The Comprehensive Instructional Program Review Report

1. College: Berkeley City College

Discipline, Department or Program: Mathematics

Date: December 2, 15

Members of the Comprehensive Instructional Program Review Team: Kelly Pernell (Math Chair), Rick Wing (Math Faculty), Theresa Rowland (Dean)

Members of the Validation Team:

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2. Narrative Description of the Discipline, Department or Program:

Mission

The mission of the Berkeley City College mathematics department is to ensure that every student graduates, transfers or progresses into a career as a disciplined, literate and ethical individual, proficient at using mathematics and quantitative reasoning appropriately to analyze and solve complex problems in the real world.

Strategic Planning Goals

Advance Student Access, Success & Equity

The Math Department supports PACE, PERSIST, FYE, and other BCC learning community programs by offering specific math sections that fit the needs of the students in each program.

We offer an accelerated pathway to transfer level statistics that helps students achieve their Quantitative Reasoning requirements for AA-T and AS-T degrees. This helps improve a student's chance of completing their educational goals within a two-year period.

Engage our Communities and Partners

The Math Department collaborates with the English, ESL, and Counseling departments, BCC's administration, and representatives from local high schools to assist students transitioning from high school to community college. We help administration and counseling to define multiple measures for placing students into math courses.

We support all of BCC's CTE programs by offering math courses required for all degrees and certificates.

We assist BCC in hosting various community events that involve mathematics and other STEM fields.

Build Programs of Distinction

The Math Department also offers special math courses such as Math 18 Math for Educators and Math 16A/B Calculus for Business and Social Sciences at least once per year so that students can complete other BCC academic programs within a two-year period.

Create a Culture of Innovation and Collaboration

The Math Department collaborates with counselors to find accelerated pathways through the developmental math sequence so that basic skills students get to transfer level math within a two-year period. We also work together to find ways for students in science, engineering, or computer science to accelerate through the math perquisite courses for their majors.

The Math Department collaborates with the math departments at the other Peralta colleges to ensure that students have a wide range of course offerings to meet their schedules and to ensure that each department succeeds in offering the full math program (AS-T) at their respective campuses.

Develop Resources to Advance and Sustain Mission

The Math Department works with the Learning Resource Center to find innovative ways to provide much needed tutorial services to our students.

We work with the Academic Senate to provide math representation on various committees that directly impact student success (eg Education Committee, Equity Committee, Facilities, PIE). We work with the administration to find faculty to represent mathematics in basic skills and for various state initiatives.

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3. Curriculum:

Most Recent Mathematics Curriculum Report (October 2015)

Role of the Mathematics Discipline at BCC

Mathematics courses align with the Institutional Learning Outcomes: Computational Skills and Critical Thinking.

Mathematics courses at the college tend to fall into three broad categories: foundational basic skills courses, mathematics for liberal arts majors, and mathematics for STEM majors.

Through its foundational (basic skills) courses and accelerated pathways through the program, the department addresses the advancement of student access, equity, and success.
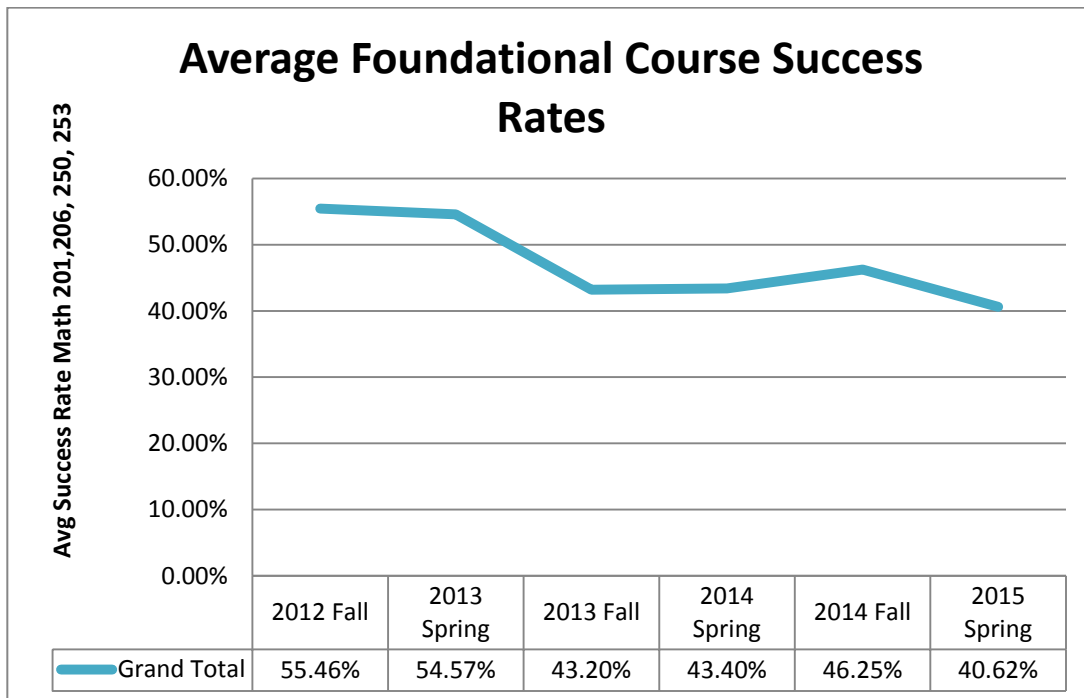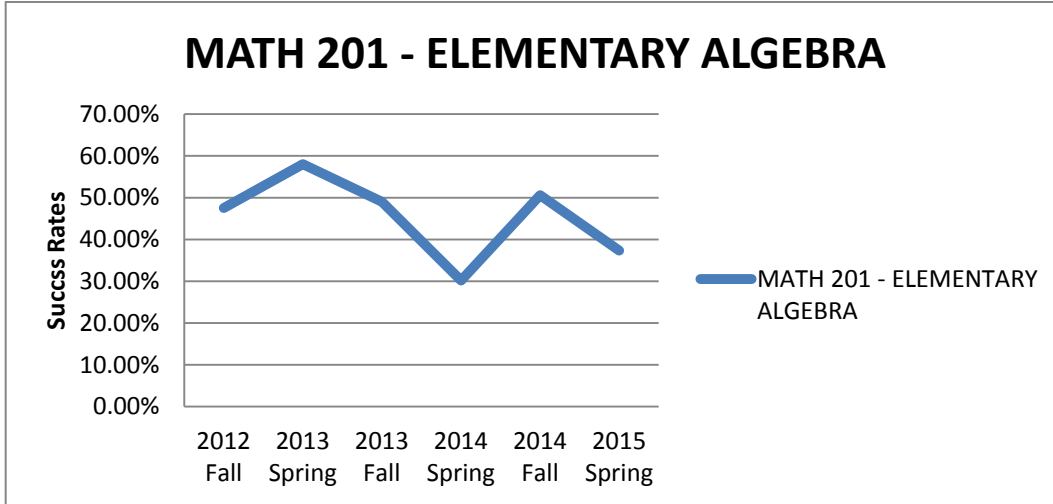
As stated above in Part 1. the goals of the department align with the strategic goals of the college:

- Advance student access, equity, and success
- Build a Program of Distinction
- Strengthen Accountability, Innovation and Collaboration
- Develop and manage resources to advance our mission
- Engage and Leverage Partners

Purposes of Courses and Programs

Basic Skills/Foundational Courses and Support Courses:

- Math 250 Arithmetic (basic skills)
- Math 253 Pre-algebra (basic skills)
- Math 201 Elementary Algebra (foundational)
- Math 206 Algebra for Statistics (foundational)

MATH 201 - ELEMENTARY ALGEBRA

Average Foundational Course Success Rates

	2012 Fall	2013 Spring	2013 Fall	2014 Spring	2014 Fall	2015 Spring
Grand Total	55.46%	54.57%	43.20%	43.40%	46.25%	40.62%

General Education Courses:

- Math 202 Geometry (PCCD GE only)
- Math 203 Intermediate Algebra (PCCD GE only)
- Math 13 Introduction to Statistics
- Math 18 Real Number Systems (PCCD and CSU only)
- Math 50 Trigonometry (PCCD and CSU only)
- Math 1 Pre-calculus
- Math 2 Pre-calculus with Analytic Geometry
- Math 16A Calculus I for Business and the Life and Social Sciences
- Math 16B Calculus II for Business and the Life and Social Sciences
- Math 3A Calculus I
- Math 3B Calculus II
- Math 3C Calculus III
- Math 3E Linear Algebra
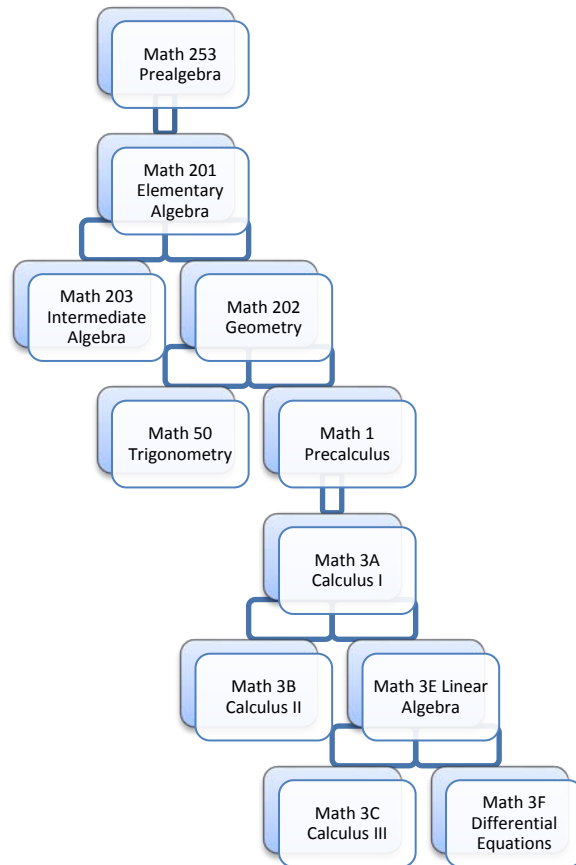- Math 3F Differential Equations

Pathway to Transfer Level Math Courses

Math 203 Intermediate Algebra → Math 13 Introduction to Statistics, Math 50 Trigonometry, Math 1 Precalculus, Math 18 Real Number Systems
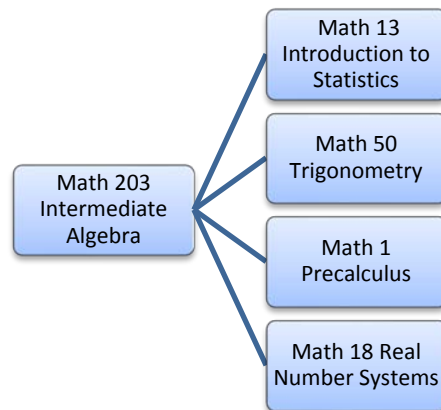
Required Courses for the AS-T Mathematics Degree:

- Math 3A Calculus I
- Math 3B Calculus II
- Math 3C Calculus III
- Math 3E Linear Algebra
- Math 3F Differential Equations

Accelerated Pathway to AS-T Mathematics Degree

Math 253
Prealgebra

Math 201
Elementary
Algebra

Math 203
Intermediate
Algebra

Math 202
Geometry

Math 50
Trigonometry

Math 1
Precalculus

Math 3A
Calculus I

Math 3B
Calculus II

Math 3E Linear
Algebra

Math 3C
Calculus III

Math 3F
Differential
Equations

Success Rates of AS-T Math Courses

	2012 Fall	2013 Spring	2013 Fall	2014 Spring	2014 Fall	2015 Spring
Grand Total	59.57%	56.36%	66.99%	71.26%	75.32%	77.31%

Average Success Rates (y-axis: 0.00% – 90.00%)

Required Courses for other AA/AS AA-T/AS-T Degrees and Certificates of Achievement/Proficiency

- Math 1 Pre-calculus (Biotechnology AS, Biotechnology CA)
- Math 13 Introduction to Statistics (Business Administration AS-T, Psychology AA-T)
- Math 16A Calculus I for Business & the Life & Social Sciences (Business Administration AS-T)
- Math 18 Real Number Systems (Elementary Teacher Education AS-T, Teacher Aide CA)
- Math 201 Elementary Algebra (Biotechnology CP)

Transfer Focus:

- Math 13 Introduction to Statistics
- Math 3A Calculus I

Electives:

Math 13 Introduction to Statistics is an elective for the Political Science AA-T.

Role in Interdisciplinary Programs and Learning Communities
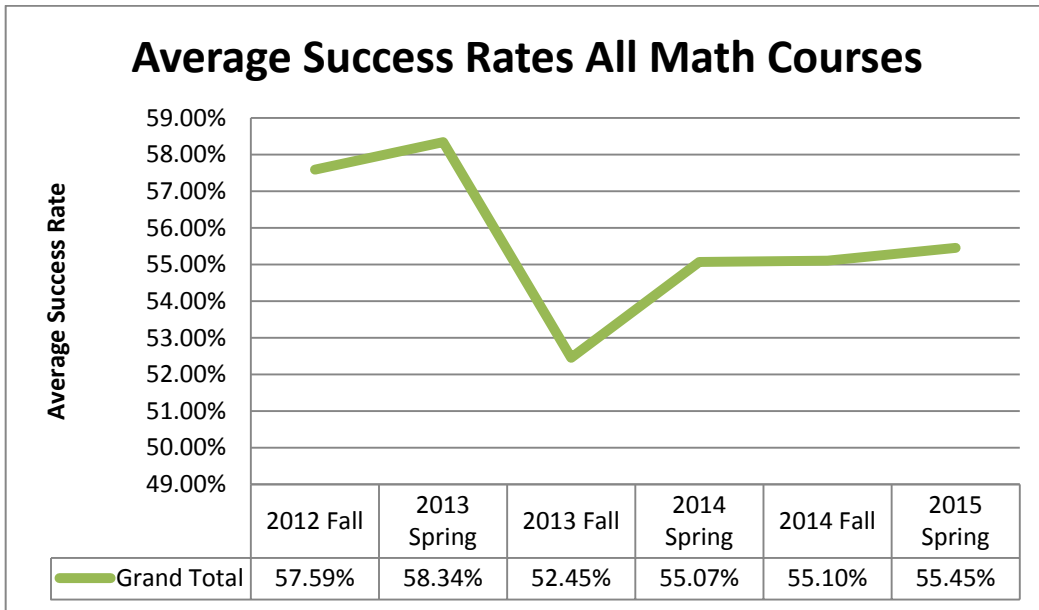
The Math Department supports PACE, PERSIST, FYE, and other BCC learning community programs by offering specific math sections that fit the needs of the students in each program.

We offer an accelerated pathway to transfer level statistics that helps students achieve their Quantitative Reasoning requirements for AD-T and AS-T degrees. This helps improve a student's chance of completing their educational goals within a two-year period.

Role of Non-Credit Curriculum
As of now, no noncredit courses are offered in the Mathematics discipline. However, it might be worth exploring the use of noncredit for foundational and support classes.
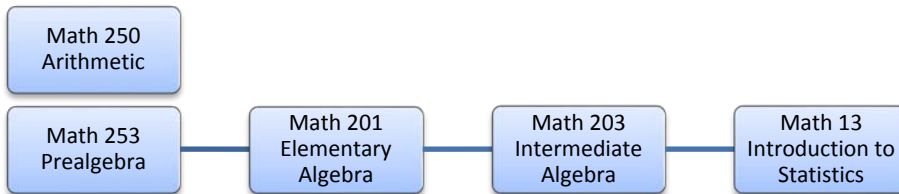
Special Characteristics Challenges of the Discipline

Average Success Rates All Math Courses

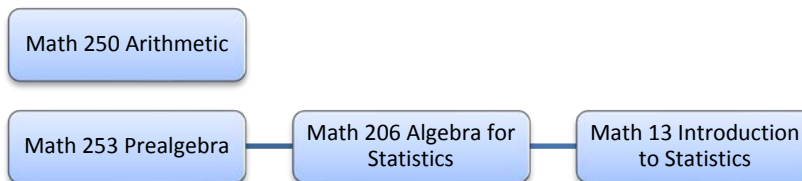|	2012 Fall	2013 Spring	2013 Fall	2014 Spring	2014 Fall	2015 Spring
Grand Total	57.59%	58.34%	52.45%	55.07%	55.10%	55.45%

The math program is a purely sequential program. New students take an assessment exam to determine where to start within the sequence. Unfortunately, many students initially place into math courses one or two levels below where they need to be to graduate within the time frame they want. At the state level, we are working on a common assessment tool that will hopefully place students more accurately (appropriately). Peralta is also working on a district-wide multiple measures process that allows students to alternatively place into math courses based on high school GPA and previous math courses taken and grades earned.

To date, Berkeley City College is the only college in the Peralta District to offer an accelerated pathway to statistics. College of Alameda has expressed interest in adopting our Math 206 Algebra for Statistics Course, but the college has yet to offer it.

Traditional Pathway to Statistics

Math 250 Arithmetic

Math 253 Prealgebra — Math 201 Elementary Algebra — Math 203 Intermediate Algebra — Math 13 Introduction to Statistics

Accelerated Pathway to Statistics

Math 250 Arithmetic

Math 253 Prealgebra — Math 206 Algebra for Statistics — Math 13 Introduction to Statistics

Another special characteristic of the BCC mathematics department is that we offer more sections of Math 1 Pre-calculus than any other college in the district -- by a large margin. BCC on average offers 5-6 sections of Math 1 Pre-calculus each semester. Laney and Merritt each offer just one section per term. College of Alameda does not offer the course. Math 2 Pre-calculus with Analytic Geometry is the traditional pre-calculus course offered district wide. It's also worth noting that the other colleges only offer 1 – 3 sections of Math 2 per term, making BCC the campus with the highest enrollment of precalculus students The difference between Math 1 and Math 2 is the prerequisite. After Math 203 Intermediate Algebra, students can take Math 1 Pre-calculus and Math 50 Trigonometry concurrently to accelerate their path to Math 3A Calculus I. Students must take Math 50 Trigonometry before they can enroll in Math 2. Also, after Math 203 Intermediate Algebra, students only need to take Math 1 Pre-calculus to get to Math 16A Business Calculus. Business is one of the largest degree/certificate programs at Berkeley City College.

Accelerated Pathway to Math 3A Calculus I (3 terms)
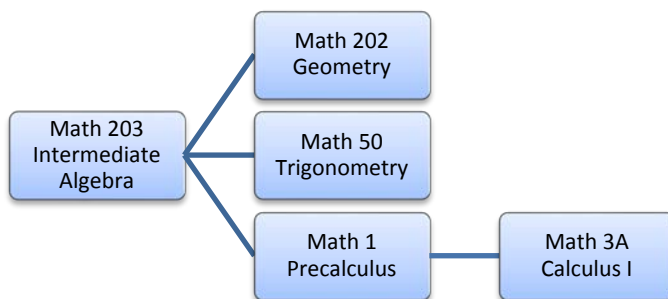
Traditional Pathway to Math 3A Calculus I (4 terms)
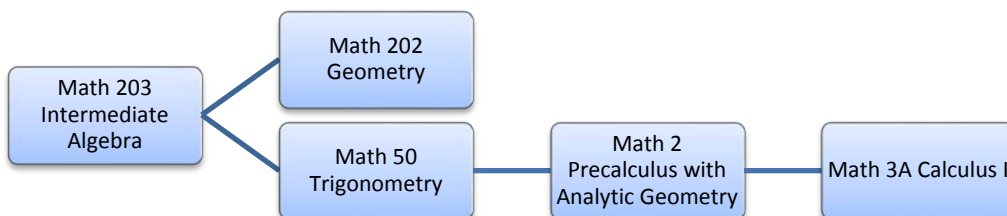
One of the challenges of offering so many sections of Math 1 Pre-calculus is that students often make the mistake of not taking Math 50 Trigonometry before enrolling in Math 3A Calculus I. They often challenge the prerequisite via multiple measures. Many often enroll in Math 3A unprepared to handle the trigonometry.

Programs

The discipline awards an Associate in Science for Transfer (AS-T) degree in Mathematics.

Students who complete the Math AS-T simultaneously complete the requirements for transfer at the junior level into the mathematics major at many four-year institutions, such as UC and CSU universities.

Several physics, engineering, and computer science majors often complete all courses in the Mathematics AS-T program.

BCC offers the full mathematics program in Fall and Spring terms. Students who initially place into Math 3A Calculus I can complete the program in 2 years.

Students majoring in STEM fields are encouraged to follow the path towards the AS-T Mathematics degree. Non-stem majors are generally guided towards the traditional and accelerated pathways to statistics. However, non-STEM majors can and do follow the AS-T Math path to satisfy their Quantitative Reasoning requirements for transfer and/or degree/certificate awards.

Enrollment Trends

Average Yearly Enrollment
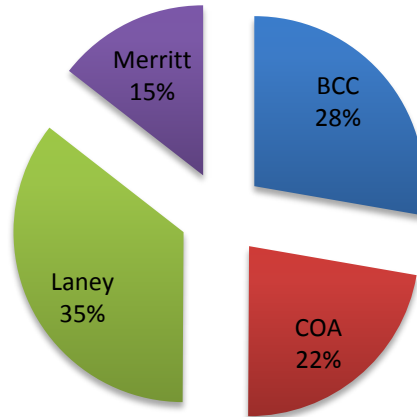
Course	BCC	COA	Laney	Merritt	District Total	BCC % of District Course Total
Math 13 Introduction to Statistics	937	797	973	386	3093	30%
Math 201 Elementary Algebra	579	678	886	564	2707	21%
Math 203 Intermediate Algebra	537	709	889	454	2589	21%
Math 253 Prealgebra	352	332	509	419	1612	22%
Math 250 Arithmetic	272	279	502	387	1440	19%
Math 3A Calculus I	363	131	537	43	1074	34%
Math 1 Pre-calculus	588	0	99	82	769	76%
Math 3B Calculus II	184	137	353	19	693	27%
Math 50 Trigonometry	161	239	224	6	630	26%
Math 2 Pre-calculus w/ Analytic Geometry	84	134	180	0	398	21%
Math 3C Calculus III	83	88	172	0	343	24%
Math 3E Linear Algebra	147	33	116	0	296	50%
Math 202 Geometry	73	89	103	15	280	26%
Math 3F Differential Equations	74	24	95	0	193	38%
Math 15 Math for Liberal Arts Students	0	0	115	0	115	0%
Math 206 Algebra for Statistics	109	0	0	0	109	100%
Math 11 Discrete Math	0	0	65	0	65	0%
Math 18 Real Number Systems	9	0	0	0	9	100%
Total:	4552 28%	3670 22%	5818 35%	2375 14%	16415	28%

Math vs College Productivity

	Summer		Fall		Spring	
	Math	College	Math	College	Math	College
■ 2012-13	17.59	16.32	20.73	18.91	18.82	18.56
■ 2013-14	15.81	15.6	19.15	18	19.4	17.86
■ 2014-15	17.64	16.81	20.1	17.63	19.66	17.36

Productivity
Highest Enrolled Classes

	2012 SUMMER	2012 FALL	2013 SPRING	2013 SUMMER	2013 FALL	2014 SPRING	2014 SUMMER	2014 FALL	2015 SPRING
■ MATH 3A - CALCULUS I	21.16	23.84	20.85	17.94	23.17	21.99	19.68	20.77	16.00
■ MATH 203 - INTERMEDIATE ALGEBRA	19.32	24.00	18.25	19.32	22.00	24.12	17.28	21.06	19.37
■ MATH 13 - INTRO TO STATISTICS	19.59	20.22	19.52	17.09	19.70	18.61	20.28	20.59	20.77
■ MATH 1 - PRE-CALCULUS	16.12	24.41	24.16	16.76	20.34	18.93	18.51	21.50	21.83
■ MATH 201 - ELEMENTARY ALGEBRA	17.02	18.13	22.17	14.72	18.40	22.07	17.25	22.46	22.83

Assessment

For each course, instructors who teach the course develop a paper-based SLO exam. The exam usually contains 1-2 questions aligned to each SLO. All sections of the course are given the SLO exam. Instructors grade and submit results to the department for data analysis. Final data analysis reports are shared with faculty in the department.

The last assessment cycle revealed that students have trouble with solving application problems and with graphing functions.

Though the department has assessed all courses, many courses require more refined assessment tools. One action plan for the department over the next three years is to review SLO statements and develop more refined assessment exams.

Course Updates

The math department will address the issues with the state C-ID approval status for Math 11, 18, 50, and 16B.

Many course outlines are out of date in Curricunet. To ensure currency, the math department will begin updating all course outlines in Spring 2016.

- What are the discipline, department or program of study plans for curriculum improvement (i.e., courses or programs to be developed, enhanced, or deactivated)?

    o The department plans to expand its accelerated pathway to transfer level statistics in an effort to improve success rates and to decrease the time to complete educational goals and/or transfer to a 4-year college or university.

    o The department will also explore developing new non-credit workshop classes to support students in their math classes. It will also explore re-activating a few of the half-credit modular hybrid courses developed three years ago (Math 248 series for Elementary and Intermediate Algebra topics, and the Math 348 series for Arithemetic and Pre-algebra level topics).

    o The department will explore converting Math 250 Arithmetic and Math 253 Pre-algebra to non-credit courses so students can repeat them multiple times.

    o The department will explore the development of a boot camp/foundational preparation class to be offered two weeks before the fall term starts. The purpose of this type of course is to prepare students to place higher on the assessment exam as well as to warm them up for their fall math courses.

- Please list your degrees and/or certificates. Can any of these degrees and/or certificates be completed through Distance Education (50% or more of the course online)? Which degree or certificate?

    The Berkeley City College Mathematics Department offers an Associates Degree for Transfer degree in Mathematics (AS-T). Currently, this degree cannot be completed through Distance Education because none of the core classes in the major are offered as hybrid or online courses.

4. Assessment:

Please answer the following questions and attach the TaskStream "At a Glance" report for your discipline, department, or program for the past three years Please review the "At a Glance" reports and answer the following questions.

COURSES	Data available from previous rounds?	Action Plan from Previous Rounds?	Notes:	Fall 2015	Spring 2016	Summer 2016*	Fall 2016	Spring 2017	Summer 2017*	Fall 2017	Spring 2018	Summer 2018*	When will the action plan be created?	Status Report?
MATH 001-Pre-Calculus	Y				X								Spring 18	
MATH 002-Pre-Calculus with Analytic Geometry	Y				X								Spring 18	
MATH 003A-Calculus I	Y						X						Spring 18	
MATH 003B-Calculus II	Y							X					Spring 18	
MATH 003C-Calculus III	Y							X					Spring 18	
MATH 003E-Linear Algebra	Y				X								Spring 18	
MATH 003F-Differential Equations	Y				X								Spring 18	
MATH 013-Introduction to Statistics	Y						X						Spring 18	
MATH 016A-Calculus for Business and the Life and Social Sciences	Y	Y					X						Spring 18	
MATH 016B Calculus for Business and the Life and Social Sciences	Y							X					Spring 18	
MATH 018 Real Number Systems	Y				X								Spring 18	
MATH 050-Trigonometry	Y				X								Spring 18	
MATH 201-Elementary Algebra	Y			X									Spring 18	

13

Course																
MATH 202-Geometry	Y			X											Spring 18	
MATH 203-Intermediate Algebra	Y				X										Spring 18	
MATH 206 Accelerated Math for Statistics	Y				X										Spring 18	
MATH 250-Arithmetic	Y			X											Spring 18	
MATH 253-Pre-Algebra	Y			X											Spring 18	
* Only for courses not offered during regular semesters																

Questions:

- How does your discipline, department or program ensure that students are aware of the learning outcomes of the courses and instructional programs in which they are enrolled? Where are your discipline, department or program course and program SLOs published? (For example: syllabi, catalog, department website, etc. If they are on a website, please include a live link to the page where they can be found)

  Student learning outcomes for all BCC math courses are available from the Berkeley City College Web site at http://www.berkeleycitycollege.edu/wp/slo/student-learning-outcomes/

  Math faculty also list student learning outcomes on course syllabi.

- Briefly describe at least three of the **most significant changes/improvements** your discipline, department or program made in the past three years as a response to course and program assessment results. Please state the course number or program name and assessment cycle (year) for each example and attach the data from the "Status Report" section of TaskStream for these findings.

  The Institutional Learning Outcome (ILO) Assessment Findings at BCC:

  Computational Skills/Quantitative Reasoning: All BCC mathematics courses were assessed prior to Spring 2012, using tests that were aligned with SLOs. In courses with multiple sections, all instructors used common test questions aligned with SLOs. Mathematics faculty discussed results and agreed that students were commonly demonstrating difficulty working with word problems.

  Improvement 1. The mathematics department invested in Math 206 Pathways to Statistics based on student success rates and SLO findings in Math 203 as well as the ILO Assessment Findings for Computational Skills/Quantitative Reasoning at BCC.

  > From the SLO results for Math 203: 30% of the students believe solving equations is most important and problem solving most difficult.

  Improvement 2. In Spring 2015, the mathematics department piloted the addition of embedded tutors in Basic Skills and Statistics classes based on poor SLO results for Math 13, Basic Skills success rates, and ILO findings for Computational Skills/Quantitative reasoning.

From the SLO results for Math 13, students did not meet the target success rate of 75% for Student Learning Outcomes: Interpret Data (success: 47% and Employ Rules of Probability Theory (success: 49%).

Improvement 3. The math department has increased its representation on various campus committees and given full support of various state initiatives such as the Clear Pathways for Transfer (CPT), and Multiple Measures Project for initial placement.

- Briefly describe three of the **most significant examples** of your discipline, department or program plans for course and /or program level improvement for the next three years as result of what you learned during the assessment process. Please state the course number or program name and attach the data from the "Assessment Findings and Action Plan" section for each example.

Plan 1. We need to revise SLO statements for many courses so they are less redundant.

Plan 2. We need to write more refined SLO assessment tests for courses that only have minute paper mini-assessment tests.

Plan 3. We need to continue to invest in the Embedded Tutoring program and Accelerated Pathways to Statistics as a result of poor results in solving and manipulating equations and expressions and poor results in word problems.

- Describe how assessment results for Distance Education courses and/or programs compare to the results for the corresponding face-to-face classes.
We do not know how SLO assessments for Distance Education courses differ or compare to corresponding face-to-face classes. This refined measure will be incorporated into our planning for SLO assessment improvement over the next three years.

- Describe assessment results for courses with multiple sections. Are there similar results in each section?

As described in the most recent Curriculum Report that is included in the Curriculum Section above:

For each course, instructors who teach the course develop a paper-based SLO exam. The exam usually contains 1-2 questions aligned to each SLO. All sections of the course are given the SLO exam. Instructors grade and submit results to the department for data analysis. Final data analysis reports are shared with faculty in the department.

The last assessment cycle revealed that students have trouble with solving application problems and with graphing functions.

Though the department has assessed all courses, many courses require more refined assessment tools. One action plan for the department over the next three years is to review SLO statements and develop more refined assessment exams.

- Describe your discipline, department or program participation in assessment of institutional level outcomes (ILOs).

Mathematics courses align with the Institutional Learning Outcomes: Computational Skills (Quantitative Reasoning) and Critical Thinking.

The mathematics department primarily focused on the ILO assessment of quantitative reasoning, which was based exclusively on course SLO assessments in the mathematics department. The high impact mathematics courses, such as Math 13, were assessed twice during one assessment cycle. Test results in most courses indicated that BCC students commonly have difficulties working with word problems. The Planning for Institutional Effectiveness (PIE) Committee developed an action plan to create sample word problems that are relevant to student lives. We are currently implementing the action plan.

- How are your course and/or program level outcomes aligned with the institutional level outcomes? Please describe and attach the "Goal Alignment Summary" from TaskStream.

Mathematics AS-T Curriculum Alignment Matrix

Course	Program Outcome 1	Program Outcome 2	Program Outcome 3	Program Outcome 4	Program Outcome 5	Program Outcome 6	Program Outcome 7
Calculus I	I, D		I, D	I, D	I		
Calculus II	M		M	M	I, D		
Calculus III	M	I, D, M	M	M	M		
Linear Algebra		M		M	M	I, D, M	
Differential Equations		M		M	M		I, D, M

PO 1: apply mean value theorems ILO's: computational skills, critical thinking
PO 2: solve problems for multivariable functions ILO's: computational skills, critical thinking
PO 3: graph and analyze basic functions ILO's: computational skills, critical thinking
PO 4: calculate derivatives ILO's: computational skills, critical thinking
PO 5: solve integration problems ILO's: computational skills, critical thinking
PO 6: solve linear systems ILO's: computational skills, critical thinking
PO 7: solve differential equations and analyze the solution sets ILO's: computational skills, critical thinking

Institutional Learning Outcomes:
- Ethics and Personal Responsibility
- Information Competency
- Communication
- Critical Thinking
- Computational Skills
- Global Awareness and Valuing Diversity
- Self-awareness and Interpersonal Skills

5. Instruction:

- Describe effective and innovative strategies used by faculty to involve students in the learning process.

  1. In Spring 2015, BCC piloted the addition of embedded tutors into basic skills and statistics courses. We expanded the embedded tutors to a few Math 3A Calculus courses and Math 2 Precalculus courses in Fall 2014.

  2. Several faculty members use the Piazza application. Piazza allows users to post mathematical expressions using Latex. It is a nice resource for students who want to ask math questions in an online public forum.

  3. In October 2015, the Associate Students of BCC (ASBCC) held a special meeting to address the equity gaps in student success in math courses. Several math faculty attended the meeting to gather information on what the students want and need to be more successful. More town halls to address this matter will be held in the coming months.

- How has new technology been used by the discipline, department or program to improve student learning?

  The department's Hybrid 250-253-201-203 sequence uses the same online course management software (MyMathLab). Students only need to purchase the e-textbook access once. Access works for all four courses in the sequence. This improves student access to the required text for these courses. Students have direct face-to-face contact with their instructor. They also have excellent online tools that are included in the software such as interactive guidance through the homework, automatic grading with an aggregated results report that directs/suggests topics for students to focus on to improve mastery and understanding.

  Most hybrid courses in the math department are scheduled in Room 321 because it has a laptop cart. the Hybrid 250-253-201-203 courses require a lab classroom setting. Therefore, while the hybrid courses are scheduled in Room 321, maintenance of the cart and laptops is required. Enrollment trends and productivity rates suggest increased demand for all of these courses.

  Some instructors of Calculus, Linear Algebra, and Differential Equations use the online application/web site Piazza to help students with homework. The application allows users to post mathematical expressions and equations using Latex.

- How does the discipline, department, or program maintain the integrity and consistency of academic standards with all methods of delivery, including face-to-face, hybrid, and Distance Education courses?

  The math department maintains a list of standard textbooks to use for all courses offered in the department. Each semester, the math department offers two combined sections each of Math 250/253 and Math 201/203. These are hybrid courses that use the MyMathLab online course management system. Faculty who teach the sections collaborate and develop a common course syllabus, offer the same homework assignments, and administer the same structure of exams. Students can take any course in the 250-253-201-203 sequence with the purchase of one access code.

  Each term faculty are reminded to cover all topics listed in the course outline record for the courses they teach.

- How do you ensure that Distance Education classes have the same level of rigor as the corresponding face-to-face classes?

  The topics/lecture content listed in the Course Outline of Record (COR) are covered in Distance Education classes.

Evaluation of written work is necessary in evaluating the skill level of a math student. The department agrees to require that some paper work be submitted either scanned electronically or sent via snail mail (US mail) – either under the category of homework, quiz, or exam.

The department agrees to require that at least 30% of the course grade come from at least one in-person exam (some combination of midterm and final is okay). Therefore, though BCC has a few sections classified as online courses, in actuality, the department only offers Hybrid sections.

The department and administration need to address the re-classification of all online math courses as hybrid. Student success rates certainly support the need to decrease online course offerings. Success rates are significantly lower in online courses than they are for traditional face-to face sections.

- Briefly discuss the enrollment trends of your discipline, department or program. Include the following:

    o Overall enrollment trends in the past three years

Three-Year Enrollment Trends by Term
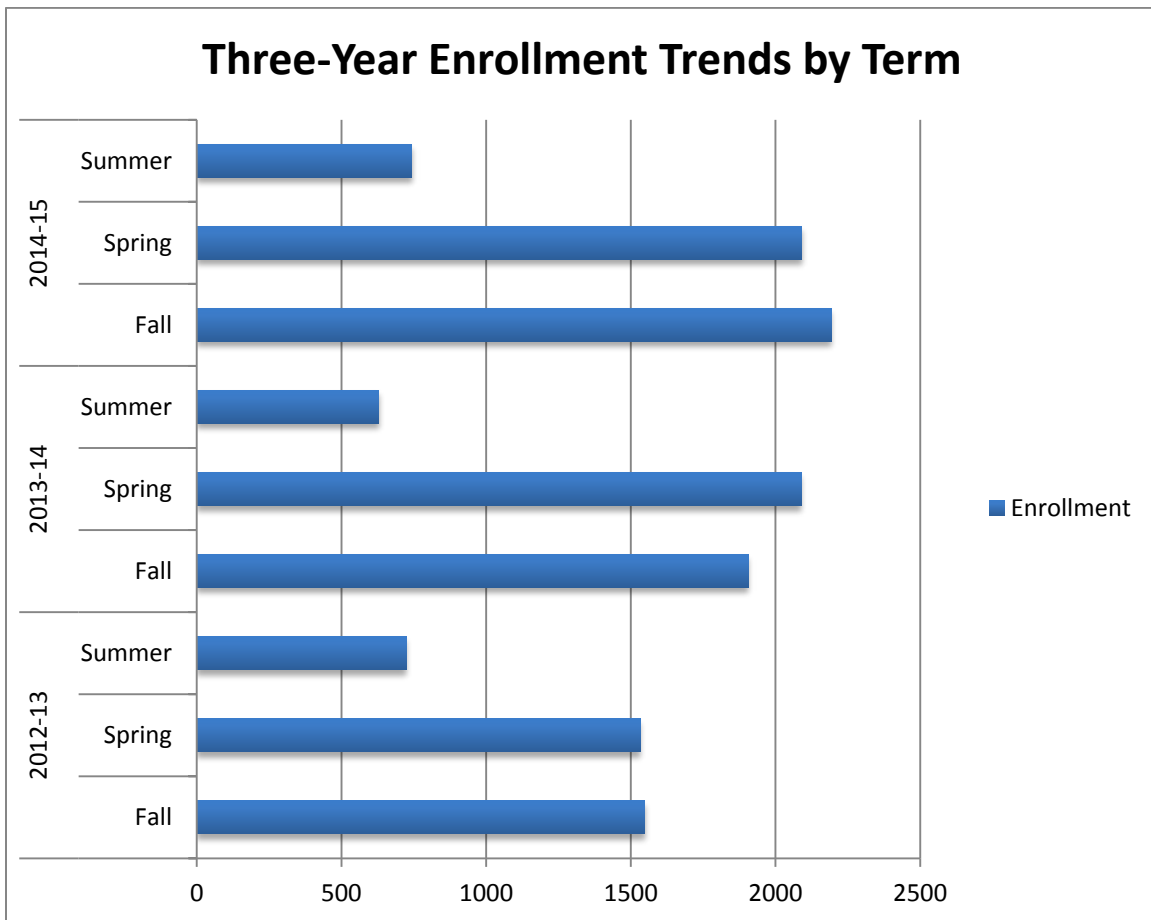
Berkeley City College Mathematics Department Three-Year Enrollment Trends By Term

	2012 Summer	2012 Fall	2013 Spring	2013 Summer	2013 Fall	2014 Spring	2014 Summer	2014 Fall	2015 Spring
Total	724	1,549	1,532	629	1,906	2,089	742	2,193	2,091

Average Yearly Enrollment by Course and Course Level
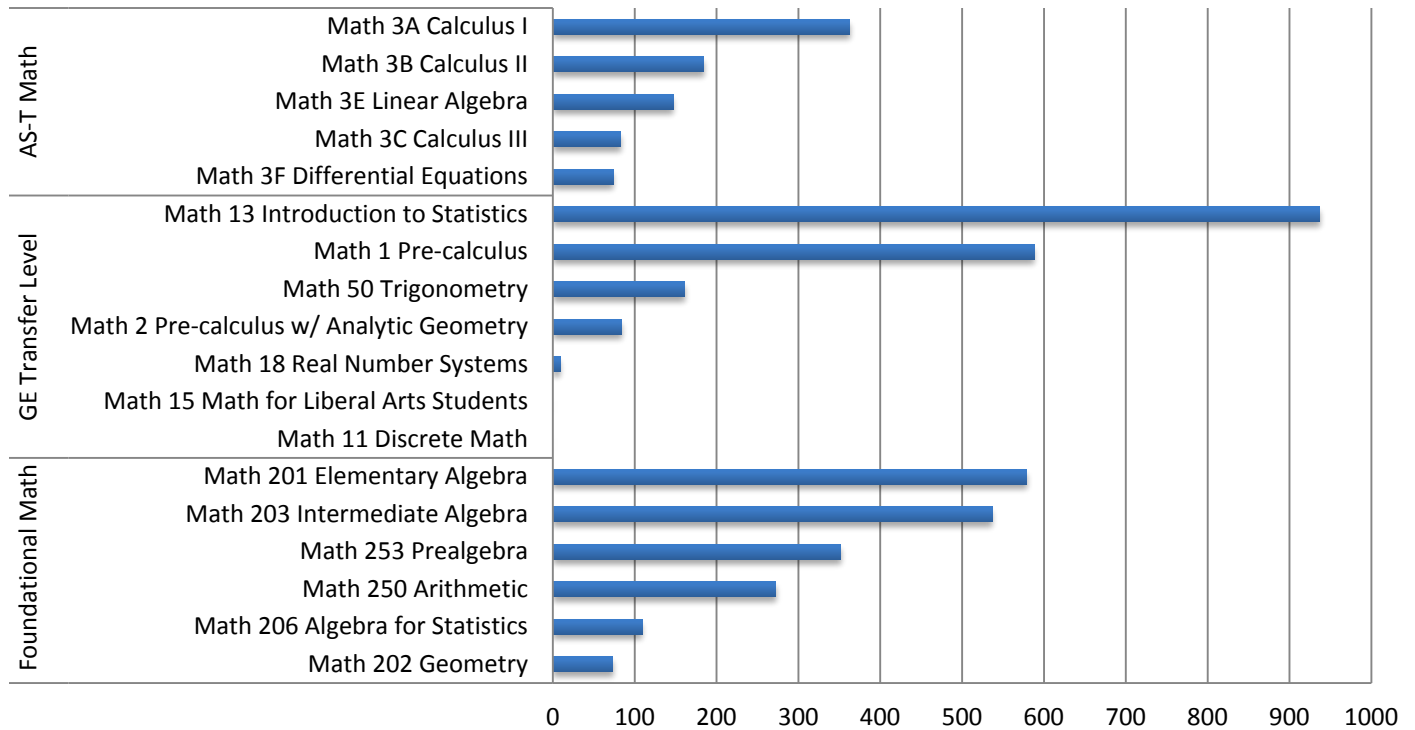
	Foundational Math						GE Transfer Level						AS-T Math				
	Math 202 Geometry	Math 206 Algebra for Statistics	Math 250 Arithmetic	Math 253 Prealgebra	Math 203 Intermediate Algebra	Math 201 Elementary Algebra	Math 11 Discrete Math	Math 15 Math for Liberal Arts Students	Math 18 Real Number Systems	Math 2 Pre-calculus w/ Analytic Geometry	Math 50 Trigonometry	Math 1 Pre-calculus	Math 13 Introduction to Statistics	Math 3F Differential Equations	Math 3C Calculus III	Math 3E Linear Algebra	Math 3B Calculus II	Math 3A Calculus I
Enrollment	73	109	272	352	537	579	0	0	9	84	161	588	937	74	83	147	184	363

Enrollment Trends Fall Term
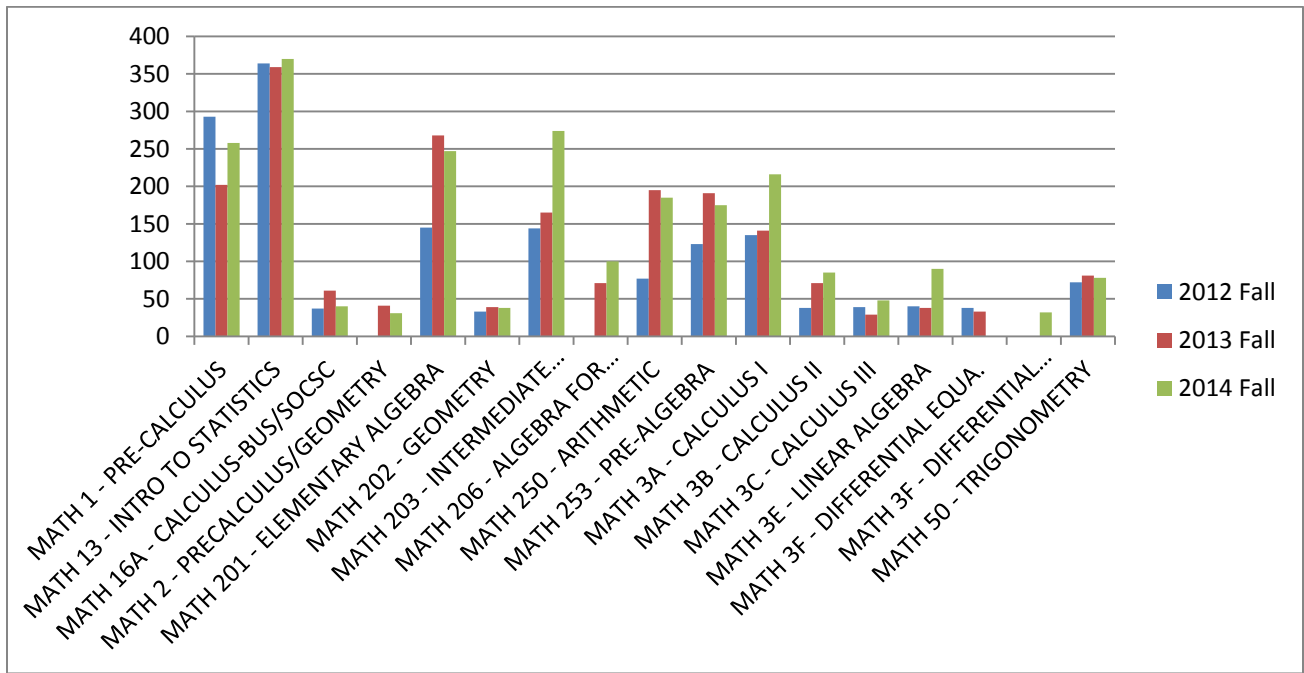
The most significant increases in Fall enrollment occurs for the following math courses: 1, 13, 201, 203, 206, 250, 3A, 3B, 3C, and 3E.

Enrollment Trends Spring Term
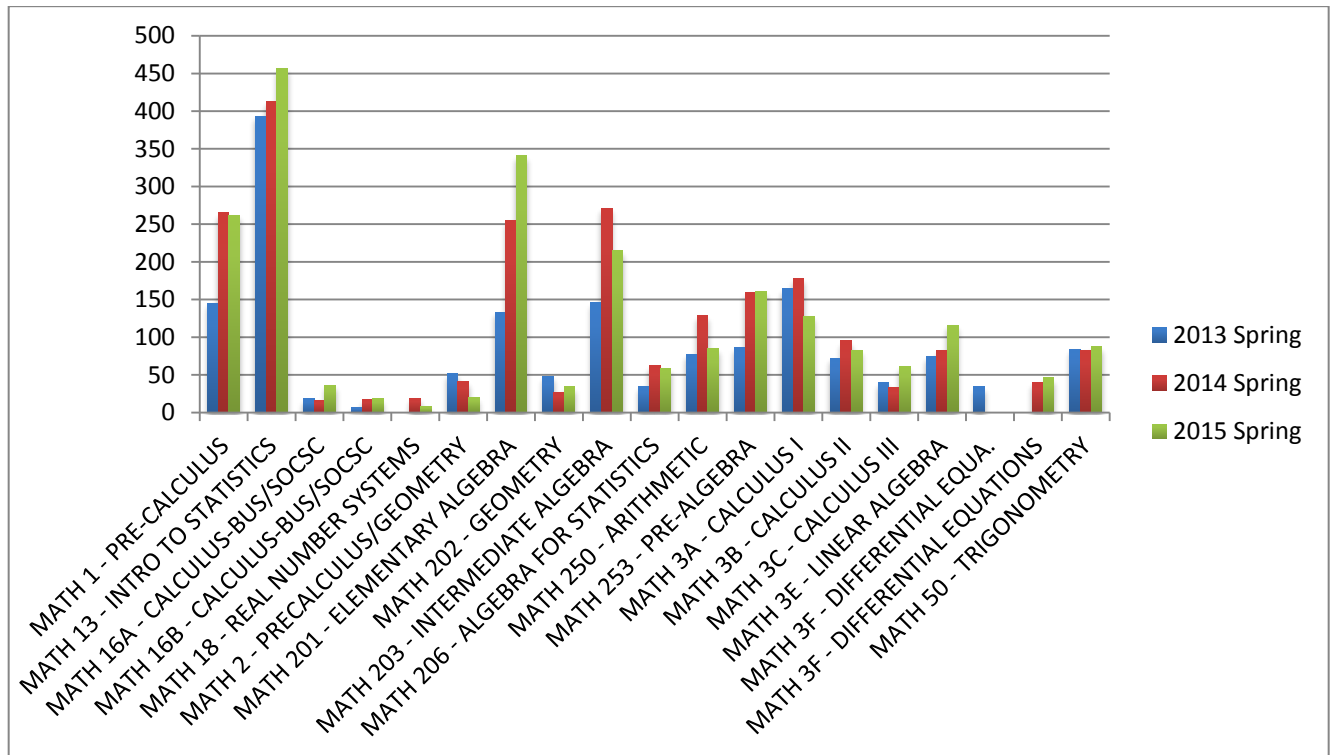
The most significant increases in Spring enrollment occur for the following math courses: 1, 13, 201, 206, 3A, 3C, and 3E.

Enrollment Trends Summer Term

The most significant increases in Summer enrollment occur for the following math courses: 201, 3B

- An explanation of student demand (or lack thereof) for specific courses.
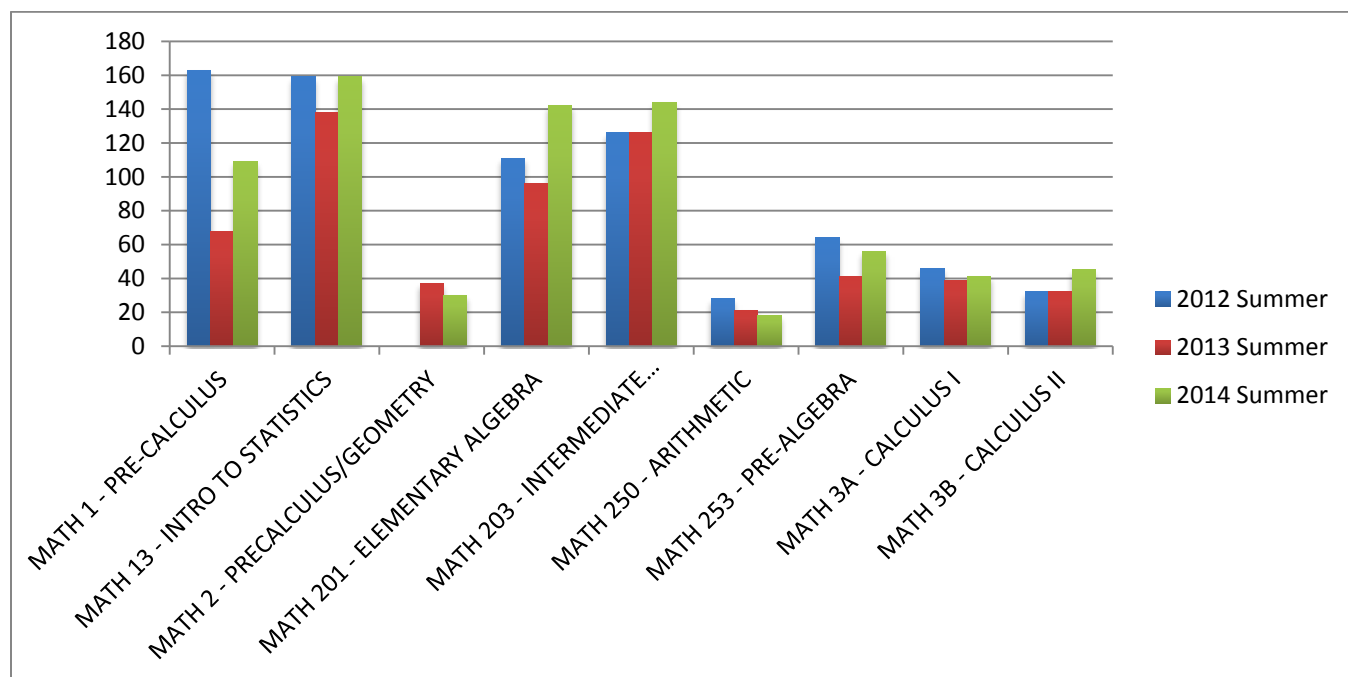 - Courses in highest demand in the Spring and Fall terms:

    1- Math 201 Elementary Algebra
    2- Math 203 Intermediate Algebra
    3- Math 13 Introduction to Statistics (in highest demand)
    4- Math 1 Pre-calculus
    5- Math 3A Calculus I

  - Math 18 Real Number Systems is a required course for the Elementary Teacher Education AS-T and Teacher's Aide Certificate of Achievement. It is currently offered once per year. Enrollment is currently low because the AS-T is relatively new.

- Productivity for the discipline, department, or program compared to the college

Mathematics Department Productivity Rate

Productivity	Term								
	2012 SUMMER	2012 FALL	2013 SPRING	2013 SUMMER	2013 FALL	2014 SPRING	2014 SUMMER	2014 FALL	2015 SPRING
Total	17.59	20.73	18.82	15.81	19.15	19.40	17.64	20.10	19.66

College Productivity Rate

Productivity	Term								
	2012 SUMMER	2012 FALL	2013 SPRING	2013 SUMMER	2013 FALL	2014 SPRING	2014 SUMMER	2014 FALL	2015 SPRING
Total	16.32	18.91	18.56	15.60	18.00	17.86	16.81	17.63	17.36

Math vs College Productivity

	Summer Math	Summer College	Fall Math	Fall College	Spring Math	Spring College
2012-13	17.59	16.32	20.73	18.91	18.82	18.56
2013-14	15.81	15.6	19.15	18	19.4	17.86
2014-15	17.64	16.81	20.1	17.63	19.66	17.36
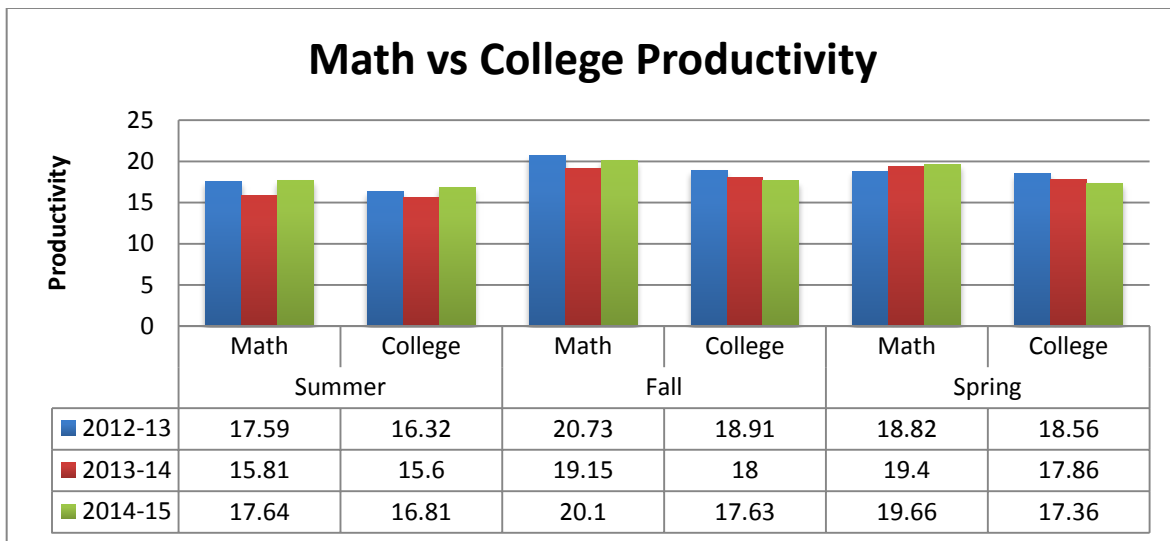
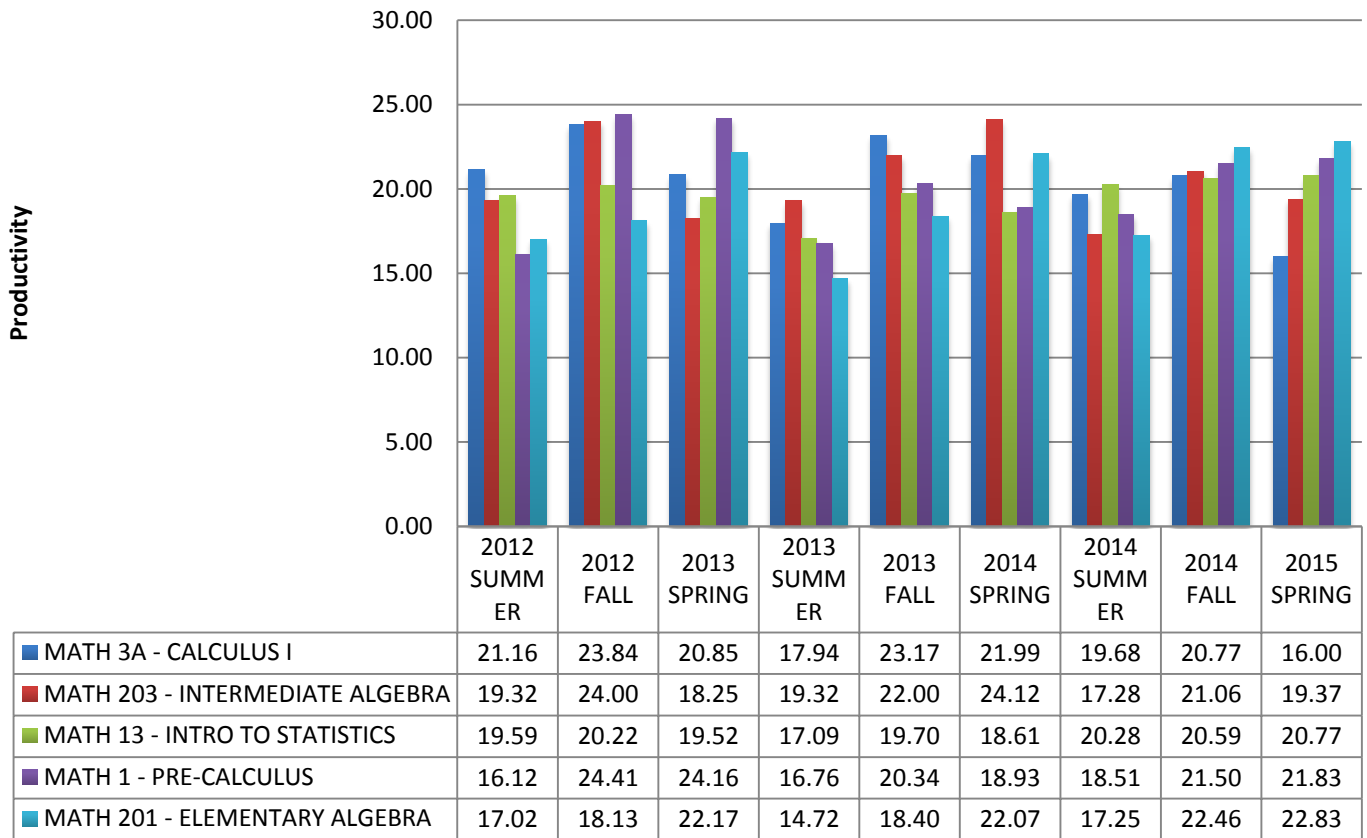**Berkeley City College Mathematics Department Productivity Rate by Course**

Productivity Course	Term 2012 SUMMER	2012 FALL	2013 SPRING	2013 SUMMER	2013 FALL	2014 SPRING	2014 SUMMER	2014 FALL	2015 SPRING
MATH 1 - PRE-CALCULUS	16.12	24.41	24.16	16.76	20.34	18.93	18.51	21.50	21.83
MATH 13 - INTRO TO STATISTICS	19.59	20.22	19.52	17.09	19.70	18.61	20.28	20.59	20.77
MATH 16A - CALCULUS-BUS/SOCSC	NA	18.50	9.00	NA	15.25	8.00	NA	20.00	18.00
MATH 16B - CALCULUS-BUS/SOCSC	NA	NA	3.50	NA	NA	8.50	NA	NA	9.00
MATH 18 - REAL NUMBER SYSTEMS	NA	NA	NA	NA	NA	9.50	NA	NA	4.00
MATH 2 - PRECALCULUS/GEOMETRY	NA	NA	13.00	17.02	20.50	20.50	14.40	15.50	10.00
MATH 201 - ELEMENTARY ALGEBRA	17.02	18.13	22.17	14.72	18.40	22.07	17.25	22.46	22.83
MATH 202 - GEOMETRY	NA	16.03	11.55	NA	18.94	12.34	NA	17.37	15.54
MATH 203 - INTERMEDIATE ALGEBRA	19.32	24.00	18.25	19.32	22.00	24.12	17.28	21.06	19.37
MATH 206 - ALGEBRA FOR STATISTICS	NA	NA	17.50	NA	17.75	15.75	NA	16.67	14.75
MATH 250 - ARITHMETIC	15.33	17.51	17.40	9.20	16.15	15.61	8.23	16.07	15.68
MATH 253 - PRE-ALGEBRA	14.76	20.50	21.50	9.60	19.27	15.35	13.71	18.41	16.88
MATH 3A - CALCULUS I	21.16	23.84	20.85	17.94	23.17	21.99	19.68	20.77	16.00
MATH 3B - CALCULUS II	14.72	19.00	18.00	14.72	17.75	23.75	21.60	21.25	20.50
MATH 3C - CALCULUS III	NA	19.50	20.00	NA	14.50	16.50	NA	24.00	30.50
MATH 3E - LINEAR ALGEBRA	NA	20.00	18.75	NA	19.00	20.50	NA	22.50	29.00
MATH 3F - DIFFERENTIAL EQUA.	NA	19.00	17.00	NA	16.50	NA	NA	NA	NA
MATH 3F - DIFFERENTIAL EQUATIONS	NA	NA	NA	NA	NA	20.00	NA	16.00	23.00
MATH 50 - TRIGONOMETRY	NA	17.29	21.28	NA	19.54	21.89	NA	18.75	21.43

Productivity
Highest Enrolled Classes

	2012 SUMMER	2012 FALL	2013 SPRING	2013 SUMMER	2013 FALL	2014 SPRING	2014 SUMMER	2014 FALL	2015 SPRING
MATH 3A - CALCULUS I	21.16	23.84	20.85	17.94	23.17	21.99	19.68	20.77	16.00
MATH 203 - INTERMEDIATE ALGEBRA	19.32	24.00	18.25	19.32	22.00	24.12	17.28	21.06	19.37
MATH 13 - INTRO TO STATISTICS	19.59	20.22	19.52	17.09	19.70	18.61	20.28	20.59	20.77
MATH 1 - PRE-CALCULUS	16.12	24.41	24.16	16.76	20.34	18.93	18.51	21.50	21.83
MATH 201 - ELEMENTARY ALGEBRA	17.02	18.13	22.17	14.72	18.40	22.07	17.25	22.46	22.83

- Salient factors, if known, affecting the enrollment and productivity trends you mention above.

  The average yearly enrollment in a course is for the most part dependent on the number of sections BCC offers. Most courses have very high productivity.

  There a few low enrolled courses:

  Math 18 Real Number Systems.
  This is a relatively new course. It is part of the Education AS-T degree. We expect enrollment to increase as the AS-T is more widely promoted.

  Math 16B Calculus II for Business, Social & Life Sciences
  We offer one section of this course in the Fall and in Spring terms. Most students choose to enroll in the Math 3ABC engineering calculus sequence. When compared to the Math 16AB Business Calculus sequence Math 3ABC satisfies the transfer requirements for more majors. It is possible that the articulation of Math 16B with CSU may also motivate students to take Math 3B vs Math 16B as well. The department is working with the campus Articulation Officer to update and submit the course outline for Math 16B so that more students can take Math 16B to satisfy math requirements for transfer.

- Are courses scheduled in a manner that meets student needs and demands? How do you know?

  Yes. The math department offers courses with multiple sections in the morning, afternoon, evening, and online. We ensure that students taking courses twice per week or once per week can still take a math course. We offer a variety of day schedules: Monday and Wednesday, Tuesday and Thursday, Saturday and online.

High productivity suggest that we need to expand our offerings. In the last few years, computer science majors at BCC have been asking for Math 11 Discrete Math. Laney College is the only college in the district to offer Discrete Math. Average yearly enrollment of Math 11 at Laney College (over the last three years) is 65. If enrollment increases for this course, BCC may choose to reactivate it for the program.

The productivity in Math 201 Elementary Algebra is too high. In Spring 2015 it was 22.83. This suggests that average class size across all sections is above 40. Success rates for this course in Spring 2015 were a dismal 37.35% (See the Productivity Table above, and the Success Rates Table on the next page.)

- Recommendations and priorities.

Recommendations:

- Monitor enrollment closely two weeks before and two weeks after classes start. Offer a few late-start math classes to meet student demand. Late start classes will allow greater access for students to start a math class on the first day. This is a good strategy to improve student success.

- Monitor Laney's enrollment of Math 11 Discrete Math. Consider offering one section of Math 11 Discrete Math to support computer science majors at BCC.

- Student success rates show that students do much better in face-to-face math courses than they do in online courses. When adding new sections, try to offer face-to face classes. If classroom space is unavailable, then consider adding hybrid sections. Online sections should only be considered for college transferrable courses. Foundational success rates in Math 250, 253, and 201 are too low to offer online sections.

- Lower the class maximum of Math 201 Elementary Algebra to 30 students. Increase the number of sections to meet student demand. Please see section 6 on Student Success to see that Elementary Algebra success rates are below 40%. Foundational courses need extra support because they contain higher percentages of our disproportionately impacted groups. Lowering class size allows greater attention and support for these students.

- Increase the number of sections of Math 206 Algebra for Statistics to support high school-to-college projects.

- Develop Foundational, Math 13, Math 1 & 50, and Math 3AB Workshop courses that are offered through the Learning Resources Center. These could be offered as credit or non-credit courses.

6. Student Success:

- Describe course completion rates *(% of students that earned a grade "C" or better or "Credit")* in the discipline, department, or program for the past three years. Please list each course separately. How do the discipline, department, or program course completion rates compare to the college course completion standard?

College course completion standard 70%

Success	Term								
	2012	2012	2013	2013	2013	2014	2014	2014	2015
Course	Summer	Fall	Spring	Summer	Fall	Spring	Summer	Fall	Spring
MATH 1 - PRE-CALCULUS	44.72%	58.70%	68.28%	56.72%	51.34%	59.23%	32.11%	43.57%	63.60%
MATH 13 - INTRO TO STATISTICS	65.41%	48.72%	56.74%	56.20%	53.91%	58.11%	68.55%	53.55%	53.85%
MATH 16A - CALCULUS-BUS/SOCSC	NA	27.03%	27.78%	NA	55.74%	56.25%	NA	65.00%	36.11%
MATH 16B - CALCULUS-BUS/SOCSC	NA	NA	71.43%	NA	NA	82.35%	NA	NA	77.78%
MATH 18 - REAL NUMBER SYSTEMS	NA	NA	NA	NA	NA	94.74%	NA	NA	100.00%
MATH 2 - PRECALCULUS/GEOMETRY	NA	NA	78.85%	81.08%	68.29%	34.15%	80.00%	45.16%	40.00%
MATH 201 - ELEMENTARY ALGEBRA	68.18%	47.52%	58.02%	79.17%	49.04%	30.20%	60.00%	50.61%	37.35%
MATH 202 - GEOMETRY	NA	45.16%	50.00%	NA	43.24%	40.74%	NA	42.11%	52.00%
MATH 203 - INTERMEDIATE ALGEBRA	69.84%	83.80%	56.85%	78.86%	47.27%	48.34%	70.83%	57.72%	56.74%
MATH 206 - ALGEBRA FOR STATISTICS	NA	NA	54.29%	NA	66.20%	76.19%	NA	55.00%	54.24%
MATH 250 - ARITHMETIC	28.57%	65.79%	39.47%	42.86%	35.08%	30.23%	72.22%	41.62%	25.88%
MATH 253 - PRE-ALGEBRA	62.30%	58.20%	62.79%	66.67%	34.43%	62.26%	53.57%	40.00%	50.31%
MATH 3A - CALCULUS I	52.17%	64.66%	59.15%	51.28%	72.34%	72.47%	68.29%	74.54%	58.59%
MATH 3B - CALCULUS II	80.65%	37.84%	41.67%	62.50%	42.25%	64.21%	77.78%	66.67%	66.67%
MATH 3C - CALCULUS III	NA	64.10%	65.00%	NA	75.86%	69.70%	NA	68.75%	86.89%
MATH 3E - LINEAR ALGEBRA	NA	47.37%	50.67%	NA	76.32%	73.17%	NA	87.78%	95.69%
MATH 3F - DIFFERENTIAL EQUA.	NA	71.43%	76.47%	NA	78.79%	NA	NA	NA	NA
MATH 3F - DIFFERENTIAL EQUATIONS	NA	NA	NA	NA	NA	80.00%	NA	78.13%	89.13%
MATH 50 - TRIGONOMETRY	NA	68.57%	72.62%	NA	77.78%	50.62%	NA	52.56%	41.18%
Grand Total	**60.11%**	**57.59%**	**58.34%**	**66.50%**	**52.45%**	**55.07%**	**61.99%**	**55.10%**	**55.45%**

Discussion:

In Spring 2014 and Spring 2015, Math 201 Elementary Algebra reported its lowest success rates. It is worth noting that productivity rates for Elementary Algebra for these two semesters were among the highest rates reported in the course over the last three years. Recommendation: Lower the class maximum for Math 201 Elementary Algebra. Put an embedded tutor into each section of this course.

Spring & Fall Success Rates

Highest Enrolled Classes
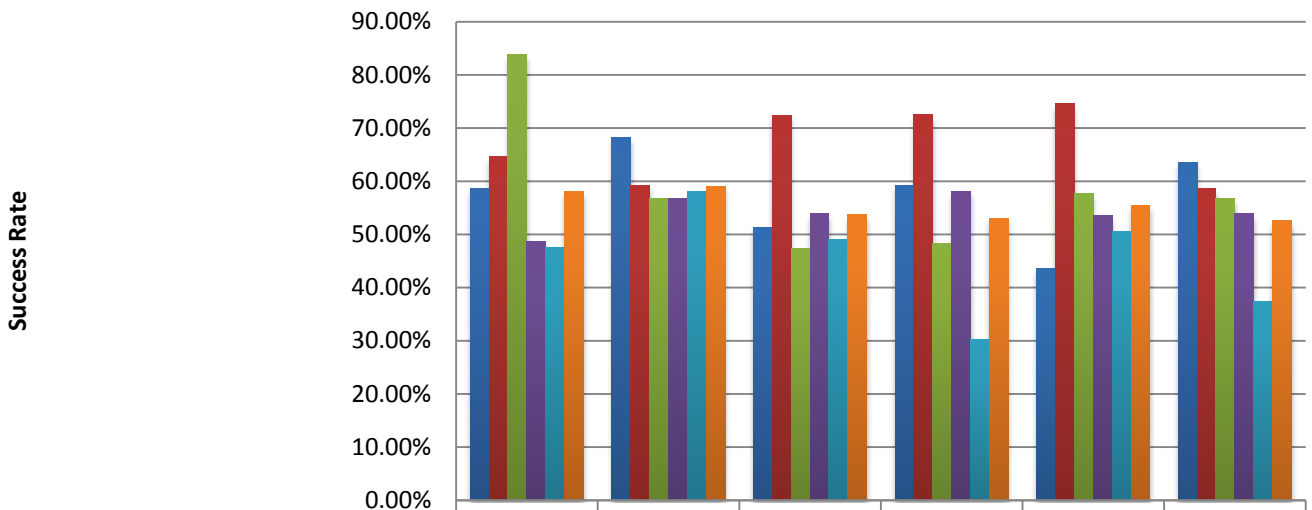
	2012 Fall	2013 Spring	2013 Fall	2014 Spring	2014 Fall	2015 Spring
■ MATH 1 - PRE-CALCULUS	58.70%	68.28%	51.34%	59.23%	43.57%	63.60%
■ MATH 3A - CALCULUS I	64.66%	59.15%	72.34%	72.47%	74.54%	58.59%
■ MATH 203 - INTERMEDIATE ALGEBRA	83.80%	56.85%	47.27%	48.34%	57.72%	56.74%
■ MATH 13 - INTRO TO STATISTICS	48.72%	56.74%	53.91%	58.11%	53.55%	53.85%
■ MATH 201 - ELEMENTARY ALGEBRA	47.52%	58.02%	49.04%	30.20%	50.61%	37.35%
■ Grand Total	58.01%	59.04%	53.69%	53.09%	55.44%	52.54%

- Are there differences in the course completion rates when disaggregated by age, gender, ethnicity or special population (current or former foster youth, students with disabilities, low income students, Veterans)? If so, please describe.

Fall 2014 & Spring 2015 Headcount by Ethnicity Stacked by Course Level
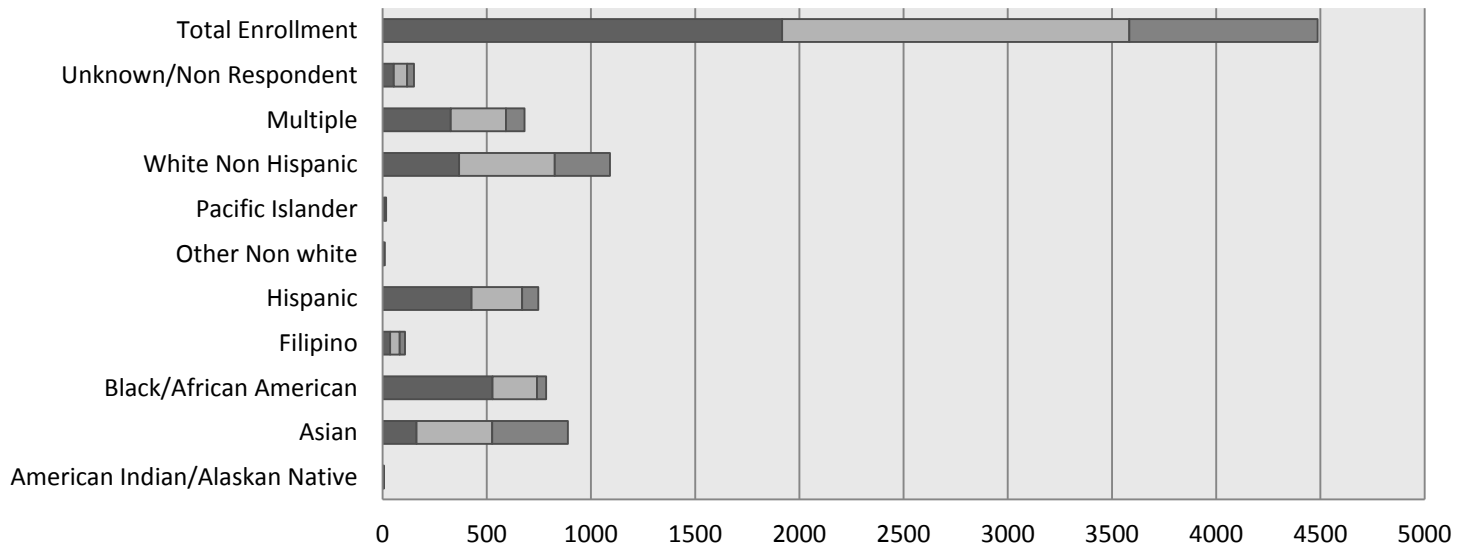
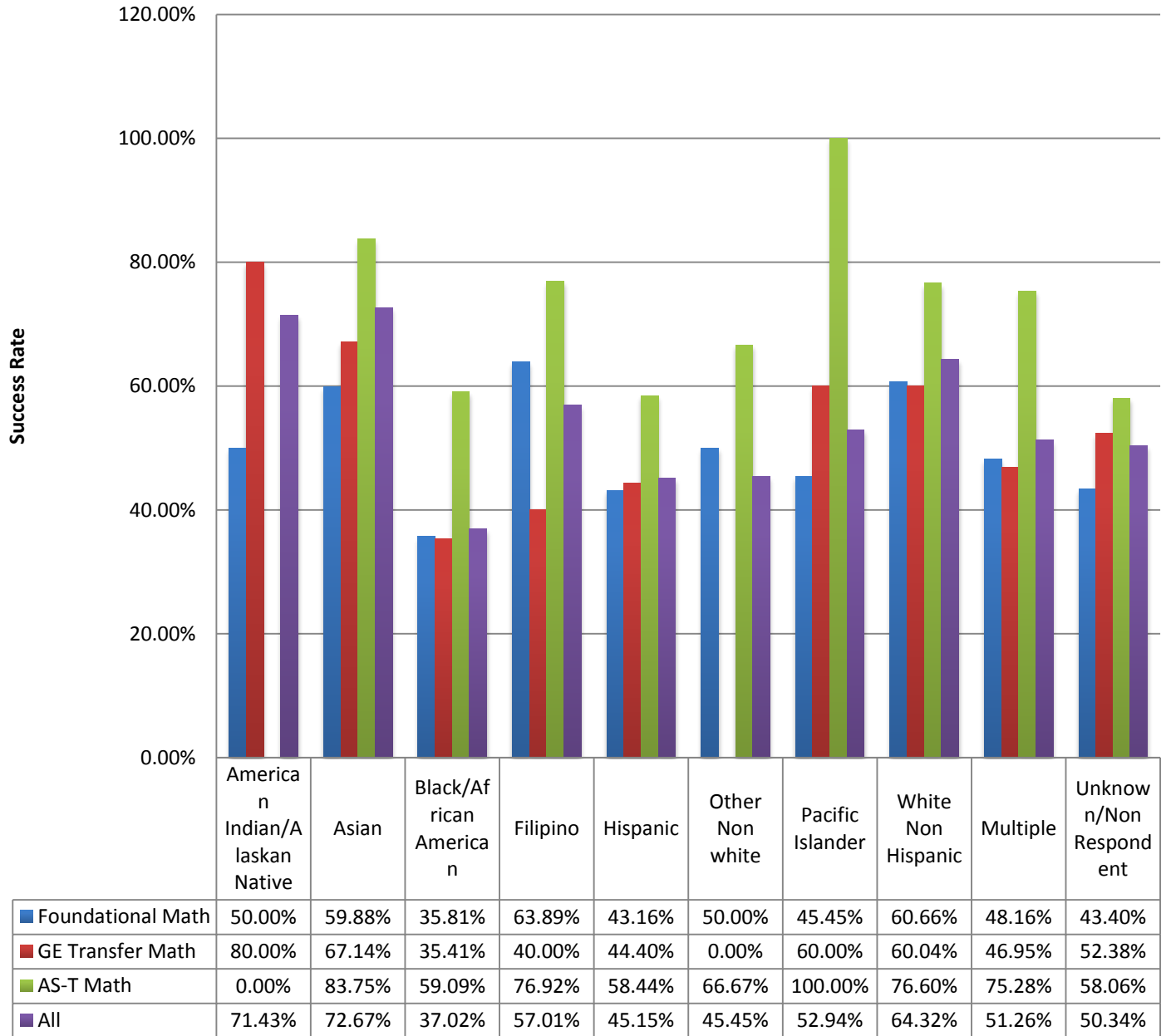|	American Indian/Alaskan Native	Asian	Black/African American	Filipino	Hispanic	Other Non white	Pacific Islander	White Non Hispanic	Multiple	Unknown/Non Respondent	Total Enrollment
■ Foundational Math	2	163	528	36	427	2	11	367	327	54	1917
▢ General Ed Transfer Math	5	363	213	46	243	3	5	459	265	64	1666
■ AS-T Math Course	0	363	44	26	77	6	1	265	89	33	904

- The total enrollment for Fall 2014 and Spring 2015 was 4,487 students.

- A total of 1917 students or 42.7% enrolled in a foundational math course (Math 250, 253, 201, 202, 203, or 206 course).

- A total of 1666 students or 37.1% enrolled in a transfer level general education course (Math 1, 2, 13, 16A, 16B, 18, 50).

- A total of 904 students or 20.2% enrolled in a required Math AS-T course (Math 3A, 3B, 3C, 3E, or 3F).

A disproportionately impacted group in the above table is one whose percentage breakdown of foundational, transfer level, and AS-T math courses within the group does not match the total campus enrollment breakdown. In particular, it is one whose Foundational Math portion is higher than 42.7% of its total (stacked) bar graph.

- African Americans appear to be the most disproportionately impacted group with 528 out of 785 (67.3%) of the population enrolling in a foundational math course (as opposed to a transfer level course).

- Hispanic/Latino students appear to be the second most disproportionally impacted group with 427 out of 747 (57.2%) of the population enrolling in a foundational math course (as opposed to a transfer level course).

Fall 2014 & Spring 2015 Success Rates by Ethnicity and Course Level

	American Indian/Alaskan Native	Asian	Black/African American	Filipino	Hispanic	Other Non white	Pacific Islander	White Non Hispanic	Multiple	Unknown/Non Respondent
■ Foundational Math	50.00%	59.88%	35.81%	63.89%	43.16%	50.00%	45.45%	60.66%	48.16%	43.40%
■ GE Transfer Math	80.00%	67.14%	35.41%	40.00%	44.40%	0.00%	60.00%	60.04%	46.95%	52.38%
■ AS-T Math	0.00%	83.75%	59.09%	76.92%	58.44%	66.67%	100.00%	76.60%	75.28%	58.06%
■ All	71.43%	72.67%	37.02%	57.01%	45.15%	45.45%	52.94%	64.32%	51.26%	50.34%

- Describe course completion rates in the department **for Distance Education** courses (100% online) for the past three years. Please list each course separately. How do the department's Distance Education course completion rates compare to the college course completion standard?

College course completion standard 70%

BCC Mathematics Distance Education Course Completion Rates

100% DE	2012 Summer	2012 Fall	2013 Spring	2013 Summer	2013 Fall	2014 Spring	2014 Summer	2014 Fall	2015 Spring
MATH	**25.64%**	**32.05%**	**64.29%**	**54.35%**	**36.67%**	**36.14%**	**36.25%**	**33.33%**	**26.03%**
MATH 1 - PRE-CALCULUS	25.64%	39.02%	NA	NA	33.33%	26.19%	22.22%	37.93%	10.71%
MATH 13 - INTRO TO STATISTICS	NA	24.32%	64.29%	54.35%	40.74%	46.34%	47.73%	25.71%	35.56%
Grand Total	**25.64%**	**32.05%**	**64.29%**	**54.35%**	**36.67%**	**36.14%**	**36.25%**	**33.33%**	**26.03%**

Discussion:

It is worth noting that BCC offers 1 section of online Math 13 and 1-2 sections of online Math 1 Precalculus each term. We offer 8-10 sections of face-to-face Math 13 and 6 sections of Math 1 Pre-calculus. We only offer the online sections to provide our students greater access to take these courses.

The department faculty prefer to offer them in the traditional face-to-face and/or hybrid format because students do much better in math courses when they have in-person contact with the instructor.

- Are there differences in the course completion rates when disaggregated by age, gender, ethnicity or special population (current or former foster youth, students with disabilities, low income students, Veterans)? If so, please describe.

We did not receive course completion data for distance education courses disaggregated by age, gender, ethnicity or special population so we cannot properly answer this question.

- Describe course completion rates in the department **for Hybrid** courses for the past three years. Please list each course separately. How do the department's Hybrid course completion rates compare to the college course completion standard?

College course completion standard 70%

Hybrid	2012 Fall	2013 Fall	2014 Spring	2014 Summer	2014 Fall	2015 Spring
MATH	59.32%	32.77%	37.38%	30.95%	40.72%	40.08%
MATH 13 - INTRO TO STATISTICS	NA	NA	NA	NA	NA	45.00%
MATH 201 - ELEMENTARY ALGEBRA	59.32%	42.65%	21.67%	30.95%	42.86%	43.90%
MATH 203 - INTERMEDIATE ALGEBRA	NA	21.74%	51.82%	NA	43.24%	40.40%
MATH 250 - ARITHMETIC	NA	16.67%	13.64%	NA	26.67%	8.70%
MATH 253 - PRE-ALGEBRA	NA	19.23%	28.57%	NA	30.00%	53.85%
Grand Total	59.32%	32.77%	37.38%	30.95%	40.72%	40.08%

- Are there differences in the course completion rates when disaggregated by age, gender, ethnicity or special population (current or former foster youth, students with disabilities, low income students, Veterans)? If so, please describe.

We did not receive course completion data hybrid courses disaggregated by age, gender, ethnicity or special population so we cannot properly answer this question.

- Are there differences in course completion rates between face to face and Distance Education/hybrid courses? If so, how does the discipline, department or program deal with this situation?

Three-Year Spring & Fall Average Success Rates By Format of Course
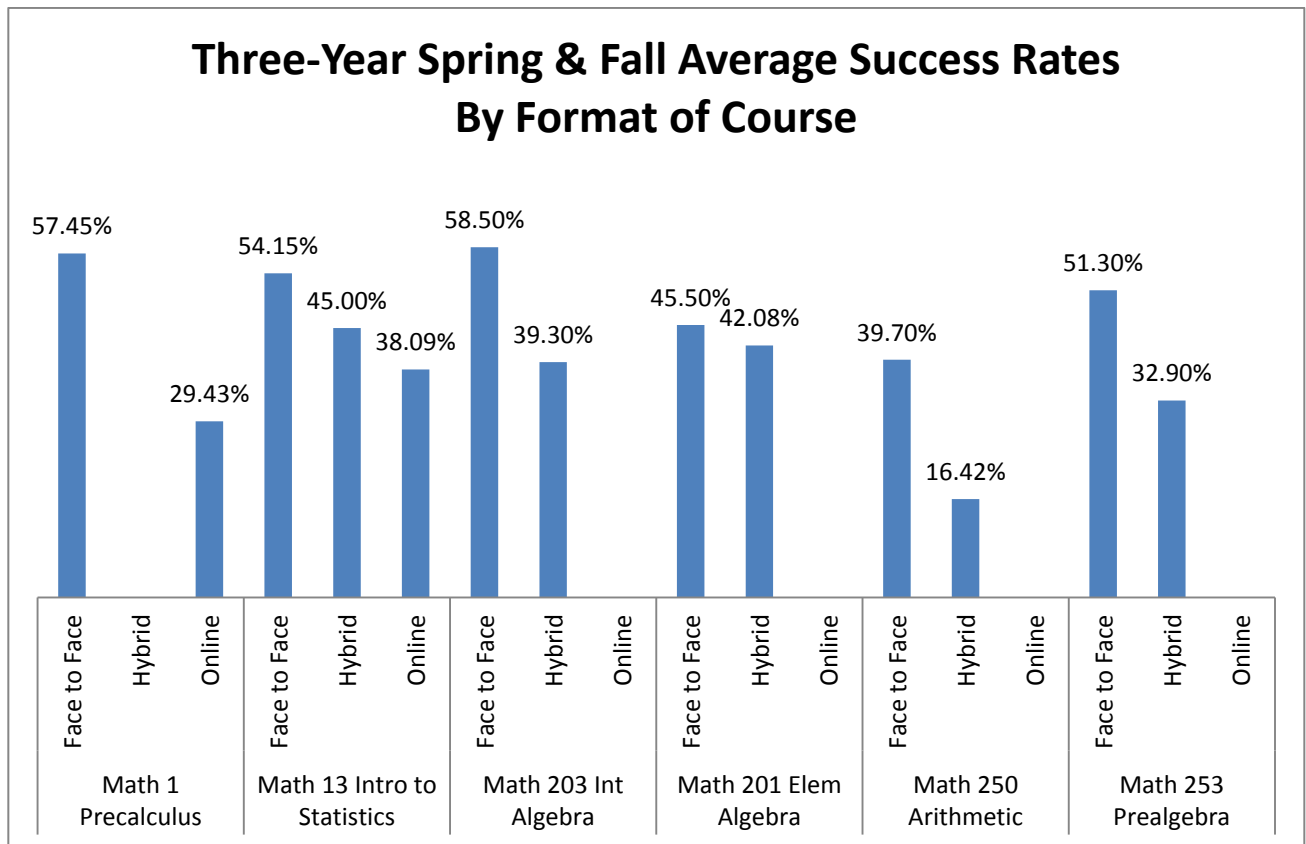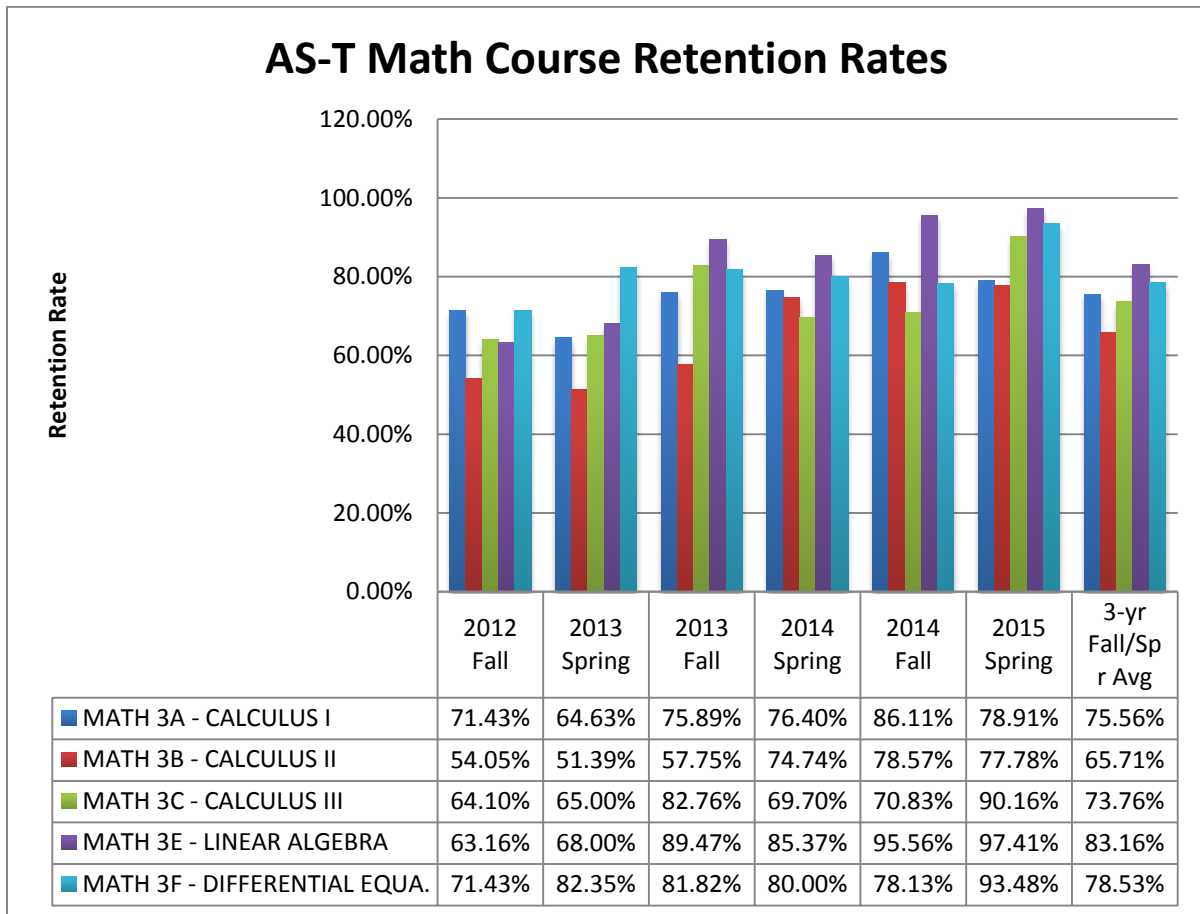
As mentioned in above, the department faculty prefer to offer math courses in the traditional face-to-face and/or hybrid format because students do much better in math courses when they have in-person contact with the instructor. The three-year average success rates for Spring and Fall terms clearly demonstrate that students do much better in face-to-face classes.

One of the department's goals is to increase student success rates in Foundational math courses. Another is to improve and implement multiple measures assessment tools to initially place students higher on the math sequence. Therefore, because success rates are so low in Hybrid Math 253 Prealgebra and Hybrid Math 250 Arithmetic, the department will very likely discontinue offering these courses in the hybrid format.
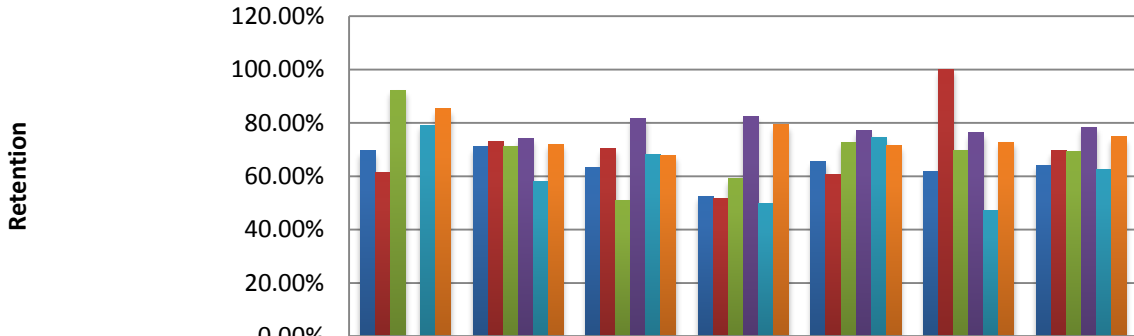
- Describe the discipline, department, or program retention rates *(After the first census, the percent of students earning any grade but a "W" in a course or series of courses).* for the past three years. How does the discipline, department, or program retention rate compare to the college retention standard?

College retention standard 100%

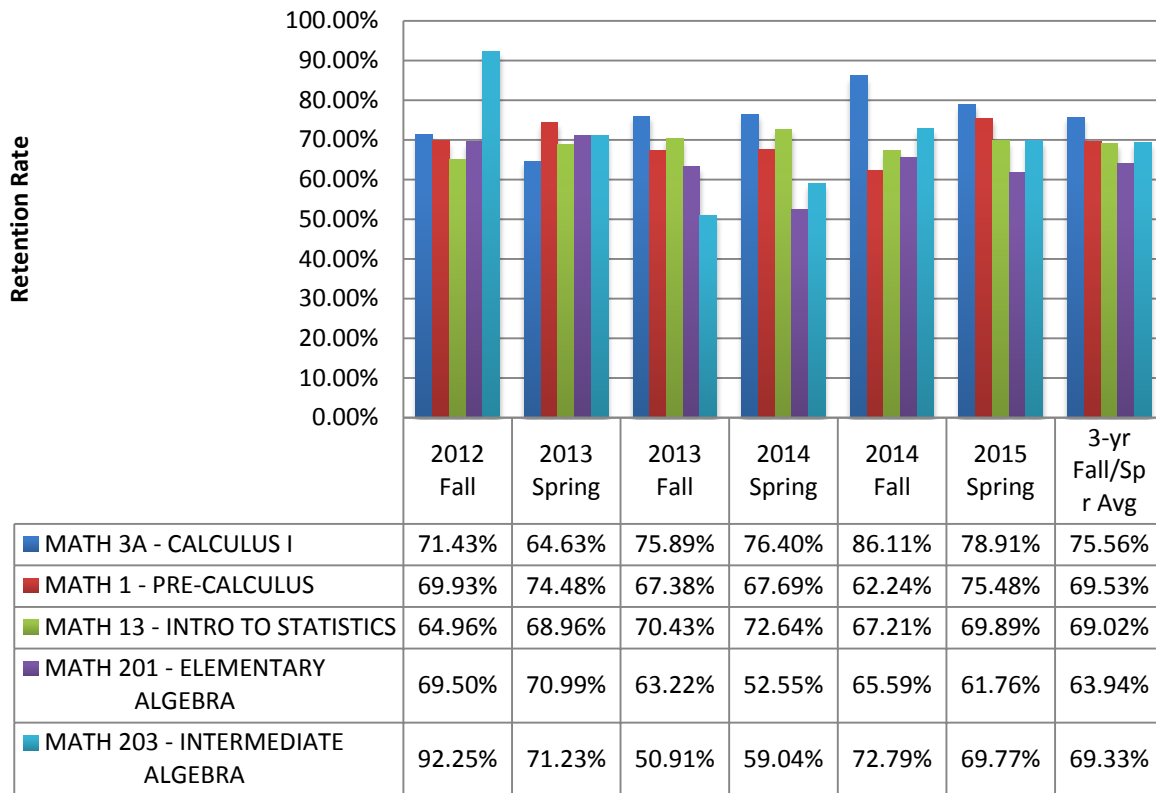Please see the charts on the next page.

AS-T Math Course Retention Rates

	2012 Fall	2013 Spring	2013 Fall	2014 Spring	2014 Fall	2015 Spring	3-yr Fall/Spr Avg
MATH 3A - CALCULUS I	71.43%	64.63%	75.89%	76.40%	86.11%	78.91%	75.56%
MATH 3B - CALCULUS II	54.05%	51.39%	57.75%	74.74%	78.57%	77.78%	65.71%
MATH 3C - CALCULUS III	64.10%	65.00%	82.76%	69.70%	70.83%	90.16%	73.76%
MATH 3E - LINEAR ALGEBRA	63.16%	68.00%	89.47%	85.37%	95.56%	97.41%	83.16%
MATH 3F - DIFFERENTIAL EQUA.	71.43%	82.35%	81.82%	80.00%	78.13%	93.48%	78.53%

Foundational Math Course Retention Rates

	2012 Fall	2013 Spring	2013 Fall	2014 Spring	2014 Fall	2015 Spring	3-yr Fall/Spr Avg
■ MATH 201 - ELEMENTARY ALGEBRA	69.50%	70.99%	63.22%	52.55%	65.59%	61.76%	63.94%
■ MATH 202 - GEOMETRY	61.29%	72.92%	70.27%	51.85%	60.53%	100.00%	69.48%
■ MATH 203 - INTERMEDIATE ALGEBRA	92.25%	71.23%	50.91%	59.04%	72.79%	69.77%	69.33%
■ MATH 206 - ALGEBRA FOR STATISTICS	0.00%	74.29%	81.69%	82.54%	77.00%	76.27%	78.36%
■ MATH 250 - ARITHMETIC	78.95%	57.89%	68.06%	49.61%	74.59%	47.06%	62.70%
■ MATH 253 - PRE-ALGEBRA	85.25%	72.09%	67.76%	79.25%	71.43%	72.67%	74.74%

Math Course Retention Rates
Highest Enrolled Classes

	2012 Fall	2013 Spring	2013 Fall	2014 Spring	2014 Fall	2015 Spring	3-yr Fall/Spr Avg
MATH 3A - CALCULUS I	71.43%	64.63%	75.89%	76.40%	86.11%	78.91%	75.56%
MATH 1 - PRE-CALCULUS	69.93%	74.48%	67.38%	67.69%	62.24%	75.48%	69.53%
MATH 13 - INTRO TO STATISTICS	64.96%	68.96%	70.43%	72.64%	67.21%	69.89%	69.02%
MATH 201 - ELEMENTARY ALGEBRA	69.50%	70.99%	63.22%	52.55%	65.59%	61.76%	63.94%
MATH 203 - INTERMEDIATE ALGEBRA	92.25%	71.23%	50.91%	59.04%	72.79%	69.77%	69.33%

Discussion:

- What has the discipline, department, or program done to improve course completion and retention rates? What is planned for the next three years?

In the last year, the department began embedding tutors into foundational math courses in an effort to improve retention and completion rates. We will continue to work with the LRC to offer embedded tutoring as part of our efforts to connect students to tutorial support.

Some of our goals for the next three years to address our completion rates are:

   o   increase tutorial support for math students.
   o   establish a greater faculty presence in the Learning Resource Center
   o   develop a tutor training program
   o   develop and offer student led study groups and workshop support classes
   o   develop a boot camp/foundations workshop class just before the Fall term
   o   develop more online resources

- Which has the discipline, department, or program done to improve the number of degrees and certificates awarded?   Include the number of degrees and certificates awarded by year, for the past three years. What is planned for the next three years?

The math department has increased the number of sections of AS-T math courses.

Number of AS-T degrees in Mathematics Awarded in the last three years:

2012-13 Academic Year: 1
2013-14 Academic Year: 1
2014-15 Academic Year: 11

There has been a dramatic increase in the number of AS-T math degrees awarded at BCC. The department believes many computer science majors complete all of the required courses for the AS-T in mathematics and are therefore encouraged by counselors to file for the math degree.

The department will consider offering Math 11 Discrete Math to support the BCC's computer science students. This course is required for transfer to many computer science programs at 4-year institutions.

The department wants to increase the number of sections of Math 206 Algebra for Statistics in order to provide greater access to the accelerated pathways to statistics. This pathway supports the increase in degrees and certificates in disciplines other than mathematics.
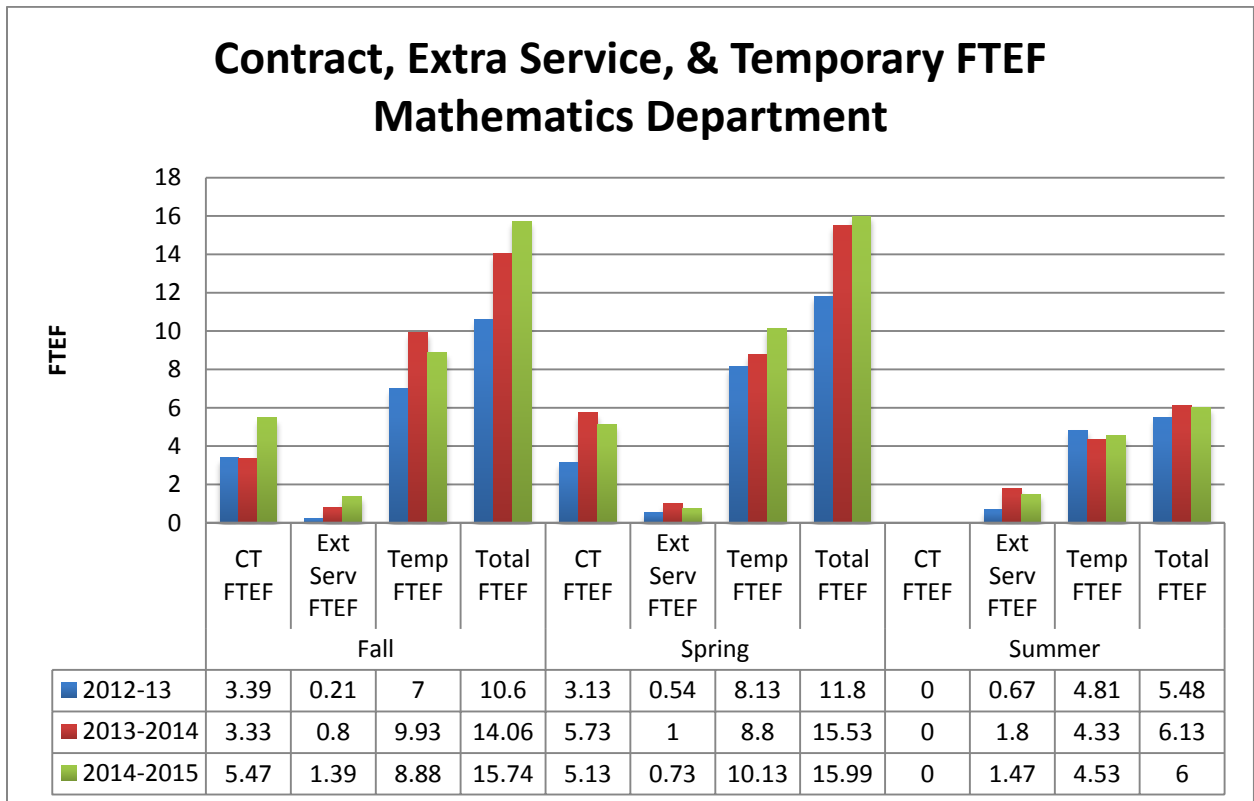
7. Human, Technological, and Physical Resources (including equipment and facilities):

- Describe your current level of staff, including full-time and part-time faculty, classified staff, and other categories of employment.

  Full-time faculty headcount _6_ (as of Fall 2015)

  Part-time faculty headcount _20_ (as of Fall 2015)

  Classified staff headcount 0

Contract, Extra Service, & Temporary FTEF Mathematics Department

	CT FTEF	Ext Serv FTEF	Temp FTEF	Total FTEF	CT FTEF	Ext Serv FTEF	Temp FTEF	Total FTEF	CT FTEF	Ext Serv FTEF	Temp FTEF	Total FTEF
	\multicolumn{4}{c}{Fall}				Spring				Summer		
2012-13	3.39	0.21	7	10.6	3.13	0.54	8.13	11.8	0	0.67	4.81	5.48
2013-2014	3.33	0.8	9.93	14.06	5.73	1	8.8	15.53	0	1.8	4.33	6.13
2014-2015	5.47	1.39	8.88	15.74	5.13	0.73	10.13	15.99	0	1.47	4.53	6

Full-time to Part-Time Faculty Ratio
(CT FTEF/(Ext Serv FTEF + Temp FTEF)

Term	2012-13	2013-2014	2014-2015
Fall	0.47	0.31	0.53
Spring	0.36	0.58	0.47
Summer	0.00	0.00	0.00

- Describe your current utilization of facilities and equipment.

  The math department office is located in Room 353 and 355 at main BCC campus. There are a total of 8 faculty desks in the two offices. The six full time faculty are assigned to six of the workstations, leaving two workstations for the twenty part time faculty in the department.

College policy states that eight part time faculty should be assigned to a workstation. Given the growth of the department and the need for more full time faculty, the math department will definitely need additional workstations in the next year or two.

Room 321 in the main BCC campus has been dedicated primarily to mathematics courses since Spring 2012. Before Fall 2014, room 321 was configured as a lab classroom. It contained 19 Macintosh computers that were purchased to support basic skills mathematics courses. In Fall 2014, the math department moved the computers to the Open Lab, in room 126. Room 321 needed to be converted to a multipurpose classroom that could hold large class lecture classes. A laptop cart with 25 computers was added to room 321 to support the hybrid Math 250-253-201-203 courses.

- What are your key staffing needs for the next three years? Why? Please provide evidence to support your request such as assessment data, student success data, enrollment data, and/or other factors.

The student success data charts in this report clearly suggests BCC needs to expand tutorial support in mathematics, specifically in the area of Basic Skills, Statistics, and Pre-calculus/Calculus I. Maintenance of student support in transfer level/AS-T courses also needs improvement if we are to achieve our SSSP and Educational Master Plan goals.

The department supports the Learning Resource Center's proposed budget for tutors. We also recommend offering a few tutoring hours after night classes let out. Students from the ASBCC specifically requested these services at a town hall meeting in October 2015.

The Math Department recommends lowering class maximum in Math 201 Elementary Algebra to 30 students and adding more sections to meet student demand for the course. The 37.35% student success rate for Elementary Algebra needs improvement.

Productivity and enrollment trend charts in this report indicate the department is growing. Most existing adjunct faculty teach a maximum 10-unit role. Many full time faculty teach extra service. Our Full-Tim to Part-time faculty ratio averages 0.5:1, when it should be1:1

Because of these points, the department recommends BCC hire 1-2 full time math instructors. The department needs at least one instructor with an interest in taking on a leadership role in Basic Skills and Learning Resources. The department anticipates the need to hire 2 – 4 new adjunct faculty in the next few years. It will work with the Faculty Diversity Internship Program to recruit new faculty.

To manage the increased requests for math chair involvement with accreditation, committees, state initiatives, and projects involving community partners, the department recommends increased faculty release time for the Department Chair.

Finally, the department needs a student TA and department assistant for roaming tutorial support, administrative tasks, development of online resources for students and faculty, and data collection and analysis our student learning outcomes.

- What are your key technological needs for the next three years? Why? Please provide evidence to support your request such as assessment data, student success data, enrollment data, and/or other factors.

Productivity is higher than the college average. Average class size for high demand courses is 41+. FTES have steadily increased over the last three years.

If we continue to grow, we will likely need to offer more hybrid sections of Math 203, 1, and 13 so we can fit more sections into the same classroom space. (Hybrid sections have reduced face to face time per week). BCC has limited classroom space; other departments will likely need to expand section offerings as well. We will need to prepare to meet the demand to grow.

Doing so will require maintenance of the laptop cart in room 321 and the addition of more units (laptops). The department recommends filling the cart to capacity.

Hiring a full time instructor and adding a another desk for part time instructors will require two computer workstations (or one laptop and one computer workstation).

- What are your key facilities needs for the next three years? Why? Please provide evidence to support your request such as assessment data, student success data, enrollment data, and/or other factors.

The Enrollment Trends and Productivity charts in this report demonstrate the department's need for more classroom space. While we wait for the new campus building to become available we may need to offer more hybrid sections. The department will want to offer hybrid sections in a lab setting that includes additional testing services (for makeup tests, online tests, etc.)

The department recommends the college to create a campus Testing Center for all students.

Productivity, Enrollment Trends, Success Rates, and Part Time to Full Time Faculty Ratio charts in this report clearly show the department's need to hire 1–2 full time faculty and a few more adjunct faculty. Currently, the department occupies 2 offices on the third floor of the main campus. These offices hold a total of 8 desks for 6 full time faculty and 20 part time faculty members. To accommodate new faculty hires, the department will need another office (1-3 desks).

Student Success Rates suggest the need for the math department to establish a greater presence in the Learning Resources Center. The department would like to develop and offer workshop/support classes to students taking mathematics at BCC. We would also like to develop a series of student led study groups that align with the embedded tutoring program we started.

To address many of our facilities needs, the math department requests the use of the office space adjacent to the LRC Coordinator's office in room 112. The math department also recommends exploring the possibility of piloting a testing center in the Open Lab, room 126.

- Refine and improve SLO assessment and analysis/action plan processes.

- Further develop the Departmental Intranet to increase and improve communication among math faculty.

- Run a FIG that addresses student struggles in mastering problem solving.

8. Community, Institutional, and Professional Engagement and Partnerships:

- Discuss how faculty and staff have engaged in institutional efforts such as committees, presentations, and departmental activities. Please list the committees that full-time faculty participate in.

  Full-time Math faculty participate in the following committees:

  Academic Senate and District Academic Senate (Kelly Pernell, Patrick Zulkowski)

  PIE Committee (Dmitriy Zhiv)

  Equity Committee (Shawn McDougal)

  Basic Skills/LRC (Kelly Pernell)

  Department Chairs (Kelly Pernell)

- Discuss how faculty and staff have engaged in community activities, partnerships and/or collaborations.

  In Fall 2014 Berkeley collaborated with the Art Department and outside community organization MoSAIC to hold a Math/Art Festival and Art Gallery.

  In the last year, BCC math faculty and other math faculty from the other Peralta colleges have worked with Berkeley and Oakland Unified School Districts to develop and pilot a Multiple Measures system to place incoming students into math courses. This system primarily uses overall high school GPA and previous math courses with grades earned as a measure to place students. The goal is to place more students into transfer level math courses.

- Discuss how adjunct faculty members are included in departmental training, discussions, and decision-making.

  Whenever math faculty are needed to participate in campus projects or department projects, the math chair sends an email to inform all faculty in the department. All faculty are invited and welcome to participate.

  One math faculty member other than the Department Chair serves as the department's Faculty Advisor.

  One adjunct faculty member serves as a liaison to the Learning Resources Center (LRC).

  One adjunct faculty member serves as the math faculty lead on the Career Pathways Trust that is working on creating sustained career pathways programs that connect businesses, K-12 schools,and community colleges to better prepare students for the workplace.

  All faculty have been invited to participate in the pathways to statistics training offered by Myra Snell of Los Medanos Community College.

  The department meets during professional development flex days.

  The department maintains an intranet site of key department documents and policies on eberkeley.org.

9. Professional Development:

- Please describe the professional development needs of your discipline or department. Include specifics such as training in the use of classroom technology, use of online resources, instructional methods, cultural sensitivity, faculty mentoring, etc.

  The department requests an annual budget of $5000 for faculty to participate in professional development activities.

  - The department recommends that 2 – 4 additional faculty receive training to teach Math 206 Algebra for Statistics. BCC has plans to expand the number of sections of this course.

  - Math faculty should be encouraged to attend various conferences that address student success, equity, basic skills, and mathematics instruction.

  - At least one math faculty member should attend the annual California Mathematics Council of Community Colleges (CMC3) held in Monterey.

  - In March 2016, the National Association of Development Education is holding a Math Summit Pre-conference and general conference in Anaheim California. BCC should send at least one math faculty member.

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10. Discipline, Department or Program Goals and Activities:

- Briefly describe and discuss the discipline, department or program goals and activities for the next three years, including the rationale for setting these goals. NOTE: Progress in attaining these goals will be assessed in subsequent years through annual program updates (APUs).

- Then fill out the goal setting template included in Appendix B. which aligns your discipline, department or program goals to the college mission statement and goals and the PCCD strategic goals and institutional objectives.

- **Goal 1. Curriculum:** Advance Student Access, Equity, and Success; Build Programs of Distinction.

  Activities and Rationale:

  - Explore reactivation of former workshop/support classes previous offered at BCC. Or, develop new workshop classes. The goal of the department is to improve student success rates.
  - Explore development of non-credit classes. Start with Math 250 and Math 253. Converting Math 250 and 253 to non-credit courses may require the need to work together with the other Peralta college math departments.
  - Update Course Outlines to maintain currency and to ensure alignment with C-ID course descriptors.
  - Support the accelerated pathway to Statistics. Work with Peralta colleges in the district to institutionalize this pathway.
  - Develop a two-week Foundations course aimed at preparing incoming students for the assessment exam (for initial placement into mathematics courses). This course can also serve as a refresher course to jump start students taking STEM classes in the upcoming semester.

- **Goal 2. Assessment:** Advance Student Success

  Activities and Rationale:
    - Revise SLO statements for many courses so they are less redundant.
    - Write more refined SLO assessment tests for courses that currently have minute paper mini-assessment tests.

- **Goal 3. Instruction:** Advance Student Access, Equity, and Success; Build Programs of Distinction

  Activities and Rationale:
    - Establish a greater faculty presence in the Learning Resource Center.
    - Develop more online resources to help students in their math courses.
    - Offer more late start classes because they allow students extra time to enroll in the appropriate level math course. Late start classes also allow students to attend/start the class on the first day.

- **Goal 4. Student Success:** Advance Student Access, Equity, and Success; Build Programs of Distinction

  Activities and Rationale:
    - Increase tutorial support for math students.
    - Work with the Learning Resources Center to develop a tutor training program
    - Develop and offer student led study groups and workshop support classes
    - Develop a foundations course just before the Fall term aimed at improvement assessment scores

- **Goal 5. Professional Development, Community, Institutional and Professional Engagement and Partnerships:**

  Activities and Rationale:
    - Given that all course and programs have an interest in improving retention, success, and transfer rates, we propose a Cross-College Thematic General Education Curriculum. This curricular theme would change semester to semester, creating and reinforcing an academic community with shared interests and experiences.

Appendices

Appendix A

Comprehensive Instructional Program Review
Prioritized Resource Requests Summary

College: __**Berkeley City College**_____

Discipline, Department or Program: __**Mathematics**_____

Contact Person: _Kelly Pernell_____

Date: _____

Resource Category	Description	Priority Ranking (1 – 5, etc.)	Estimated Cost	Justification (page # in the program review narrative report)
Human Resources: Faculty	A) 1-2 Full time instructors B) 0.4 additional release time for Department Chair to manage various state initiative projects and to work on equity and student success projects started by the college.	A) 5 B) 5		
Human Resources: Classified				
Human Resources: Student Workers	A) The math department supports the LRC's Program Review assessment of student worker need to operate the Math Embedded Tutor program and the drop-in math tutors of the LRC. B) One student worker to serve as a tutorial and administrative assistant to the department.	A) 5 B) 3		
Technology				
Equipment	A) 1–2 computer workstations when the department hires faculty. B) Increase number of laptops in cart located in Room 321.	A) Dependenent on Faculty Hire B) 3		
Supplies	Current budget for supplies	5		

	plus 10% to account for growth.			
Facilities	A) Office space and 1 – 3 desks to support new faculty hires B) Space to offer campus Testing Center	A) Dependent on faculty hires. B) 4		
Professional Development	A) $5000 for faculty to attend CMC3 and NADE conferences B) 2-4 faculty training in Statistics Pathways to teach Math 206 Algebra for Statistics	A) 3 B) 5		
Other (specify)				

Appendix B

PCCD Program Review
Alignment of Goals Template

College: Berkeley City College

Discipline, Department or Program: Mathematics

Contact Person: Kelly Pernell

Date: November 2, 2015

Discipline, Department or Program Goal	College Goal	PCCD Goal and Institutional Objective
1. • Support the accelerated pathway to Statistics. Work with Peralta colleges in the district to institutionalize this pathway. • Develop a two-week Foundations course aimed at improvement assessment exam scores and preparing students to do well in upcoming courses.	**BCC Goal 1. Increase Equitable Access** **BCC Goal 2. Improve Equitable Success**	Strategic Goals **A: Advance Student Access, Equity, and Success** 2015-2016 Institutional Objectives **A.1 Student Access:** Increase enrollment for programs and course offerings in the essential areas of basic skills/ESOL, CTE and transfer to achieve the District target of 20, 609 RES FTES. **A.2 Student Success:** Using the total 2014-2015 data as a baseline, increase students' participation in SSSP eligible activities by at least 50%, with specific emphasis on expanding orientations, assessments, academic advising and student educational plans. **A.3 Student Success:** Fully **i**mplement an Early Alert process for all students. **A.4 Student Equity:** Address

		the achievement gap through fully implementing the student success and equity plans at each campus.
		A.5 Student Success: Using 2014-2015 data as a baseline, increase student engagement in activities such as student governance, student life activities, student leadership development, service learning programs, learning communities and student employment.
2.	**BCC Goal 3. Increase the number of new partners and enhance and leverage resources with existing partners.**	Strategic Goals: **B: Engage and Leverage Partners** 2015-2016 Institutional Objectives:
		B.1 Partnerships: Develop a District-wide database that represents our current strategic partnerships and relationships, both locally and abroad. Identify the individual responsible for this objective by October 1, 2015.
		B.2. Partnerships: Expand and document domestic and international partnerships with K-12 institutions, community based organizations, four-year institutions, local government, and regional industries and businesses.
3. • Explore reactivation of former workshop/support classes previous offered at BCC. Or, develop new workshop classes. The goal of the department is to improve student success rates.	**BCC Goal 4. Reduce education and achievement gap through building and implementing programs of distinction through SSSP, Equity, BSI and other college-wide plans.**	Strategic Goals: **C: Build Programs of Distinction** 2015-2016 Institutional Objectives: **C.1 Student Success:** Develop a District-wide first year

• Explore development of non-credit classes. Start with Math 250 and Math 253. Converting Math 250 and 253 to non-credit courses may require the need to work together with the other Peralta college math departments. • Establish a greater faculty presence in the Learning Resource Center. • Develop more online resources to help students in their math courses. • Offer more late start classes because they allow students extra time to enroll in the appropriate level math course. Late start classes also allow students to attend/start the class on the first day. • Increase tutorial support for math students. • Work with the Learning Resources Center to develop a tutor training program • Develop and offer student led study groups and workshop support classes • Revise SLO statements for many courses so they are less redundant. • Write more refined SLO assessment tests for courses that currently have minute paper mini-assessment tests.		experience/student success program (such as Peralta Scholars). **C.2 Student Success:** Develop and fully implement an innovative student success program at each college that feeds into the District-wide first year experience/student success program.
4.	**BCC Goal 5. Resolve the 2 ACCJC Recommendations and BCC's self-identified Actionable Improvement Plans**	Strategic Goals: **D: Strengthen Accountability, Innovation and Collaboration** 2015-2016 Institutional Objectives: **D.1 Service Leadership:**

		Provide professional development opportunities for faculty, staff and administrators that lead to better service to our students and colleagues and community partners.
		D.2 Institutional Leadership and Governance: Evaluate and update policies and administrative procedures, the overall PCCD organizational structure, and functional responsibilities within the District.
		D.3. Institutional Effectiveness: Evaluate and update the PBIM participatory governance structure and the Budget Allocation Model (BAM).
		D.4. Global Planning: Develop a Total Cost of Ownership (TCO) plan that includes agreed upon standards, estimates costs for facilities operations and maintenance, costs for technology acquisition, repair and replacement cycles, custodial and stationary engineering services for all existing buildings and potential new facilities.
5.	**BCC Goal 6. Increase BCC additional and alternative funding sources through materializing BAM, funding raising, non-RES tuition, grants, etc.**	Strategic Goals: **E: Develop and Manage Resources to Advance Our Mission** 2015-2016 Institutional Objectives:

		E.1 **FTES/FTEF Target**: Achieve the District target FTES/FTEF within budget.
		E.2 **Budget to Improve Student Success:** Increase alternative funding sources including, but not limited to, the Peralta Colleges Foundation, non-RES tuition (with a particular focus on recruiting international students), grants, etc.
		E.3 **Fiscal Oversight:** Prudently manage all fiscal resources; general fund, bonds, benefits, OPEB), other long-term liabilities; Resolve all outstanding audit findings.
		E.4 **Support Quality Instruction:** Increase investments in materials, equipment, and teaching and learning resources to enhance student learning outcomes.

Appendix C

Program Review Validation Form and Signature Page

College: Berkeley City College

Discipline, Department or Program: Mathematics

Part I. Overall Assessment of the Program Review Report

Review Criteria	Comments: Explanation if the box is not checked
☑ 1. The narrative information is complete and all elements of the program review are addressed. ☑ 2. The analysis of data is thorough. ☑ 3. Conclusions and recommendations are well-substantiated and relate to the analysis of the data. ☑ 4. Discipline, department or program planning goals are articulated in the report. The goals address noted areas of concern. ☑ 5. The resource requests are connected to the discipline, department or program planning goals and are aligned to the college goals.	

Part II. Choose one of the Ratings Below and Follow the Instructions.

Rating	Instructions
☐ 1. Accepted.	1. Complete the signatures below and submit to the Vice President of Instruction.
☐ 2. Conditionally Accepted.	2. Provide commentary that indicates areas in the report that require improvement and return the report to the discipline, department or program chair with a timeline for resubmission to the validation chair.
☐ 3. Not Accepted.	3. Provide commentary that indicates areas in the report that require improvement and return the report to the discipline, department or program chair with instructions to revise. Notify the Dean and Vice President of Instruction of the non-accepted status.

Part III. Signatures

Validation Team Chair

_____   _____   _____
Print Name   Signature   Date

Discipline, Department or Program Chair

_____   _____   _____
Print Name   Signature   Date

Received by Vice President of Instruction

_____   _____   _____
Print Name   Signature   Date