummet in our courses (this has been shown by some of the "early adopters" of direct placement into transfer-level math - first year success data is low). **Our faculty desperately need professional development in active learning and best practices in teaching math.** Faculty should be encouraged and incentivized to change their teaching styles to better suit the needs of our students. One example of how to incentivize professional development is to allow part-time faculty to participate in meaningful, directed professional development as their required professional responsibility hours each semester. Active learning workshops such as OnCourse should

be offered and encouraged on Mandatory FLEX day, instead of ad-hoc in the semester.

Emporium mode: This mode added support courses: 107F, 110F, 55F that are corequisite to their corresponding B-course. Seeing the success of the A-Course students when given the opportunity to take the same amount of time to do half of the content, we wanted to apply that same idea to the B-course students to aid in their success. This mode was lucky enough to have a full-time senior level instructional assistant hired on to help with running and overseeing the operations in this area. However, the Sr. IA resigned as of Summer 2017 and a search for a replacement began. While this area has gotten by with temporary IA coverage and donated hours from math faculty, it will be nice to have someone at the helm once more. One of our part-time IAs resigned as of August 2018 and the rehiring for that position was denied. There is a need to refill this vacancy. Having that 10-hr a week position allowed for our Sr. IA to take a lunch break without a lapse in IA coverage. It also allowed for additional coverage during the busiest time of the day and allows for our Sr. IA to have uninterrupted time to put towards the coordination of this area. With the grant ending next year, there is also a compelling need to find reassign time for both the Math Emporium faculty coordinator and Math Jam faculty coordinator, as both of these areas take considerably more time than any one faculty member is professionally responsible for.

Technical Math Sequence: Fall 2018 saw the launch of our new and improved Math for the Trades (rebranded as Technical Math) sequence. This sequence consists of two parts: 1) Technical Elementary Algebra (made up of 1-unit 8-wk courses Math 72A, 72B, 72C and 72D) and Technical Intermediate Algebra (made up of 1.5-2 unit 8-wk courses 52A and 52B or 53A and 53B). Not only do these new sequences allow our trades students to learn the math in context of Automotive or Welding, but the completion of this sequence counts towards an AS degree in either Automotive or Welding. The sequence also still allows for just the completion of the Welding certificate by taking 72A, 72C and 53A.

Full-Time Faculty: Currently our department consists of 15 full-time faculty and approximately 60 part-time faculty. In 11 years, we have had two growth positions (one in 2008 and a second in 2015.) All of the other newly hired faculty are replacements, as we have had quite a few retirements. The percentage of FTEF taught by full-time faculty as load for the past six semesters has been decreasing (to 30.4% in spring 2018) as our faculty take on more roles within college governance. The department has the highest FTES generated in the college, with 549 in fall 2017 and 531 in spring 2018. These numbers show the desperate need of our department for more full-time faculty members. Our department is consistently offering more sections each year to accommodate our ever-growing student population. As our student population grows and our course offerings grow and department faculty work other assignments, our department becomes stretched thin with many department initiatives.

STEM Program Coordinator: Approximately 450 students each year participate in Math Jam, designed specifically to provide a supportive, noncredit pathway for students into the credit math courses required for an associates degree or for transfer. This program also allows for paid math tutors to receive intensive professional and content development around tutoring mathematics. Math Faculty also received professional development around growth mindset, best practices in the classroom and online supports. The coordination of this program has been provided by grant funding (HSI and Transformation) that will be ending this year and next. This program will be unable to continue without either faculty release time (which is costly) or a STEM Program Coordinator to coordinate. To sustain this and other important STEM initiatives, Mathematics, along with other STEM programs, is helping complete a new classified position request for a full-time STEM coordinator.

Mark an X before each area that is addressed in your response.			Definitions of terms: https://goo.gl/23jrx1				
	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software	x	LPC Planning Priorities	x	Services to Students
x	Curriculum committee items	x	Financial/Budgetary	x	LPC Collaborations		SLO/SAO Process

x	Enrollment Management	x	Human Resources	x	Pedagogy	Technology Use
x	External Factors	x	Learning Support	x	Professional Development	

C. Reflection: What plans from the [2017 Program Review](#) or any [previous Program Reviews/Updates](#) have been achieved and how? You may also describe achievements that were not planned in earlier Program Reviews.

With the retirement of Greg Daubenmire and Teri Henson at the end of fall 2017, we hired two new replacement faculty starting fall 2018. Several new part-time faculty have also joined our growing department.

We successfully implemented a more robust-use of multiple measures as part of the placement process. Starting October 2, 2017, students were placed into math courses based on either their high school GPA and last math class passed, or their score on the Accuplacer exam. High school GPA and course success is a better predictor of future academic success. The success data is discussed below (data section).

Due to students placing higher as a result of multiple measures, we added more sections of transfer level courses (Math 1, 2, 30, 39) and removed sections of Math 107, 110. For example, we had more than twice as many students (48 vs. 21) place into Math 1 in Spring 2018 compared to Spring 2017. Success rates remained relatively constant. With the upcoming implementation of AB 705, we will see an even greater shift in this direction.

We removed the trigonometry portion of Math 20 (Precalculus) and replaced it by Math 30 (College Algebra for STEM). This gives students the option of taking Math 30 and 39 in either order or concurrently. We also reduced Math 65 (Elementary Algebra) from 5 to 4 units and renumbered it Math 110 to adhere to the district's numbering policy for courses, since Elementary Algebra is not degree-applicable. We approved curriculum for co-requisite courses for Math 55 and Math 110 and will develop concurrent support courses for transfer level math as we implement AB 705.

We successfully launched the Math Emporium mode of instruction, and hired two part-time IAs and a Senior IA for our Emporium classes. Through funding from the HSI grant, faculty were able to monitor the materials and progress of students in that mode and make changes throughout the year to improve success. However, the initial Sr. IA resigned in the Summer of 2018, so a search began to find a replacement. One of our part time IAs also resigned as of August 2018, but the search to rehire was denied. There is a strong need to fill this vacant IA position since it offers coverage when the Sr. IA goes to lunch as well as double coverage during one of the busiest times of the day. It also allows for our Sr. IA to have uninterrupted time to put towards the coordination of this area.

Math 47 now has an attached instead of a TBA Lab hour. With AB 705, the Math Learning Center's role may shift towards co-requisite support, so we will consider changing other TBA labs to attached labs or removing them.

Last year we offered more promotion/help for the AMATYC competition through the Math Club. Though most of the credit goes to the students, we are happy to say that LPC ranked 7th among community colleges nationwide!

In collaboration with the Livermore School District (LVJSD), we successfully launched an on-campus tutoring program for Livermore Valley high school students. The course is offered as the non-credit TUTOR 200 with faculty and student tutors. We are continuing to offer a year-long Math 3 course at a local high school to help reach the large number of high school students who are prepared for Calculus 3 their senior year.

Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxr			
X	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software	X	LPC Planning Priorities	X	Services to Students
X	Curriculum committee items		Financial/Budgetary		LPC Collaborations		SLO/SAO Process
X	Enrollment Management	X	Human Resources	x	Pedagogy		Technology Use
	External Factors	X	Learning Support	x	Professional Development		

D. IR Data Review: Describe any significant trends in your program’s data from the office of Institutional Research and Planning. (Note: Not all Programs have IR data packets available; if your program does not have a data packet, you may note that in the response box). You may also discuss any other data generated for your program by the Office of Institutional Research and Planning.

IR Data packets are available here: <http://www.laspositascollege.edu/research/progrev.php>

In this section, we used PT to refer to students taking 6-11.5 units and PPT to refer to students taking 0.5-5.5 units.

Parts 1-4 are based on throughput data from Fall 2016 to Summer 2018.

1. We “lost” a large percentage of students who passed their prerequisite class in Fall 2016 but as of Summer 2018 they had not enrolled in one of the classes it is a prerequisite for. Specifically,

a. From 65 to 50/55: 14.6% of students who passed 65 in Fall 2016 did not enroll in 50 or 55 within the next 3 semesters. We can further break it down by the type of student (Full Time, Part Time, or very Part Time (PPT)). 37% of our PPT students who passed 65 did not take 50 or 55. At LPC only 12.5% of our PPT students take math in a semester. Alternatively, only 12% of our FT students who passed 65 did not go on to take 50 or 55. At LPC 50% of our Full Time students take math each semester.

b. From 39 to 20: 46 students passed 39 but only 36 of those enrolled in 20. 1 of them were PT and 35 were FT (no PPT passed 39). Perhaps the ten who passed 39 but did not take 20 is due to students transferring before taking 20 or to students jumping 20 into 1.

c. From 55 to transfer level: It is hard to say from this data how many we lost as some students attempted multiple transfer level courses. We lost a minimum of 10% up to possibly 21% of students who passed 55 and did not enroll in a transfer course. Perhaps some of these students had a goal of an AA degree only. Looking at FT vs. PT, we lost at least 35% of our PT passers of 55, and 62% of our PPT, while 103% of our FT students enrolled in 47/40/38/39/34 (so clearly our FT students are taking more than one of these classes).

2. Throughput from 65 to 50/55 (students enrolled in 65, succeeding in 50/55) to be eligible to take a college credit course is about 32%, which is pretty consistent over the last 3 samplings of 2 year periods (Fall 2014-Summer 2016, Fall 2015-Summer 2017, and Fall 2016-Summer 2018)

3. Of our Math 65 students, 19% took 50, same across FT, PT, and PPT; however for 55 FT was much more likely (69%) to take 55, while PT was only slightly less likely (65%), but PPT was much less likely (44%) to take 55. Perhaps more FT students are STEM majors or perhaps they just want to keep their options open.

4. Looking at who passed 55 and then enrolled in a transfer level course by gender:

Gender	BSTEM	SLAM	Did not enroll	Total
Female	30	70	32*	132
Male	70	59	7*	136

*Potentially more since some students took both STEM and SLAM transfer level courses

5. Comparing our data to LPC data:

- a. In Fall 2017, only 39% of classes were taught by Full Time Faculty, down from our average of about 41% and this was reduced in Spring to 30% of our classes taught by FT faculty due to the mid-year retirement of 2 FT faculty and a large number of our faculty receiving CAH to perform other duties on campus.
- b. About 1/8 of all classes students took at LPC took math
- c. Roughly 30% of all female students at LPC took math and 35% of male students took math.
- d. Our Fall success rates (56%) are about 80% of what LPC is (70%) though Spring increases slightly higher (60%) which is about 82% of what LPC is (72%). About 2% of that could be explained by failing students who we lose from Fall to Spring, but the other 2% is an increase in passing rates. Possibly due to students trying harder in the Spring before transfer.
- e. We give about half as many A's as LPC, about the same number of B's, and 1/3 more C's. Our F/NP is 1.5 times that of LPC and our W rate is 1.6 times that of LPC.
- f. Only 25% of African American students at LPC take math in the Fall, compared to 30-37% in other ethnic groups (groups with very small numbers were left out of this comparison). In the Spring semester, the numbers went up to 27%, so possibly either more African American students are waiting until Spring to take math and/or they are more resilient.

The table below is the percent of LPC students who are taking math:

	FALL					SPRG				
	2013	2014	2015	2016	2017	2014	2015	2016	2017	2018
African American	0.238	0.248	0.276	0.281	0.246	0.283	0.281	0.288	0.270	0.275
Asian	0.303	0.296	0.305	0.293	0.322	0.277	0.270	0.304	0.285	0.308
Filipino	0.346	0.368	0.356	0.379	0.371	0.307	0.304	0.370	0.390	0.379
Latino	0.322	0.321	0.349	0.362	0.346	0.309	0.327	0.368	0.356	0.349
White	0.306	0.315	0.341	0.341	0.325	0.294	0.310	0.330	0.327	0.314
Multiethnic	0.339	0.323	0.354	0.351	0.320	0.264	0.353	0.358	0.328	0.350

The table below is the result of the number of students taking math in the Fall minus Spring so negative numbers indicate an increase from Fall to Spring. Clearly more students are attempting math in the Fall than in the Spring, which is also true for LPC in general.

Change Fall to Spring - Number of Students

	2013-14	2014-15	2015-16	2016-17	2017-18
African American	-15	-4	8	10	-6
Asian	27	27	-8	6	-21
Filipino	14	29	-4	1	7
Latino	32	34	-10	42	49
White	40	29	62	76	71
Multiethnic	41	-11	-7	7	-11

6. Estimating needs of AB705 (PLEASE NOTE THIS IS AN ESTIMATE AND ADDING GPA DATA WOULD POTENTIALLY GIVE A BETTER ESTIMATE):

IF we make the following assumptions:

- a. students attempting 55/65/107 will go to transfer level courses in the same proportions as students who pass 55
- b. 75% of Math 55 students, 60% of Math 110, and 40% of Math 107 students will go directly to transfer level courses
- c. Of Math 50 students, 20% go to 47 and 60% go to 40 and 20% only take 50
- d. 75% of Math 65/110 students go to Math 55 and 25% would go to Math 50
- e. Total students going to 39/30 from 55 is 28% plus additional 3% (1/4 of 13%) from 30 (since most take only 1 at a time)
- f. GPA data would be a better estimate for where people may go than 110/107 and also students who plan to go on SLAM pathway are probably more likely to skip the lower math levels than STEM students
- g. Max change assumes all of Math 55 students, 80% of Math 110 students, and 65% of 107 students go directly to transfer plus 34% of Math 55 students going to 30/39

Transfer class	Likely change	Max change	Math 50/55 13 classes	Math 110 12 classes: 9 to 55, 3 to 50	Math 107: 5 classes: 3.75 to 55, 1.25 to 50
47	1.5	2	$(.2)(5)=1$	$(.6)(.2) 3 =.5$	$(.4)(.2)(1.25) =0$
40	11.5	15	$(.6)5+ (.75)(.43)13=7.4$	$(.6)(.6)3 + (.6)(.43)9 =3.5$	$(.4)(.43)(3.75)+.4(.6)(1.25)=1$

34	1.5	2	$(.75)(.09)13 = .9$	$(.6)(.09)9 = .5$	$(.4)(.09)(3.75) = .1$
30/39	5	8	$(.75)(.31)13 = 3$	$(.6)(.31)9 = 1.7$	$(.4)(.31)(3.75) = .5$

Incidentally, these track pretty well with Cuyamaca who have a 60% increase in Precalc and 62-66% increase in Statistics

Individual Course Success: Semester by semester & year

50 vs 55 success rates

			Reference Data										Evaluation Year	
			2012-13		2013-14		2014-15		2015-16		2016-17		2017-18	
			Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.
MATH 50	Overall	Success							169	64%	175	59%		
		Non-success							38	14%	75	25%		
		Withdrawal (W)							57	22%	49	16%		
		Total							264	100%	299	100%		
MATH 55	Overall	Success	729	59%	679	53%	649	51%	793	55%	563	52%	441	48%
		Non-success	237	19%	284	22%	286	23%	292	20%	231	21%	214	23%
		Withdrawal (W)	265	22%	311	24%	329	26%	349	24%	297	27%	271	29%
		Total	1,231	100%	1,274	100%	1,264	100%	1,434	100%	1,091	100%	926	100%

Math 50 seems more successful than Math 55 overall, but more data is needed. (Recall Math 50 is intended for Non-STEM majors, while Math 55 is intended for STEM majors.)

39 success rates vs 38 success rates

There was anecdotal concern that success rates dropped when we made the change for Math 38 (5-unit) to Math 39 (4-unit), but looking at the data the success rates seem comparable. The students taking Math 38 in 2016-2017 and 2017-2018 (a year when we offered both courses) were members of cohorts in the Engineering Tech program, and thus took several courses together (studies show that students in a cohort perform better overall).

			Reference Data										Evaluation Year	
			2012-13		2013-14		2014-15		2015-16		2016-17		2017-18	
			Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.
MATH 38	Overall	Success	184	62%	212	59%	181	54%	249	51%	64	73%	11	69%
		Non-success	49	16%	55	15%	46	14%	91	19%	14	16%	1	6%
		Withdrawal (W)	64	22%	90	25%	109	32%	151	31%	10	11%	4	25%
		Total	297	100%	357	100%	336	100%	491	100%	88	100%	16	100%
MATH 39	Overall	Success							248	56%	340	60%		
		Non-success							68	15%	98	17%		
		Withdrawal (W)							126	29%	124	22%		
		Total							442	100%	562	100%		

The following is our success rates of Math 55, 65, and 40 Distance Ed vs. Face-to-Face. Distance Education courses continue to have lower success rates than courses taught in person. The success trend in DE is decreasing, and that is very concerning to our department. Since AB 705 allows students to enroll in first-level transfer, the Math 55 and Math 65 DE courses may no longer be offered (also their success rates are just too abysmal to consider keeping the courses – students need more face-to-face support, or the course offering needs to be drastically improved). Please note that starting Fall 2015, all the Math 65 and Math 55 DE courses were converted to 50% hybrid one day per week courses. We used to offer one test-only hybrid section and one one-day-per-week section each semester.

This table “Fall Only” for Math 55 DE highlights the decreasing success trend, ending with Fall 2017’s 13% success rate (not shown due to glitch in online interactive program).

MATH Course Success Rates: Course-Level Detail (**Fall Only**)

			Reference Data										Evaluation Year	
			Fall 2012		Fall 2013		Fall 2014		Fall 2015		Fall 2016		Fall 2017	
			Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.
MATH 55	Distance Education	Success	22	34%	31	39%	22	31%	18	25%	12	16%		
		Non-success	18	28%	20	25%	15	21%	18	25%	25	33%	47	65%
		Withdrawal (W)	24	38%	29	36%	33	47%	35	49%	38	51%	16	22%
		Total	64	100%	80	100%	70	100%	71	100%	75	100%	72	100%
	Non-Distance Education	Success	317	59%	282	55%	316	58%	325	55%	259	59%	171	51%
		Non-success	98	18%	102	20%	115	21%	140	24%	85	19%	75	22%
		Withdrawal (W)	121	23%	125	25%	112	21%	128	22%	96	22%	89	27%
		Total	536	100%	509	100%	543	100%	593	100%	440	100%	335	100%

MATH Course Success Rates: Course-Level Detail (**Academic Year**)

			Reference Data										Evaluation Year	
			2012-13		2013-14		2014-15		2015-16		2016-17		2017-18	
			Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.
MATH 65	Distance Education	Success	64	40%	66	40%	54	31%	67	37%	46	27%	46	28%
		Non-success	61	38%	74	45%	80	46%	59	32%	77	45%	73	44%
		Withdrawal (W)	34	21%	26	16%	41	23%	56	31%	50	29%	47	28%
		Total	159	100%	166	100%	175	100%	182	100%	173	100%	166	100%
	Non-Distance Education	Success	449	58%	427	57%	450	59%	452	58%	469	63%	345	49%
		Non-success	178	23%	181	24%	169	22%	192	25%	163	22%	149	21%
		Withdrawal (W)	150	19%	140	19%	144	19%	139	18%	118	16%	211	30%
		Total	777	100%	748	100%	763	100%	783	100%	750	100%	705	100%

Math 40 hybrids have success rates comparable to our overall math success, but do not compare to face-to-face Math 40 sections.

MATH Course Success Rates: Course-Level Detail

(**Academic Year**)

			Reference Data						Evaluation Year	
			2014-15		2015-16		2016-17		2017-18	
			Num	Pct.	Num	Pct.	Num	Pct.	Num	Pct.
MATH 40	Distance Education	Success	64	43%	85	47%	78	44%	55	39%
		Non-success	36	24%	28	16%	22	13%	34	24%
		Withdrawal (W)	50	33%	67	37%	76	43%	53	37%
		Total	150	100%	180	100%	176	100%	142	100%
	Non-Distance Education	Success	606	62%	661	63%	772	68%	810	70%
		Non-success	145	15%	138	13%	151	13%	133	11%
		Withdrawal (W)	226	23%	246	24%	220	19%	221	19%
		Total	977	100%	1,045	100%	1,143	100%	1,164	100%

Mark an X before each area that is addressed in your response.

Definitions of terms: <https://goo.gl/23jrxt>

Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
Curriculum committee items		Financial/Budgetary		LPC Collaborations		SLO/SAO Process
Enrollment Management		Human Resources	x	Pedagogy	x	Technology Use
External Factors	x	Learning Support	x	Professional Development		

E. Other Data Review (Optional): Describe any significant findings based on other data regarding your program. Possible sources of relevant information might include, but are not limited to, the following:

- Data generated by your program
- CEMC Data

○ **Labor Market Data**

Math Emporium (Changes made possible by the HSI grant, so Latino student success is looked at for purposes of metrics.)

Data from the last two semesters for our Emporium students yielded some promising results.

While the course success rates are still lower than we would like, we know this is mostly due to high withdrawal rates of students as they set a comfortable pace for themselves to complete the course content. However, withdrawing from this mode of course is not failure. Instead, it is pausing and pickup up where the students left off the next semester.

After two semesters, the change in success from one semester to the next has increased for all three levels for all LPC students.

All LPC Students			Latino Students		
Percent Change in Success from Fall 2017 to Spring 2018			Percent Change in Success from Fall 2017 to Spring 2018		
55(55B)	Math Emporium	19%	55(55B)	Math Emporium	75%
	Lecture	22%		Lecture	42%
110(110B)	Math Emporium	55%	110(110B)	Math Emporium	29%
	Lecture	-53%		Lecture	-64%
107(107B)	Math Emporium	53%	107(107B)	Math Emporium	150%
	Lecture	-89%		Lecture	-83%

Also of note, but expected based on the increased success rates, the Emporium Mode courses are starting to be reach the same levels of success as the lecture classes.

All LPC Students

Latino Students

Closing the Gap between Lecture and Emporium			Closing the Gap between Lecture and Emporium		
Difference of success rates for Lecture and Emporium.			Difference of success rates for Lecture and Emporium.		
55	Fall 2017	23%	55	Fall 2017	30%
	Fall 2017-Sp/Su 2018	20% ↓		Fall 2017-Sp/Su 2018	23% ↓
110(65)	Fall 2017	19%	110(65)	Fall 2017	21%
	Fall 2017-Sp/Su 2018	4% ↓		Fall 2017-Sp/Su 2018	8% ↓
107	Fall 2017	22%	107	Fall 2017	28%
	Fall 2017-Sp/Su 2018	5% ↓		Fall 2017-Sp/Su 2018	6% ↓

After just looking at the Fall data, some of the Emporium classes were not showing an increase in success compared to their Math X counterpart. That is no longer the case. The HSI grant's support has helped make a positive impact in this mode of learning.

All LPC Students.

Latino Students

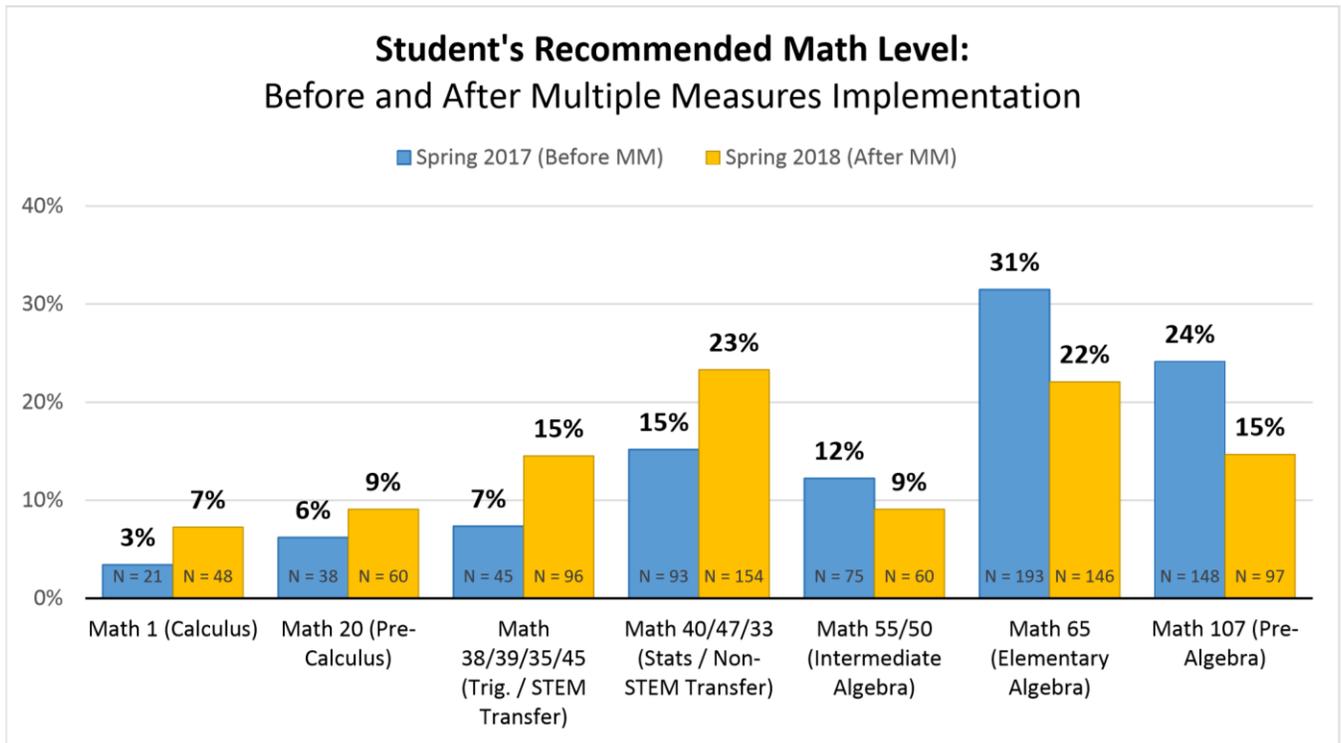
Difference in Success of Emporium to X.							Difference in Success of Emporium to X.						
	55A	55B	110A	110B	107A	107B		55A	55B	110A	110B	107A	107B
Fall 2017	25%	14%	21%	-1%	-1%	-12%	Fall 2017	36%	-1%	44%	2%	7%	-35%
Fall 2017-Sp/Su 2018	38%	13%	23%	7%	20%	4%	Fall 2017-Sp/Su 2018	46%	14%	36%	14%	25%	6%

As the success rates for Emporium mode continue to increase, whereas the Lecture mode decreased from Fall to Spring, we are looking forward to seeing long term results of this mode.

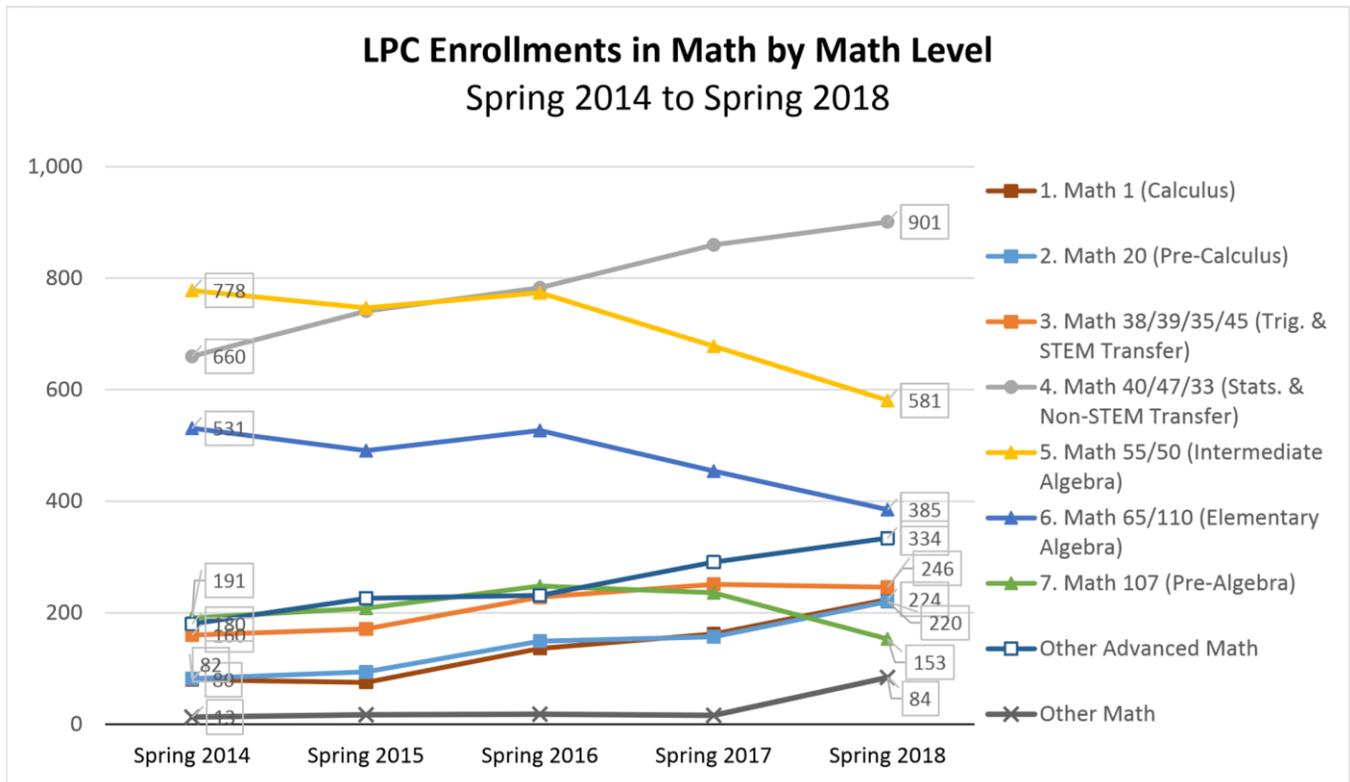
Data from placement (generated by OIR)

Initial studies done last year showed that by using more robust multiple measures – that is, students get placed into a class based on the placement exam score OR their high school GPA and last math class – more students would place higher than by just using the placement test (that included a very small bump in scores based on high school data). The bar graph below shows actual placement numbers by levels

comparing spring 2017 (no multiple measures) to spring 2018 (first use of multiple measures).



The following line graph shows trends in our enrollments over the past 5 years. Interesting to note, basic skills were trending downward and transfer level trending upward even before multiple measures were implemented.



Success rates are shown below by course level; it is important to note that the sample size is very small

for these classes, and so percentages were not shown for small numbers.

**Success Rates in Math of Those Who Took the Math Assessment Test
by Entry Method: Spring 2018**

Math Level	Overall		Both Test & HS		HS GPA / Grade Only		Test Only	
	Cohort	Rate	Cohort	Rate	Cohort	Rate	Cohort	Rate
Math 1 (Calculus)	24	75%	7	*	13	*	4	*
Math 20 (Pre-Calculus)	32	63%	5	80%	9	33%	18	72%
Math 38/39/35/45 (Trig. & STEM Transfer)	33	61%	7	57%	8	63%	18	61%
Math 40/47/33 (Stats. & Non-STEM Transfer)	95	64%	7	100%	43	58%	45	64%
Math 55/50 (Intermediate Algebra)	59	51%	3	33%	11	36%	45	56%
Math 65/110 (Elementary Algebra)	68	43%	16	50%	10	20%	42	45%
Math 107 (Pre-Algebra)	23	57%	0	*	0	*	23	*
Other Advanced Math	1	100%	1	*	0	*	0	*
Other Math	9	78%	0	*	1	*	8	*
Total	344	58%	46	67%	95	49%	203	60%

NOTE: "Other Advanced Math" are math courses with a calculus prerequisite or higher math.

"Other Math" are support courses (e.g. 107E) and courses not in the main math sequence (e.g. 72A, 52A, 29).

Data includes students who took the math assessments test from October 1, 2017 through January 31, 2018.

*Success rates were not calculated for any math level with less than 30 enrollments

Some interesting notes about the above table:

- For Math 20 Precalculus, students entering by placement test or both HS data and placement test performed significantly well. (Still small numbers; 3/9 who placed via HS data only were successful)
- For the Trig and STEM transfer group, success rates were consistent across all three groups
- Stats & Non-STEM transfer students who got in through only one method (HS data or test only) were comparable in success.

Even though these are promising, we cannot continue to study our students in the same way since the placement exam will end in January (and this is okay). We will continue to attempt to track students through high school data and success in our classes through direct placement or completion of self-selected prerequisite courses.

Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxr			
	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
	Curriculum committee items		Financial/Budgetary		LPC Collaborations		SLO/SAO Process
x	Enrollment Management		Human Resources	x	Pedagogy		Technology Use
x	External Factors	x	Learning Support		Professional Development		

F. Impacts to Students (Optional): Discuss at least one example of how students have been impacted by the work of your program since the last Program Review Update (only if you did not already answer this in Questions B-E).

Answered in multiple places above.

Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxr			
	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
	Curriculum committee items		Financial/Budgetary		LPC Collaborations		SLO/SAO Process
	Enrollment Management		Human Resources		Pedagogy		Technology Use
	External Factors		Learning Support		Professional Development		

G. Obstacles: What obstacles has your program faced in achieving plans and goals?

One of our part-time Math Emporium IAs resigned as of August 2018 and the rehiring for that position was denied. There is a strong need to fill this vacant IA position since having that 10-hr a week position allowed for our Sr. IA to take a lunch break without a lapse in IA coverage. It also allowed for additional coverage during the busiest time of the day and gave our Sr. IA uninterrupted time to coordinate that area.

Once the HSI grant runs its course (this marks year 4 of 5) there will be no reassign time for coordination of the Math Emporium or Math Jam. Both of these areas require extra time and commitment outside of a faculty member’s usual professional responsibilities. Each needs to be granted a measure of reassign time in acknowledgement of the work that is being done to support these areas on top of the faculty member’s contractual obligations. The quality of work that is currently happening may not be able to continue due to workload concerns.

Hiring and mentoring part-time faculty is difficult. We are constantly needing new part-time faculty just to teach classes. Our full-time faculty are serving leadership roles across campus (as they should), but this draws on the overall ability of the FT faculty to work on program needs.

We have currently maxed out our computer lab classrooms with math courses requiring computers, even though the new building provided two new computer labs. If we increase our transfer-level math offerings (as we must with AB 705), we will have an even greater need for more labs. Rolling out our concurrent support courses in Fall 2019 will be extremely difficult without the necessary computers to help propel this individualized-learning environment.

No Proctoring Center for our non-Emporium classes makes having a Growth Mindset in taking and grading exams very difficult for our faculty. Students cannot easily re-take a missed exam, faculty have to coordinate time with students (sometimes several students) which can be difficult if not impossible for our part-time faculty teaching at other schools.

Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxt			
<input checked="" type="checkbox"/>	Community Partnerships/Outreach	<input checked="" type="checkbox"/>	Facilities, Supplies and Equipment, Software	<input type="checkbox"/>	LPC Planning Priorities	<input checked="" type="checkbox"/>	Services to Students
<input type="checkbox"/>	Curriculum committee items	<input checked="" type="checkbox"/>	Financial/Budgetary	<input type="checkbox"/>	LPC Collaborations	<input type="checkbox"/>	SLO/SAO Process
<input type="checkbox"/>	Enrollment Management	<input checked="" type="checkbox"/>	Human Resources	<input type="checkbox"/>	Pedagogy	<input type="checkbox"/>	Technology Use
<input checked="" type="checkbox"/>	External Factors	<input type="checkbox"/>	Learning Support	<input checked="" type="checkbox"/>	Professional Development	<input type="checkbox"/>	

H. Short Term Planning: What are your most important plans (either new or continuing) for next year? Describe plans starting now and continuing through AY 2018-19.

AB 705 was passed October 2017 with implementation mandated Fall 2019. AB 705 allows students to self-place into a transfer-level math class and placement exams to be banned. The data behind this mandate is exciting, but the successful colleges in implementing this have had rigorous extra curricular support and professional development in place to support struggling students and promote the academic grit required on the part of the student to persevere. Students can self-place themselves into a basic skills math course (Intermediate Algebra and below) but should be encouraged to consider first level transfer.

In an effort to support all students, the Math Department will be:

- Mirroring all basic skills courses (Prealgebra, Elementary and Intermediate algebra level courses Math 107, 110, 55 and 50). Mirrored courses are offered as credit or noncredit to students based on their individual financial needs.
- Creating new mirrored concurrent support courses for basic skills and first-transfer level math courses. Most of these concurrent support courses will be offered in the Math Learning Center in the ILC. They will include cohort learning time with students in the same target course grouped, online personalized remediation, and workshops offered on key math concepts. Professional Development and materials for these support courses will happen this year as a collaborative effort with all math faculty during monthly Friday Math Initiative Meetings.
- Submitting six noncredit certificates to the Curriculum Committee this semester for approval with the goal of qualifying all of our basic skills math courses, concurrent support and math jam courses to for enhanced CDCP funding.
- Developing additional SMART Shops o expand our current offerings to include workshops around fractions, factoring polynomials, and calculator use.

The Math Learning Center is going to get a facelift starting fall 2018 and the coordination of that space will be more important than ever. As with Emporium and Math Jam, there will now be many different components that will need to be coordinated in the Math Learning Center, with support courses for all levels of math offered concurrently, course shells and professional development to be consistent across sections, noncredit reporting, etc. will require extra time and commitment outside of a faculty member's usual professional responsibilities. The current reassign time for coordinating the Math Learning Center (ILC) will be more important than ever in acknowledgement of the work that is being done to support these areas on top of the faculty member's contractual obligations.

We recently submitted curriculum changes seeking DE approval for most of our transfer level math courses including Math 30, 33, 34, 39, 1 and 2. The goal is to offer new hybrid courses next year in Math 34 and Math 30/39 and then eventually develop courses for the OEI.

Mark an X before each area that is addressed in your response.			Definitions of terms: https://goo.gl/23jrxt				
	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software	x	LPC Planning Priorities	x	Services to Students
x	Curriculum committee items		Financial/Budgetary	x	LPC Collaborations		SLO/SAO Process
x	Enrollment Management	x	Human Resources	x	Pedagogy		Technology Use
x	External Factors	x	Learning Support	x	Professional Development		

I. Long Term Planning (Optional): Please detail any long-term plans for the next 3-5 years. (Only if you have significant plans, such as implementation of a grant project, creation of long-term initiatives including those using restricted funds such as Equity or SSSP, construction and outfitting of a new building).

The Math Department intends to develop courses for the OEI. While we do not specifically know which courses we might offer in the OEI, we are thinking of developing Math 40 and Math 34 for the OEI. (Currently, there is no business calculus course on the OEI Exchange).

The Math Department would like a joint facility for the Tutorial Center/Math Learning Center, and Math Emporium classroom and proctoring. This would allow us to streamline personnel and strengthen student learning supports. The **Proctoring Center** would then ideally support the campus and be staffed by a classified professional. As we wait for this new joint facility, we are going to use our Emporium Room 607 to offer proctoring support to a subset of our Math classes this Spring 2018 as a pilot in preparation of offering it to all of our Math classes starting Fall 2019. In math, many of our courses are taught by part timers who are unable to offer make-up exams either at all or at a time that meets student

needs. Fall 2019, as we implement AB 705 (state law that says all incoming students can pick the transfer level math class of their choice regardless of their math background/qualifications), it is important that instructors have a Growth Mindset in our grading, such as allowing a student who did not understand the material by the day of the test but did master the content by the end of the semester to be able to do a make up exam. With the potential to for students to sign up for classes that they are not adequately prepared for, this flexibility in student assessment will be key to many students' success. So the need for proctoring capability starting Fall 2019 will be critical to many instructors' strategies for supporting struggling students while still maintaining the rigor of the course. Our temporary proctoring center will truly put students first and if we have the full IA coverage we once had before the loss of our 10-hr IA position that would make achieving this goal less complicated.

Several of our faculty have been involved in active-learning workshops, such as OnCourse and STEM Faculty Learning Program, and have felt that these activities have really improved their classroom climate and student learning. We would like for all of our faculty to participate in one of these programs or the like to help improve success and retention across the campus, but they are expensive and sometimes lengthy. We continue to support Communities of Practice within our department; Growth Mindset activities were developed two years ago and are being used and improved within our classrooms; our department meets regularly for "Initiatives" meetings to collaborate and work on the needs of the department (this year's focus is content development in support of AB 705 implementation). We will continue to foster this culture of collaboration within our department, as we all learn from each other.

Mark an X before to each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxt			
	Community Partnerships/Outreach	X	Facilities, Supplies and Equipment, Software	X	LPC Planning Priorities	X	Services to Students
X	Curriculum committee items		Financial/Budgetary	X	LPC Collaborations		SLO/SAO Process
X	Enrollment Management	X	Human Resources	X	Pedagogy	X	Technology Use
X	External Factors	X	Learning Support	X	Professional Development		

Section Two: Current Topics (Required for All Programs)

- A. **Educational Master Plan:** A list of goals and strategies appears on page ii of the Educational Master Plan, which can be accessed here: (<https://goo.gl/1AefkX>). If applicable, describe how your program's upcoming plans reflect the goals described in the college's Educational Master Plan (your plans are described in Section 1, Questions H-I, or on a previous program review if you did not complete this year's Program Snapshot).

- A. Educational Excellence:** our department continues to critically evaluate our own teaching and to hire quality instructors. We participate in different types of professional development activities and strive to share that learning with the department, especially after we incorporate it in the classroom. The Title V HSI grant has allowed our department to make improvements that we didn't have the manpower to accomplish quickly and effectively. We worked last year to align our course offerings so that students taking sequential courses had similar course offering days/times and their schedules were more predictable semester to semester. Our Math Club/Math Honor Society attracts significant numbers of students who are engaged in the club activities. We have worked closely with the Tutorial Center and using categorical funds (BSI/BSSOT/HSI) to hire tutors to work in Emporium and the Math Learning Center this past year.
- B. Community Collaboration:** We meet with the local high school math instructors on a regular basis to discuss curriculum alignment and upcoming changes in our programs. Our inclusion in the Engineering Tech program allows our department to collaborate with other departments and the Advisory Board (consisting of Industry representatives) to support a cohort of students each year.
- C. Supportive Organizational Structures:** Staffing has been challenging but we have been able to offer our classes through hiring additional part-time faculty. Emporium is utilizing Impero, a web-browser monitoring system that allows the administrator (instructor or IA) to lock computer browsers while students are taking computer-based exams. This hopefully will be expanded to other computer labs across campus, as instructors of face-to-face classes would like to control what webpages students can access during class or while taking exams and using technology on the computer (this could be greatly helpful in a statistics class for example, where students need to use either graphing calculators or Excel for complicated computations).
- D. Organizational Effectiveness:** We are requesting more robust professional development, specifically for best practices in teaching. Some faculty participating in Active Learning workshops are changing their classrooms with student success in mind; we would like for this to be shared effectively and encouraged with all math faculty.

- B. **Program-Set Standard (Instructional Programs Only):** Did your program meet its program-set standard for successful course completion? yes no

Program-set standard data can be found on this page:

<http://www.laspositascollege.edu/research/outcomes.php>

If your program did not meet your program-set standard, discuss possible reasons and how this may affect program planning or resource requests.

n/a

C. Facilities: Do you have any facilities needs that are currently unmet? If yes, please describe.

YES: Although bldg 1000 provided additional computer labs, with implementation of AB 705 we are going to need even more computer labs for more statistics classes and our concurrent support classes.

As mentioned above, The Math Department would like a joint facility for the Tutorial Center/Math Learning Center, and Math Emporium classroom and proctoring. This would allow us to streamline personnel and strengthen student learning supports. The **Proctoring Center** would then ideally support the campus and be staffed by a classified professional.

D. Professional Development

Section 87153 of California Education Code specifies the type of Professional Development activities that may be funded by the Community College Professional Development Program. You can review these activities here: <https://goo.gl/w8sqBM>

D1. Summarize the aspects of professional development that have been working well for your program. This might include the process of obtaining funds, the types of training your program members have been attending, etc.

With BSSOT, BSI, CTE and Strong Workforce, our department has been benefiting from the different moneys available on campus and attending various conferences and workshops across the country.

Some faculty have had the benefit of participating in Growth Mindset and Habits of Mind Communities of Practice, attending various conferences held by state and national organizations (CMC3, RP Group, CAP, AMATYC, 3CSN), attending 3-day or 1-day OnCourse active learning strategies workshops, or participating in a semester-long STEM Faculty Learning Program run by CSU East Bay (sponsored by NSF grant). These activities have changed the way some of us teach; but all faculty cannot benefit from these primarily due to expense and time. Mandatory FLEX has provided our department with opportunities to share major changes in our program and to discuss these changes across disciplines and departments, resulting in rich collaborations.

D2. Summarize any needs, desires and visions your program has regarding professional development, as well as any challenges.

Our instructors need professional development in teaching mathematics effectively, especially in light of the changes coming to LPC Fall 2019 due to the implementation of AB705 and the new funding model. Instructors will need to embrace practices beyond traditional lecture of the course material to help potential underprepared students succeed in their course. While it is difficult to encourage all of our full-time faculty to take the time to embrace this type of professional development, it is extremely difficult to encourage part-time faculty, who are working multiple places, to take time for any professional development when they also have professional responsibility hours to fulfill that can be used towards extremely limited activities. We as a department really need to develop good pedagogy and encourage our faculty to participate in meaningful workshops, trainings, and conferences to become better teachers to then improve the overall success of our department and of our students. It is vital to the success of our program to help professionally develop our instructors to become more effective teachers, to help close achievement gaps on disproportionately impacted students, to help our students become better students, and improve the overall climate within our department.

The recommendation across the state is to heavily invest in professional development that will help faculty and classified professionals (Instructional Assistants) best serve students who would have formerly been placed in basic skills Math classes. This professional development would include, but not be limited to, the following:

- Viewing Students with a Capacity Mindset (Growth Mindset)
- Backwards Design
- Best Practices in Teaching: Just-in-time Remediation
- Reading Apprenticeship – specifically to mathematics, reading a math textbook and making thinking visible in application problems
- CAP AB705 Curriculum-Design Workshops
- Working with Wrap-Around Services
- Working with ESL and DSPS Student Needs
- Supporting At-Risk Student Populations (i.e. male students of color)

The need, desire, and vision our program has is to offer this kind of robust and relevant professional development to both full-time and part-time faculty in Math. We would like to offer as much in-house professional development as possible due to cost and expediency. This would require the following:

- additional coordination time (CAH);
- willingness to allow the department to compensate part-time faculty, preferably allowing them to use Professional Responsibility hours, as they are very time restricted (part-time faculty often do not have time to do additional professional development – which is vital as we respond to AB705 – in addition to other campus-wide professional responsibility activities. The program need is that our part-time faculty be “professionally developed” to respond to urgent student needs.
- Time at college days / Town Hall to meet with counseling, English, and ESL to coordinate our efforts and support Guided Pathways.

The department would also like LPC to financially support and help expand Professional Development activities:

- Math Initiatives Meetings for our full- and part-time faculty members (ongoing)
- Communities of Practice within our department in teaching specific courses
- Peer-Observation Pools across disciplines
- Developing faculty in Active Learning Strategies who can then teach those practices to others within the department (and at large)

Challenges:

- Coordination time (CAH) for researching, designing, organizing, and offering robust and meaningful professional development in response to AB705
- Coordinated, clear, useful, and timely lists for each academic year or semester of how Math part-time faculty may fulfill their professional responsibility needs, which would include dean and department-approved professional development activities responding to AB705 programmatic changes.

E. Program Suggestions (optional): What questions or suggestions do you have regarding the Program Review forms or process?

Keep the form similar to this! This format will easily upload into a Google Doc, and the entire department can contribute to one version simultaneously instead of having multiple versions floating around in emails or on Canvas. This was greatly beneficial to our large department 😊

Section Three: SLOs/SAOs (Required for All Programs)

A. In the box below, copy and paste your “Plans for Analysis of SLO/SAO Data” from last year's Program Review. This plan can be found in the [2017 Program Review](#) Section 1 Question L.

(If discussing multiple PSLO/SAOs copy the box below as needed.)

Hello reader! I'm choosing to keep all of this information in one box since it works for the way the department is planning and assessing our SLOS. - Jennie

Circle One: <u>CSLO</u> <u>PSLO</u> SAO
Course, Program Name, or Student Service Area: Mathematics
Text of CSLO/PSLO/SAO: <u>PSLOs:</u> <ul style="list-style-type: none">• Communication: Students will read, write, listen to, and speak mathematics with understanding.• Modeling: Students will learn mathematics through modeling real-world situations. <u>CSLOs that relate to the above PSLOs</u> Pre-Transfer Level: Math 107: <ul style="list-style-type: none">• a student should be able to interpret the results of an application in the context of the problem. (Communication)• a student should be able to set up and solve applications involving ratios, rates, or proportions. (Modeling) Math 110(formerly 65): <ul style="list-style-type: none">• a student should be able to interpret the slope in the context of a problem. (Communication)• a student should be able to construct a linear model based on a given situation. (Modeling) Math 55: <ul style="list-style-type: none">• a student should be able to interpret the solution of an applied problem that uses a function. (Communication)• a student should be able to solve an applied problem using a function. (Modeling) Math 50: <ul style="list-style-type: none">• a student should be able to solve and interpret an applied problem using a function. (Communication)• a student should be able to write an exponential function model. (Modeling) Transfer Level - STEM Math 39:

- a student should be able to identify and describe the period, amplitude and phase shift of a sine or cosine function. (Communication)
- a student should be able to solve an application problem using law of sines or law of cosines. (Modeling)

Math 20/45: (Note: Math 30 replaced these classes, so looked at both sets of data).

- a student should be able to graph and identify the main features of a rational function without using a graphing utility. (Communication)
- a student should be able to model a problem using exponential growth or decay. (Modeling)

Math 1:

- a student should be able to evaluate and interpret a definite integral. (Communication)
- a student should be able to construct an optimization model and use it to find the desired quantity. (Modeling)

Math 2:

- a student should be able to determine the interval of convergence for a power series. (Communication)
- a student should be able to determine an arc length using parametric equations. (Modeling)

Math 3:

- a student should be able to interpret directional derivatives, including the gradient. (Communication)
- a student should be able to solve an optimization problem by using the method of LaGrange multipliers. (Modeling)

Transfer Level - SLAM

Math 34:

- a student should be able to calculate the marginal cost, marginal profit, and marginal revenue and discuss their meaning in the context of an applied problem.
- a student should be able to write a differential equation that models an applied problem.

Math 40:

- a student should be able to determine whether or not there is significant correlation for a bivariate data set, and if so, fit a linear regression equation and use it for data prediction.
- a student should be able to perform the steps for a hypothesis test about a single population parameter and interpret the result.

Math 47:

- a student should be able to develop and use an appropriate model (linear or exponential) for a given problem.
- a student should be able to find the probability of an event and explain the meaning of the value found.

Note: Math 5,7,10,33 not discussed due to lack of data. These classes are only offered once a semester or once a year. Will wait until the three year cycle when more data is available and then discuss.

If you plan to analyze a PSLO, identify the courses that are mapped to the PSLO.

1, 2, 3, 5, 7, 40

B. Below, report on your program's progress on the plan described in Question (A) above.

Text of CSLO/PSLO/SAO:

Math Looked at all of the CSLOs related the listed PSLOs for most of our courses. Results summarized below.

SLOs: Assessment data collected from almost every sections over 2 semesters.

SAOs: Assessment data collected from _____ students over _____ semesters.

Describe the quantitative or qualitative results

Note: Mastery for this discussion uses the data for the Mastery and Above Average columns.

Pre-Transfer Level:

- Math 107 had more mastery in modeling (46.27%) than in communication (44.03%), but neither SLO has the Mastery numbers we would like to see.
- The trend continued in Math 110: Modeling (40.8%) and Communication (43.96%) and Math 55: Modeling (38.08%) and Communication (45.35%).
- Noticed the downward trend in the mastery level of these SLOs as the students progress from 107 to 55.
- Math 50's Comm SLO, which is very similar to Math 55's Modeling and Comm SLOs has a Mastery Level of 48.31%, which is higher than the Math 55 Mastery rate, but in this course the function that is typically used for this SLO is Linear, whereas in 55 the functions typically used are quadratic or exponential. This matches the Math 50 modeling SLO that has an 39.32% mastery rate.

Transfer Level - STEM

- Math 39: Modeling (63.41%) and Communication (60.5%).
- Math 20: Modeling (61.32%) and Communication (54.43%) and Math 45: Modeling (71.19%) and Communication (83.08%).
- Math 1: Modeling (35.21%) and Communication (64.1%).
- Math 2: Modeling (53.6%) and Communication (56.21%).
- Math 3: Modeling (74.22%) and Communication (82.03%).

Transfer Level - SLAMish

- Math 34: Modeling (52%) and Communication (66.22%).
- Math 40: Modeling (67.85%) and Communication (61.43%).
- Math 47: Modeling (53.12%) and Communication (61.72%).

Discuss and reflect upon student achievement for this CSLO/PSLO/SAO. Discuss any actions taken so far (and results, if known) and your action plan for the future:

Pre-Transfer Level:

- Those who had higher mastery rates noted that the use of Lab assignments or worksheets on the topic helped students understand these concepts.
- Some 55 instructors noted that group work designed to address modeling worked well.
- Other 55 instructors suggested having students draw pictures for word problems along with continually emphasizing communication and reasoning in class yielded good results.
- Looking ahead, some instructors mentioned incorporating more Growth Mindset materials in their classes to help students overcome their fear of word problems – suggestion from the group was to show a video about GRIT in the classroom right before a collaboration on applications. Instructors also noted that they needed to build into their questions a prompt to have students communicate what a number means in the context of a word problem.

Transfer Level - STEM

- Math 39 – Instructors with higher mastery rates noted that they spent more time on the topics for each SLO and devoted Labs to enhance the topics. Some instructors mentioned that students did not do as well with Tan/Cot for graphing, so it may be a good idea to emphasize these more. Similarly, varying the types of application problems used for law of sine and cosine applications to determine if students can handle a slightly different setup in that type of application.
- Math 20/45 – we did not examine these reflections as a group due to Math 20 and 45 being deactivated in eLumen. However, it is interesting to note that the Math 20 SLOs both had lower mastery rates than the Math 45 SLOs – this could be due to more challenging questions in Pre-calc vs. College Algebra, but it is hard to say. Fall 2018, students from both of these classes are now forced into once class: Math 30, so it will be interesting to see what happens when these SLOs are revisited.
- Math 1: The reflections show that optimization (modeling) needs to be covered a little slower and with more review throughout the semester. As with most applications, this topic can take some time for students to fully grasp it. Many instructors noted that they would also try to add in some group work to give students an opportunity to discuss. For the communication SLO, many instructors noted that students did not have a hard time with the evaluation of the integral, but struggled with the interpretations, so more time needs to be spent emphasizing the importance of what the results mean in the context of a question.
- Math 2: Suggestions ranged from stressing the value of class attendance and homework completion to spending a little more time on these topic in class. Instructors who felt there students did alright commented that they gave handouts and in class activities that allowed for repeated practice and student-to-student interactions. Another instructor noted that, especially for the Interval of Convergence question, that writing an assessment question that directly tests that topic without having the student find the power series first might yield different results.
- Math 3: Both SLOs had relatively high levels of mastery, but one instructor did caution that while students had an easy time of finding the gradient (it being fresher in their minds), they struggled finding the directional derivative and interpreting, so it is a good idea to continually review that topic after it is introduced.
- General notes: Using tools such as GEOGEBRA are a great way to insert interactive and static graphics into your course, especially for the calculus sequence. The calculus

sequence is in the stages of a textbook transition: Math 1 started with Thomas Fall 2017, but 2 and 3 stuck with Stewart. For Spring 2018, Math 3 used Steward. Fall 2018 marks the first semester where all instructors are using Thomas.

Transfer Level - SLAM-ish

- In general, reflections showed that increasing the number of examples and group work opportunities, along with coming up with strategies to get students to stop skipping class. Emphasizing interpretation, real world applications and foreshadow more concepts.
- For Math 47: Find a way to help students relate to the material. This makes it less of a chore and more fun. Could be a curriculum change. Consider attaching the Lab hour to this class instead of having it TBA. Consensus was that students struggled with the algebraic concepts of finding the equation of a line that they were supposed to come into the class with, but did fine with the newer topic of probability that was learned during that semester. Retention of information needs work.

What changes in student achievement are evident across the semesters you analyzed? What are some possible explanations for these changes?

For both Transfer Level STEM and SLAM-ish courses, there was a drop in mastery of topics from Fall 2017 to Spring 2018. While this could, in some cases, be the result of missing data or more sections offered in the Spring versus Fall it should be noted that as of Fall 2017, the placement test students took to place them in their Spring 2018 classes was based on Multiple Measures. So, this could be the result of students taking a class above their skill level. This guess is further reinforced by the fact that the pre-transfer level classes did not have the same dip in mastery rates as the transfer level classes. With AB705 implementation on the horizon, it is likely that the SLO numbers will continue to decline until we fully build in supports to assist students in being successful in their chosen course.

DO you plan to continue tracking this SLO in the next year? Explain.

No. These PSLOs/SLOs will cycle to the assessment phase in three years when we will look at them again. Given all of the changes coming to Math Fall 2019, the department decided to hold off and let things settle before looking at the assessment results for these SLOs.

C. Planning: What are your future plans (either new or continuing) for SLO/SAO analysis for next year? Identify the PSLOs, CSLOs, or SAOs that your program plans to focus on the upcoming year with subsequent analysis (next year's program review). (Copy the box below as needed.) Nope

Circle One:

CSLO **PSLO** SAO

Course, Program Name, or Student Service Area:

Mathematics

Text of CSLO/PSLO/SAO:

PSLOS

- Multiple Representations: Students will demonstrate the ability to use symbolic,

graphical, numerical, and written representations of mathematical ideas.

- Technology: Students will use appropriate technology to enhance their mathematical thinking and understanding, solve mathematical problems, and judge the reasonableness of their results.

CSLOS that relate to the above PSLOs

Pre-Transfer Level

Math 107:

- Write a fraction in decimal form and as a percentage.

Math 110:

- Construct multiple representations of a linear equation (numerical, graphical, or symbolic).

Math 55:

- Construct multiple representations of a function (numerical, graphical, or symbolic).

Math 50:

- Construct multiple representations of a function (numerical, graphical, or symbolic).
- Given a data set, use technology to graph a scatter plot of the data and find the line of best fit (linear regression).

Transfer Level - STEM

Math 30:

- Find extrema and zeros using a graphing calculator and/or other technology.

Math 39:

- Define trigonometric functions in terms of the right triangle, using coordinates of a point and distance from the origin, and using the unit circle.
- Solve a trigonometric equation that does not involve any of the standard angles as solutions, making usage of a calculator necessary.

Math 1:

- Find the volume of a solid of revolution using washers or shells.
- Find the roots of a function using Newton's method.

Math 2:

- Evaluate an integral using a power series representation.
- Numerically evaluate an integral using Simpson's Rule and determine the error.

Math 3:

- Evaluating a surface integral for vector functions using parameterization of the surface or using the Divergence theorem.

Math 5: (All SLOS reviewed since sufficient data count achieved.)

- Model an RLC using differential equations.
- Use the method of Laplace transforms to solve a differential equation.
- Construct and interpret the solution of a mass-spring system.

- Use a 4th order Runge-Kutta algorithm to solve an equation numerically.

Math 7: (All SLOS reviewed since sufficient data count achieved.)

- Determine if a set is a subspace of a vector space.
- Set up a system of Linear Equations to represent a network and then solve the system.
- Diagonalize a matrix.
- Use software to solve a least squares problem.

Math 10: (All SLOS reviewed since sufficient data count achieved.)

- Write a coherent formal proof using mathematical induction.
- Use mathematical reasoning and counting techniques to correctly enumerate the number of ways in which a specified event can occur.
- Determine whether a relation is an equivalence relation.
- Create an undirected graph that represents the network of objects in a set and find a minimum spanning tree for the graph.

Transfer Level - SLAMish

Math 40:

- Build a frequency distribution for, and make a histogram of, quantitative data.
- Use a computer program to make a graph of categorical data.

Math 47:

- Translate a statement into symbolic logic notation.

Math 34:

- Graph an elementary function by hand using the 1st and 2nd derivatives.
- Solve an amortization problem involving the use of a calculator.

Math 33: (All SLOS reviewed since sufficient data count achieved.)

- Write a system of linear equations and inequalities that represent the relationships between the quantities in a linear programming problem and represent the solution graphically and verbally.
- Find the probability of an event and explain the meaning of the value found.
- Model an applied problem by writing a system of linear inequalities or equalities.
- Solve a system of linear equations in matrix form by hand (without using a calculator).
- Use the financial functions on a graphing calculator to answer questions about loans or annuities

If you plan to analyze a PSLO, identify the courses that are mapped to the PSLO.

1, 2, 3, 5, 7, 40

D. SLO/SAO Suggestions (optional): What questions or suggestions do you have regarding SLO/SAO planning, assessment and reporting?

**Section Four: Curriculum Review
(Programs with Courses Only)**

The following questions ask you to review your program's curriculum. To see the last outline revision date and revision due date:

1. Log in to CurricUNET
2. Select "Course Outline Report" under "Reports/Interfaces"
3. Select the report as an Excel file or as HTML

Curriculum Updates

A. Title V Updates: Are any of your courses requiring an update to stay within the 5 year cycle? List courses needing updates below.

No

B. Degree/Certificate Updates: Are any degrees/certificates requiring an update to do changes to courses (title, units) or addition/deactivation of courses? List needed changes below.

No

C. DE Courses/Degrees/Certificates: Detail your department's plans, if any, for adding DE courses, degrees, and/or certificates. For new DE degrees and/or certificates (those offered completely online), please include a brief rationale as to why the degree/certificate will be offered online.

Course outlines were updated for several of our math courses to include the option of offering a hybrid or DE version: Math 30, 33, 34, 39 (first-level transfer courses), 1 and 2, and interest exists to offer at least one of these starting Fall 2019. To apply for OEI inclusion, a course must be offered online first. We want to offer DE courses for those students who have restricting schedules as long as the courses are beneficial for the students. The department is looking to submit at least one course to the OEI soon, and the courses above give us options as to what we could potentially offer.