

# All Fields Report

<b>Program</b>	MATH Math
<b>Does this program have a CTE component?</b>	No
<b>Academic Year</b>	2015/2016
<b>Review Period</b>	6 Year
<b>Service Areas</b>	

## A. Program Description and Goals

*This section addresses the big picture. Prompts should help you describe your program and goals and the relationship to the institutional mission, vision and goals, and how the program is funded.*

### **1. Describe the program and/or service area under review and how the program supports the mission of Santa Monica College.**

The Santa Monica College Mathematics Department serves a large and diverse student population. The course offerings are designed to meet the needs and requirements of the full spectrum of students at the college.

The faculty of the math department are deeply committed to both maintaining high standards and providing our students the support required to meet these standards. Our goals are to have students participate in those courses where they have the skills needed for success, gain the skills they need for success in future courses and leave our department ready to be successful as they transfer to 4-year institutions, enter graduate or professional school, or begin their careers.

#### **Mathematics Department Mission Statement**

*The Mathematics Department of Santa Monica College is committed to helping students develop to their full potential. Our mission is to provide SMC students with an opportunity to foster an appreciation and understanding of mathematics in order to achieve academic excellence, enhance career opportunities, utilize technology, and develop creative and logical solutions to various problems encountered in life.*

*To fulfill this mission, each instructor with his or her expertise takes great care to present clear and concise lectures in a supportive environment conducive to learning. Students are encouraged to take advantage of various support systems available to them – the student oriented Math Lab (with experienced instructional assistants, tutors, and instructors) and their own instructors who provide assistance on a more personal basis during office hours.*

*Serving a global and diverse community, we give to those students for whom math is a challenge a key to unlock the door to mathematics and provide others a stepping-stone to other academic areas. Ultimately, our students will become lifelong learners as result of their successful experiences in mathematics at Santa Monica College.*

We believe that our departmental mission directly supports the college mission by contributing to the first two ILOs which state that SMC students will:

- Acquire the self-confidence and self-discipline to pursue their intellectual curiosities with integrity in both their personal and professional lives.
- Obtain the knowledge and skills necessary to access, evaluate, and interpret ideas, images, and information critically in order to communicate effectively, reach conclusions and solve problems.

Students new to SMC enroll in mathematics courses based on their scores on the COMPASS Math Assessment or on the prerequisite work in mathematics that they have completed at SMC or elsewhere. Continuing students move through the mathematics sequence by successfully completing the prerequisites(s) required for the next course in the sequence.

The curriculum includes basic skills courses, transfer level applied courses and the traditional sequence of transfer courses required by a student in a STEM (science, technology, engineering and mathematics) field. The courses in the Basic Skills area are designed for students who need to acquire or enhance basic mathematical skills. The Transfer Applied courses are transferable courses required for most non-STEM majors.

### **Basic Skills**

Math 81 and Math 84, or Math 85, are the initial courses of the developmental math sequence, covering arithmetic and pre-algebra. Math 31, Elementary Algebra, and Math 18, Intermediate Algebra for Statistics and Finite Mathematics, or Math 49, Beginning and Intermediate Algebra for Statistics and Finite Mathematics, were designed to meet the needs of the non-STEM students and satisfy the requirements for enrollment in transfer applied mathematics courses. Math 31, Math 20, Intermediate Algebra, and Math 32, Plane Geometry, provide a more rigorous preparation in algebra and geometry leading to the study of calculus. This sequence of courses is designed for students interested in a STEM program.

### **Transfer Applied**

Math 21, 26, 28, 29, 41 and 54 comprise our applied transfer level courses for non-STEM major students. Math 41, Mathematics for Elementary School Teachers, fulfills the math requirement for the Liberal Studies major at CSU campuses but does not meet the mathematics admission requirement at any of the CSU or UC campuses. Math 21, Finite Mathematics, and 54, Elementary Statistics, are terminal mathematics courses for non-STEM majors. Math 26, 28, and 29, comprise the calculus designed to serve those planning to transfer to Business, Social Science, and Economics\* majors.

\* Certain transfer institutions require students satisfactorily complete Math 7 and Math 8.

### **Transfer (STEM)**

Math 2 is an intensive course bridging intermediate algebra and the traditional calculus sequence. Math 2 covers content of college algebra and trigonometry. This course is also a prerequisite course for several science courses at SMC. Math 7, 8 and 11 comprise our traditional, trigonometry-based calculus sequence, and is designed for students planning to transfer with majors in STEM fields or business at many UC campuses and other colleges.

Math 10, 13 and 15 all have a prerequisite of Math 8. Math 10, currently cross-listed as Computer Science 10, covers topics in discrete mathematics and is designed primarily for students planning to major in computer science, engineering and mathematics. Math 13 is a rigorous introduction to abstract and applied linear algebra and is designed for students planning to transfer with majors in STEM. Math 13 and 10 require students to write mathematical proofs, and they are often the first courses that require, not just problem solving, but significant mathematical writing. Math 15 is an introduction to ordinary differential equations.

**2. Identify the overarching goal(s) or charge/responsibilities of the program or service area. If appropriate, include ensuring/monitoring compliance with state, federal or other mandates.**

The math department strives to:

- Develop students' numerical literacy, providing them with the necessary skills to interpret and reason with quantitative information. (*Analytic and Communication Skills, Applied Knowledge and Valuation of the Physical World, Innovative and Responsive Academic Environment.*)
- Prepare students for transfer to four-year institutions and professional programs. (*Analytic and Communication Skills, Innovative and Responsive Academic Environment*)
- Guide students in the development of the prerequisite skills necessary for success in STEM and CTE courses. (*Analytic and Communication Skills, Applied Knowledge and Valuation of the Physical World*)
- Promote and encourage students' understanding and appreciation of the fundamental applications and relevance of mathematics to other fields. (*Applied Knowledge and Valuation of the Physical World*)
- Promote and provide the effective support necessary for students to be successful in mathematics. (*Supportive Learning Environment*)
- Increase rates of participation and success for underrepresented students in mathematics. (*Supportive Learning Environment, Innovate and Responsive Academic Environment*)
- Provide faculty members with effective and supportive professional development. (*Supportive Collegial Environment*)
- Provide each student with a respectful and accessible environment that allows development of their mathematical ability and maturity. (*Supportive Learning Environment, Authentic Engagement*)
- Develop students' abilities to read, create and write valid mathematical explanations proofs and counterexamples. (*Analytic and Communication Skills*)
- Empower students with the analytical skills and critical thinking skills required to solve theoretical and applied problems related to the global environment and motivate them to take responsibility for their own impact on the earth by living a sustainable and ethical lifestyle. (*Analytic and Communication Skills, Authentic Engagement*)

**3. If applicable, describe how the Institutional Learning Outcomes (ILOs), Supporting Goals, and/or Strategic Initiatives of the institution are integrated into the goals of the program or service area.**

Each of the math department goals are aligned with at least one of the ILOs or Supporting Goals of Santa Monica College. Please see italicized notes in question 2.

**4. If your program receives operating funding from any source other than District funds identify the funding source. If applicable, note the start and end dates of the funding (generally a grant), the percentage of the program budget supported by non-District funding, and list any staff positions funded wholly or in part by non-District funds. Do not include awards for non-operational items such as equipment (ex. VTEA) or value added activities (ex Margin of**

**Excellence).**

All activities of the department are funded by the district with the following exceptions.

**BSI - CTE Grant**

As part of the Basic Skills Initiative and Career Technical Education Collaborative Project the department participated in the Summer Jams and Summer Bridge Programs. Summer Jams was designed to help recent high school graduates transition to college. The 10-day program aimed to strengthen students' skills, including math and study skills, and to prepare students for college level coursework. Summer Jams participation was exclusively offered to students who placed into pre-college English and/or math. The program grant covered three summers, 2013 - 2015.

The Summer Bridge Program, part of the First Year Experience (FYE) Program, was offered to FYE students during the summer after their first year at SMC. Participating students would enroll in a math class and a paired counseling class. The counseling class would focus on general student skills, but also target specific behaviors that would lead to success in mathematics courses.

During the fall and spring semesters, the department offers several sections of high-demand math courses that are paired with the FYE program. Students enrolled in these sections are provided extra counseling and monitoring in hopes of increasing student success.

**HSI - STEM Grant**

As part of the Hispanic Serving Institutions STEM grant, the department partnered with the SMC STEM program to maximize student success in STEM-specific math courses. Math is the foundation of all STEM course success and the STEM program and the math department work together to provide students with intensive counseling and STEM study tools/techniques. Students from the STEM program also participated in the SMC-UCLA STEM and Summer Research Initiative, with department faculty coordinating the math portion of the program.

**MUREP MC31 Grant**

In 2015, SMC was awarded a grant funded by NASA through the Minority University Research and Education Project. The goal of the proposed MC31 project is to increase the number of underrepresented students pursuing STEM degrees and careers through the development and implementation of curriculum improvements in support of STEM and vocational certificate programs, AA/AS degree programs, and transfer programs. The department will be working with department members from Computer Science, Engineering, Physical and Biological Sciences on creating new programs whose main goal is to increase the likelihood of success among underrepresented students in STEM. The department is represented on this committee by Hafedh Herichi.

**Student Success and Support Program**

Jamar London, together with John Quevedo, submitted a proposal developed jointly with the Minority Male Community College Collaborative intended to narrow the equity gap for minority male students of color in the area of basic skills math course completion and retention. Activities that would be supported with Equity funds would be student services and student services categorical programs, research and evaluation, and professional development.

## B. Populations Served

*In this section you will provide information that describes who your program or service area serves. When comparing data from different periods, use a consistent time frame (ex. Compare one fall term to another fall term)*

### Saved Information For Populations Served

#### Area/Discipline Information Pertains To

*All Disciplines (answered once)*

**1. Describe your students in terms of ethnicity, race, gender, age, residency status, citizenship, educational goal, enrollment status, and full/part-time status. Note any changes in student or enrollment data since the last six-year program review and the possible reasons for the changes.**

The mathematics department is one of the larger departments at Santa Monica College with an enrollment of 9089 students during the fall 2014 semester. The students enrolled during this semester were:

- 48.4% female;
- 44.1% aged 19 years or younger;
- 42.0% aged 20 - 24 years;
- 15.1% Asian, 8.1% Black, 47.0% Hispanic, 18.7% White, 0.1% Native American, 3.3% Multiracial, and 7.6% unreported;
- 79.1% California residents, 7.1% out-of-state, and 13.8% international;
- 31.8% first time students, 5.5% first-time transfer students, 3.8% returning students , 58.5% continuing students, and 0.1% special admits (K - 12 students);
- 89.2% are planning to transfer;
- 96.3% are high school graduates.

There have been a few notable changes in demographics since the last program review. Unless otherwise noted, the given statistics refer to the fall 2009 and fall 2014. The changes include:

- Enrollment of Hispanic students has increased from 34% to 47%. Between fall 2009 and fall 2014 there was a steady increase in the enrollment of Hispanic students. This same trend was seen college-wide and is possibly associated with the college's STEM initiatives.
- Enrollment of students with transfer as a stated goal has increased from 83.1% in fall 2010 to 89.2% in fall 2014.
- The percentage of students aged 19 or younger decreased from 49.5% to 44.1% and the percentage aged 20 - 24 increased from 35% to 42%.

For the most part, the remaining demographics did not show statistically significant changes during this time period.

**2. Compare your student population with the college demographic. Are your students different from the college**

## population?

There are differences between the demographics of the math department and the demographics of the college. In most cases the differences are reflective of the educational goals of the different groups of students. For the fall 2014 term the most notable include:

- The percentage of students aged 19 and younger in the department was 44.1%. College-wide 30.1% of students were aged 19 and younger. As the student age groups categories increased, the percentage enrolled in the college tends to be higher than the percentage enrolled in the math department.
- In the math department 47% of enrolled students are Hispanic. College-wide this figure is 38.5%. In addition to the educational goals of the students, this could be reflective of the college STEM initiatives.
- There are also significant differences in enrollment status:
  - In the department 31.8% of students are first-time college students, college-wide 19.1%
  - In the department 5.5% are first-time transfer students, college-wide 11.1%
  - In the department 3.8% are returning students, college-wide 10%

Math is often a basic requirement completed by students at the beginning of their college career. This would most likely contribute to the higher percentage of first-time students and the lower percentages seen in the other two groups.

- In the department 89.2% of students say that their educational goal is to transfer, college-wide 74.4% of students indicated transfer as their educational goal.
- 96.3% of students enrolled in math courses were high school graduates or the equivalent, college-wide this figure was 85.8%.

The department is aware that there are significant differences in the enrollment demographics across the different department course areas. These differences are not unique to Santa Monica College. The department is dedicated to working with college-wide equity programs to address these issues.

This is discussed in more depth later.

### **3. What percentage of students in your program place in basic skills and, if applicable, how does this impact your program goals and/or curriculum.**

The basic skills area of the math department is committed to providing all students with the necessary mathematical skills to meet the needs of their educational plan. The dedicated faculty teaching in the basic skills area are continually working to improve and strengthen the program, and the entire department is committed to providing the support necessary to reach this goal.

During the fall 2014 term, 5230 Santa Monica College students were enrolled in a basic skills math course. This represented 56.4% of all students enrolled in a math course and 17.3% of the total Santa Monica College student population. This is a small decrease of about 6% from fall 2010. Historically the department has seen increases and decreases in enrollment in this area which are inversely correlated to changes in the economy. As the basic skills area comprises a majority of enrollment and course offerings in the department, this area significantly impacts the program curriculum, planning and goals.

Planning focuses on:

- The hiring of full-time faculty
- Curriculum development
- Increased educational support for students
- Participation in faculty development opportunities

### **Full-Time Faculty Hiring in Basic Skills**

During the fall 2014 semester only 19% of basic skills courses were taught by full-time faculty; this is a significant decrease from the 29% in the fall 2010 semester. Realizing the importance of full-time faculty in student success and retention, the department believes that hiring in the basic skills area is an extremely important element of department planning. During the fall 2015 semester, the department hired four additional full-time faculty that will teach in the basic skills area. Two of the new hires will teach 100% of their assignment in basic skills and the other two will teach at least 2/3 of their assignment in basic skills. These new instructors will help the department work toward the desired 75/25 ratio, but overall the area and the department will still be well short of this goal.

### **Curriculum Development**

Curriculum development has concentrated on finding ways to decrease the time students spend in pre-collegiate courses. It is widely recognized that a significant obstacle to student progress toward completing a transfer level course is the length of the traditional mathematics sequence, especially for a student who begins at the basic skills level. In an effort to shorten this sequence, the department has developed three new courses; Math 85, which covers Math 81 and 84, and Math 49, which covers Math 31 and Math 18, and Math 50, Prestatistics. Students that complete both of Math 85 and 49 could shorten the basic skills sequence by two semesters. Math 85 and Math 49 are relatively new and the department is in the process of evaluating the success of these courses. Math 50 will serve as a prerequisite for Math 54 - Elementary Statistics. Students entering at the elementary algebra level will be able to complete the quantitative skills requirement for transfer with only two semesters of coursework.

### **Increased Educational Support**

In order to increase the availability of educational support and tutoring options for students, the basic skills program has created new opportunities within the department and actively participated in institution-wide programs. Within the department, this has included the opening of the Math Learning Resource Center in MC72, the creation of topic specific review sessions for Math 20, and the offering of course specific workshops through the math lab. (See description in Section D-1: Looking Back.) Department faculty have also participated in and been leaders for The Summer Bridge Program, the Summer Jams program, the HSI STEM grant and the Center for Teaching and Learning.

### **Faculty Development**

Basic skills instructors have participated in many different faculty development programs. These include the Title V cohort, the Summer Faculty Institute, The Center for Teaching Excellence and in workshops offered jointly with the Minority Male Community College Collaborative funded through an equity grant.

## C. Program Evaluation

*In this section programs/units are to identify how, using what tools, and when program evaluation takes place. Evaluation must include outcomes assessment as well as any other measures used by the program. Please use Section D to address program responses to the findings described in this section.*

**Programs/units with multiple disciplines or functions may choose to answer the following questions for each area. If this is your preferred method of responding, begin by selecting a discipline/function from the drop down, answer the set of questions and click "Save", your answers will be added to the bottom of page. Do this for each discipline/function. If you would like to answer the questions once, choose "Answer Once" from the drop down.**

**How would you like to answer these questions?**

### Saved Information For Program Evaluation

**Area/Discipline Information Pertains To**

All Disciplines (answered once)

**1. List the specific SLOs your program or discipline has chosen to focus on this year for discussion of program improvement.**

*SLOs are specific, measurable statements of 'what a student should know, be able to do, or value when they complete a course'. An SLO focuses on specific knowledge, attitudes, or behaviors that students will demonstrate or possess as a result of instruction.*

#### Basic Skills

Student learning outcomes in the basic skills courses are designed to assess students' knowledge and skills in mathematics, as applied in solving the types of real world problems they will encounter in coursework outside of the mathematics department. SLOs of the developmental program include an assessment of the acquisition and enhancement of study strategies, actions, behaviors and attitudes that promote student success in mathematics courses.

#### Math 81

1. Given a simple expression involving whole numbers, fractions, decimals and/or percents, with or without grouping symbols, students will correctly evaluate the expression without the use of a calculator.
2. Given a practical problem involving whole numbers fractions, decimals and/or percents, students will select and perform the appropriate arithmetic operation(s) to solve the problem and interpret their results.
3. Develop student success skills and academic behaviors including use of class notes and required text, regular attendance, timeliness, participation in class activities, and adherence to the College Honor Code.

#### Math 84

1. Given an expression involving signed numbers (integers, fractions, decimals, powers) and grouping symbols, students will correctly evaluate the expression without the use of a calculator.
2. Develop student success skills and academic behaviors including use of class notes and required text, regular attendance, timeliness, participation in class activities, and adherence to the College Honor Code and other codes of conduct.



**Math 85**

1. Develop student success skills and academic behaviors including use of class notes and required text, regular attendance, timeliness, participation in class activities, and adherence to the College Honor Code and other codes of conduct.
2. Given an expression involving signed numbers (integers, fractions, decimals and powers) and grouping symbols, students will evaluate the expression without the use of a calculator.

**Math 31**

1. Given a multi-step application problem, students will use a line of reasoning that includes algebraic content and vocabulary to formulate an equation or other algebraic problem-solving strategy to develop a solution.
2. Develop student success skills and academic behaviors including use of class notes and required text, regular attendance, timeliness, participation in class activities, and adherence to the College Honor Code and other codes of conduct.

**Math 20**

1. Given an algebraic expression involving multiple operations, students will derive an equivalent expression that is in simplest terms.
2. Given a linear, quadratic, simple cubic, radical, reciprocal, absolute value, exponential or logarithmic function, students will sketch its graph using horizontal and vertical translations and determine its domain and range.
3. Given equations such as linear, quadratic, logarithmic and exponential, students will solve for the indicated value.
4. Develop student success skills and academic behaviors including use of class notes and required text, regular attendance, timeliness, participation in class activities, and adherence to the College Honor Code.

**Math 18**

1. Given a multi-step application problem, students will apply algebraic concepts and vocabulary to formulate an appropriate equation, inequality, or system of equations or inequalities, solve this mathematical problem, and interpret the answer.
2. Given equations such as linear, quadratic, logarithmic and exponential, students will solve for the indicated variable.
3. Develop student success skills and academic behaviors including use of class notes and required text, regular attendance, timeliness, participation in class activities, and adherence to the College Honor Code.

**Math 32**

1. Develop student success skills and academic behaviors including use of class notes and required text, regular attendance, timeliness, participation in class activities, and adherence to the College Honor Code.
2. Given an argument, students will determine if it is valid, and will provide a counterexample if it is invalid.
3. Using geometric definitions, postulates, and theorems, students will write a proof of a given statement.

**Math 49**

1. Students will develop success skills and academic behaviors including use of class notes and required text, regular

attendance, timeliness, participation in class activities, and adherence to the College Honor Code and other codes of conduct.

2. Given a multi-step application problem, students will use a line of reasoning that includes algebraic concept and vocabulary to formulate an equation or other algebraic problem-solving strategy to develop a solution.

### **Transfer Applied**

SLOs in the transfer applied courses are designed to empower students with mathematical knowledge and analytical skills that can be used to model and solve problems in a real world setting.

### **Math 21**

1. Given a linear system of equations or inequalities, students will identify an appropriate problem solving strategy and construct a solution.
2. Given a word problem involving sets, counting, probability, optimization or the mathematics of finance, students will reframe the problem mathematically and utilize problem solving skills to determine the solution.
3. Given a data set, students will describe it using appropriate diagrams and/or statistics.

### **Math 26**

1. Given an algebraic function, students will analyze the function and create a graph that includes intercepts, asymptotes (if any exist), and appropriate maximum and/or minimum values.
2. Given the description of a practical situation such as compound interest, supply and demand, cost, maximizing revenue or profit, or exponential growth/decay, define a function that models the situation and analyze this function to obtain relevant information.

### **Math 28**

1. Given a situation encountered in finance, students will determine the correct finance formula to solve the problem.
2. Given a polynomial, rational, exponential or log function, students will analyze the function using concepts of derivative and create a graph that includes intercepts, holes, asymptotes, maximum and/or minimum values and points of inflection, if any exist.
3. Given a situation encountered in business or social sciences, students will determine the function or equation that best models the situation and solve the problem.

### **Math 29**

1. Given a real-valued function of two or more variables, students will use appropriate techniques to differentiate and/or integrate the function and interpret the results.
2. Given the description of a practical situation such as related rates, differential approximation, compound interest, supply and demand, cost, revenue/profit, maximization productivity, or exponential growth/decay, students will define a function that models the situation and analyze this function to obtain relevant information.
3. Given a probability density function, students will determine its expected value, standard deviation, variance and probability of a specific occurrence.

## **Math 41**

1. Students will demonstrate conceptual understanding of the algorithms for operations with whole numbers, fractions, decimals and percent.
2. Given a word problem, students will present at least two non-algebraic models for solving the problem.

## **Math 54**

1. When given a data set, analyze the data set and design a presentation of the information using tables, graphs and statistical calculations.
2. When given sample data, decide on and use appropriate estimation strategies to make inferences about the important characteristics of population data, including the mean, proportion and variation.
3. When given sample data, decide on and use an appropriate test to reach conclusions about a hypothesis made about a population parameter.

## **Transfer**

SLOs in the transfer courses are designed to evaluate both the theoretical understanding and the problem solving abilities of the students.

## **Math 2**

1. Given a rational, trigonometric, inverse trigonometric, exponential or logarithmic function, students will analyze the function and create a graph including key information such as shape, location, intercepts, holes and asymptotes.
2. Students will solve equations and inequalities involving rational, trigonometric, inverse trigonometric, exponential and logarithmic functions.
3. Given an English-language description of a mathematical, social, practical or physical situation, students will determine a function or equation that models the situation, and use numerical information to solve the problem.

## **Math 7**

1. Given an algebraic or trigonometric function, students will evaluate and apply limits and prove basic limit statements.
2. Given an algebraic or trigonometric function, students will differentiate the function and solve application problems involving differentiation.
3. Given an algebraic or trigonometric function, students will integrate the function and solve application problems involving integration.

## **Math 8**

1. Students will set up and solve applications problems involving limits, areas, volumes, arc length, indeterminate forms, center of mass and improper integrals using differentiation and integration techniques with transcendental functions.
2. Students will determine the divergence or type of convergence of various infinite series, find the domain (interval of convergence) of power series and derive and apply Taylor series.
3. Students will graph and analyze curves using parametric equations and/or polar coordinates and solve applications

involving functions in either polar or parametric form.

### **Math 11**

1. Given vector-valued or real-valued functions involving two or more independent variables, students will identify and use appropriate techniques to analyze the fundamental properties of those functions. Included would be partial and directional derivatives, gradients, differentials, and integrals over lines, surfaces and solid regions.
2. Students will be able to setup and solve physical applications problems related to all aspects of motion along a curve. Included would be the arclength parametrization of a curve and the use of tangent, velocity, normal and binormal vectors, curvature, and the tangential and normal components of acceleration and their relationship to the osculating plane containing the circle of best fit at a point on the curve.
3. Students will be able to apply Green's Theorem, Stokes' Theorem, and Gauss' Divergence Theorem with the concepts of divergence, curl and flux. Students will solve problems related to vector fields including magnetic fields, flow fields, and conservative vector fields.

### **Math 10**

1. Given a theoretical or applied problem, students will be able to represent the problem and solve it using techniques such as combinatorics, graph theory, function theory and logic.
2. Given a mathematical statement, students will be able to construct and communicate a valid argument using standard proof techniques.

### **Math 13**

1. Apply definitions and theorems of linear algebra, with topics including linear independence, spanning, dimension, subspaces and linear transformations, to establish consequences of new definitions, prove additional results, and illustrate arguments with specific examples.

### **Math 15**

1. Given a first or second order or nonhomogeneous linear differential equation, students will determine and apply appropriate strategies to solve the differential equation.
2. Given an applied differential equation problem such as physical motion, orthogonal trajectories, mixtures, springs or electrical circuits, students will determine and apply appropriate strategies to set up and solve the problem.

## **2. Describe how the program assesses SLOs and uses the results for program improvement including:**

- **how outcomes are assessed and how often**
- **how and when the program or discipline reviews the results and engages program/discipline faculty in the process**

Over the last six years, the math department has regularly reviewed and updated our courses' Student Learning Outcomes. Many of them were changed to be broader and more reflective of overall course goals instead of specific skill-oriented outcomes. These new SLOs all map to one or more of the Institutional Learning Outcomes and the Department Learning Outcomes and, we feel, are representative of the overall goals of the college.

Student Learning Outcomes are assessed every semester. With a few exceptions, most of the SLOs are assessed using exercises on homework assignments, by questions on midterm or final exams, or by the completion of classroom activities. The department has developed suggested exam questions included in the Course Outline of Record, which may be incorporated into exams. Instructors may also choose to develop their own questions for SLO assessment. At the end of every semester, instructors complete an SLO assessment for each student. These assessments are submitted electronically with the end of semester grade report. Instructors select “Meets Standard” if the student has successfully met the requirements of an SLO and either “Does Not Meet Standard” or “Not Assessed” for all other students. “Not Assessed” is used for students that did not complete enough of the required assignments, problems or activities for an instructor to make a fair assessment of their SLO achievement. All instructors are encouraged to review their SLO achievement rates and summaries at their mProfessor site on a regular basis. A summary of SLO achievement rates, by math department course, is discussed in section D-1. SLOs and the assessment of SLOs are regularly discussed at math department flex day meetings. At this time the faculty of each standing committee can review the SLO results, compare them to past semesters, discuss assessment methods, and determine if changes should be made.

SLOs that are assessed in other manners include:

- Math 54 students are required to complete a semester long statistical project in which they develop a sample plan, gather and analyze data and present their findings in a report and/or classroom presentation.
- In order to assess students’ learning of academic skills, math faculty who teach developmental math courses collect assignments from a study strategies workbook, and some faculty also collect and review math course notebooks.

**3. If your program or discipline issues a degree or certificate list each degree or certificate and the core competencies students are expected to achieve on completion.**

*Core competencies focus on the body of knowledge, attitudes, and behaviors a student will have acquired upon completion of a program or certificate and are assessed by either a capstone course or success rates on SLOs for core courses.*

Beginning with the fall 2011 term, the math department began offering an Associate of Science Degree in Mathematics for Transfer (AS-T Mathematics).

This degree fulfills the lower division mathematics course requirements for students wanting to transfer and complete either a Bachelor of Arts or Bachelor of Science degree in mathematics, physics engineering or computer science for both the University of California and California State University systems. A successful candidate would have certified competencies in Differential and Integral Calculus, Infinite Series, Calculus of Several Variables, and Linear Algebra.

The specific knowledge base obtained by the student would be in the following topics:

1. Limits, continuity, and derivatives and integrals of algebraic and trigonometric functions, with mathematical and physical applications.
2. Derivatives and integrals of transcendental functions with mathematical and physical applications, indeterminate forms and improper integrals, infinite sequences and series, and curves, including conic sections described by

parametric equations and polar coordinates.

3. Vectors and analytic geometry in two and three dimensions, vector functions with applications, partial derivatives, extrema, Lagrange multipliers, multiple integrals with applications, vector fields, Green's Theorem, Divergence Theorem, and Stokes' Theorem.
4. Matrices and linear transformations; abstract vector spaces and subspaces; linear independence and bases; determinants; systems of equations; eigenvalues and eigenvectors.

With this background, the student will not only have the prerequisite mathematical knowledge to successfully complete any upper division math, science, or engineering course, but will also have the skill set necessary to be an instructional assistant, tutor, or supplemental instruction leader at any college or university.

**4. What other evaluation measures does your program or discipline use to inform planning? (For example, student surveys, enrollment trends, student success, retention, degrees/certificates awarded, job placement, transfer rates, TIMS report, tutor usage etc.) Note trends and differences in performance by group (ethnicity, gender, age) or enrollment type (day/evening, on-ground/on-line).**

The department uses student success and retention rates, enrollment trends, TIMS reports, and math lab usage data to inform planning.

**Performance By Group**

When broken down by ethnicity, the success rates for all major groups over the fall semesters between 2010 and 2015 do not show significant differences from our previous program review. Averages over this period include success rates of 57.9% for Asian/PI students, 36.1% for Black students, 42.7% for Hispanic students and 57.0% for White students. The low success rates of Hispanic and Black students are an obvious concern. The department continues to work with the HSI STEM Grant programming and the Equity Grant in efforts to improve these outcomes.

When broken down by time of day, the success rates for those taking day and evening classes also appear unchanged. The success rates for day classes varied from 47.0% to 49.3%, and for evening classes from 48.5% to 54.1%. There was no discernable trend in the values. There is a small difference between success rates of students enrolled during the day and during the evening. The difference ranged from 0.8% – 5.9%. This difference does seem to be decreasing, with the trend starting with the fall 2013 semester. For fall 2014 the evening course success rate was only 0.8% higher than the day course rate. This decreasing difference could be related to the change in the withdrawal policy that occurred between fall 2012 and 2013, but the department is unsure of the reason and will continue to watch these numbers.

The department is aware that there are many other factors that influence success and retention rates; for example there is a strong relationship between the grade earned in a prerequisite course and the outcome in the subsequent course. The department has been actively reviewing data related to success and retention factors and a full discussion can be found in section D-1.

Other evaluation measures used include:

- TIMS report data for full-time hiring narratives
- Enrollment data for scheduling purpose

- Student surveys to determine the value of a pilot program with the Business Department. Student responses supported continuing interdisciplinary ventures.
- Survey Gizmo to collect teaching preferences for scheduling and for department votes on policy.
- Information on tutor usage is provided in section D-6: Looking Back. This information is used to for scheduling and hiring.

## D. Looking Back

As part of the planning process, programs are expected to establish annual objectives that support the program's goals. Please document the status of the program/function's previous year's objectives. Add comments if you feel further explanation is needed.

### D1. Objectives

<p><u>Objective:</u> Improve methodology and testing related to classified staff hiring of Math Instructional Assistants.</p> <p><u>Status:</u> Completed</p> <p><u>Comments:</u> A new exam that was a better reflection of the knowledge required of Instructional Assistants was developed. With the opening of the new basic skills lab, two permanent part-time instructional assistants specializing in this area were hired.</p>	
<p><u>Objective:</u> Based on the Mathematics Department Equity Proposal, create and implement an action plan that involves faculty and staff to work toward addressing the disparities that exist within the African-American and Latino male students in basic skills math completion.</p> <p><u>Status:</u> In Progress</p> <p><u>Comments:</u> This is an ongoing objective, but was modified to better reflect the goals of the Department Equity Grant. Please see the updated version in the current objectives.</p>	
<p><u>Objective:</u> Work toward increasing the success rates in basic skills math courses, we will expand our work in the development of academic skills and academic behaviors of successful students including, but not limited to, self-responsibility, self-motivation, and self-management.</p>	

<p><u>Status:</u> Completed</p> <p><u>Comments:</u> All basic skills classes now include a SLO that address behaviors that are associated with student success.</p>	
<p><u>Objective:</u></p> <p>Improve methodology and testing related to classified staff hiring of Math Instructional Assistants</p> <p><u>Status:</u> In Progress</p> <p><u>Comments:</u> With an improved exam we should see an increase in the quality of the math lab instructional assistants.</p>	
<p><u>Objective:</u></p> <p>Based on the Mathematics Department Equity Proposal, increase awareness of and address the disparities that exist within the African-American and Latino male students in basic skills math completion by providing professional development opportunities.</p> <p><u>Status:</u> In Progress</p> <p><u>Comments:</u> This objective was modified from the previous program review to better reflect the goals of the related grant. It is an ongoing objective for the department.</p>	
<p><u>Objective:</u></p> <p>Update department website to improve organization and access.</p> <p><u>Status:</u> In Progress</p> <p><u>Comments:</u> Completion of this objective should improve communication with students and department members.</p>	
<p><u>Objective:</u></p> <p>Increase hybrid mathematics course offerings.</p>	



<p><u>Status:</u> In Progress</p> <p><u>Comments:</u> The department will evaluate the success of this first course and then consider adding additional hybrid courses in the future.</p>	
<p><u>Objective:</u></p> <p>Increase basic skills usage of the resources available in the Math Lab and the Math Learning Resource Center</p> <p><u>Status:</u> In Progress</p> <p><u>Comments:</u> The math department opened the Math Learning Resource Center in fall 2015. This new math lab is focused on the needs of basic skills students.</p>	

## D1. Looking Back

*In this section, please document what you did last year as a result of what you described in Section C.*

**1. Describe any accomplishments, achievements, activities, initiatives undertaken, and any other positives the program wishes to note and document.**

Since the completion of the last six-year program review, the math department has complete or worked on several notable projects. The projects include: participation in the Summer Jams and Summer Bridge programs, the HSI-STEM Grant, the Basic Skills Initiative, the Math Boot Camp (as part of the Chemistry Boot Camp), the SMC-UCLA Summer Research Initiative, and the MUREP MC31 NASA Grant, all of which were discussed in section A-4.

In addition to the above achievements, the department wishes to document the following:

1. In 2011 Santa Monica College began offering an AS-T degree in mathematics. A full description of this degree program is given in section C-3 of this document. We are proud to say that the Math Department was the first department on campus to successfully create and obtain approval for this type of degree. There are now thirteen such degrees offered at Santa Monica College. Furthermore, we have been told that we were the first to offer a Mathematics AS-T degree in the State of California.
2. The Department received a \$60,000 Equity Grant to work with the Minority Male Community College Collaborative to offer professional development opportunities with the goal of narrowing the equity gap for minority male students of color in the area of basic skills math course completion and retention.
3. In 2012 several department faculty worked on the College Assessment App, writing problems that would be used as part of a mobile application which would allow potential SMC students to voluntarily prepare for the Mathematics assessment exam. To our knowledge, the College has not implemented this application.
4. Over the last year the department has been working to bring our Math 7, 8, 11, 13, 15, 28, and 54 courses in to alignment with the statewide C-ID descriptors. As of January 2016, Math 15 and Math 28 have received final C-ID approval. Math 7, 8, 11, 13, and 54 have received temporary approval. For the courses with temporary approval, the department plans to make the requested changes and resubmit in the upcoming semester.

5. Santa Monica College has been selected to pilot a comprehensive, common assessment for Math, English, and ESL as part of the Common Assessment Initiative. Members of the department have been participating in workgroups with CAI to help create the test and to provide critical support and feedback to develop this Common Assessment system that will be used by all Community College students.
6. Through a collaboration with an outside consultant, the Disabled Student Center, and the math department, portions of the math department website have been rewritten and brought up to “best practice” standards in design and navigation to align with ADA compliance.
7. Two department members developed and offered a hybrid statistics course. Two sections of this course were offered in the fall 2015 term and the department plans to offer an additional two sections in spring 2015.
8. The department developed a series of course specific workshops in the math lab. These free workshops are open to all students enrolled in a Santa Monica College math course and provide a chance for students to ask questions, review and receive support from an instructor currently teaching that course.
9. Recognizing that Math 20 is a critical “gateway” course for STEM students, topic specific workshops were developed to provide support in areas that have been historically difficult for students. Basic Skills faculty provide these workshops in addition to their regular office hours, their regularly scheduled math lab workshops.
10. In conjunction with MIS and outside companies, a new means of tracking arranged hours was developed. Students taking math 81, 84 and 31 must complete 16 arranged hours each semester. These hours can be completed in one or more of the following ways: online activities, attending math workshops, attending supplemental instruction sessions or using paper activities. Online activities are recorded through outside companies and tracking and reporting these hours was a weekly labor intensive project. The new process allows MIS to import the information directly from outside companies and report the information directly to faculty. Moreover, MIS created a link enabling instructors to view their students arranged hours at any time.
11. Math Faculty from the Student Success Committee collaborated to design a faculty workshop to share teaching strategies targeting basic skills courses. In November 2014, the “Basic Skills Math Workshop: Teaching Strategies and Resources” was presented. In April 2015 a follow-up workshop, “Basic Skills Mathematics Workshop II: Teaching Strategies, Collaborative Learning and Resources” was offered. With the success of these two workshops, faculty presenters hope to develop additional workshops to support effective teaching and learning strategies.
12. Members of the department work with Professor Ming Lu of the Business Department to incorporate financial literacy into basic skills courses. The objective of the project were to stimulate student interest in learning mathematics and to improve financial literacy. This project was well received by the students with 90% saying they benefited from the project.
13. Each year approximately 100 students have been participating in the American Mathematical Association of Two-Year Colleges (AMATYC) math competition. Students are required to take two exams, one in the spring and one in the fall and their final score is based on the total of these two exams. Awards are given both for individual achievement and for a team total for a college. This math competition is a great opportunity for students in higher level mathematics to compete against other community college students nationwide. The team from Santa Monica College was ranked #2 in 2011, #7 in year 2012, and #8 in year 2013. In 2012 Yi Lin, then a student at SMC, was

ranked #2 in Southern California and was awarded \$300 from CMC3S, in addition to \$100 from SMC.

14. The Math Learning Resources Center was opened in September 2016. This new area of the math lab is specifically designed and staffed to assist basic skills students. There is space provided for one-on-one tutoring appointments, for group tutoring and for course specific workshops. The goal of the center is to increase the availability of assistance to basic skills students and to increase the number of students taking advantage of this assistance.
15. The department regularly works with campus programs aimed at increasing student success, including: Supplemental Instruction, First Year Experience, Black Collegians, Adelante, and Scholars'. During the fall 2014 term 34 program focus courses were offered and 33 math department sections had an attached supplemental instruction component.
16. Members of the department are working with Institutional Research and Counseling to implement an effective multiple measure placement system. A new system was voted on during a fall 2015 department meeting.
17. On October 9, 2015 the Math Department and The Center for Teaching Excellence, co-sponsored a workshop by Dr. Paul Nolting, Learning Specialist. This workshop was presented as part of the department equity grant. Dr. Nolting is a national expert in assessing math learning problems – from study skills-to learning disabilities- and developing effective learning strategies and testing accommodations. He also consults with colleges and universities on developing a Quality Enhancement Plan to improve overall math success. After the workshop, Dr. Nolting provided the department with suggestions and strategies for improving student success, the full text is attached in the file Dr.Nolting Report and Recommendations. The department is using his suggestions as a basis for future discussion and planning.
18. In conjunction with the STEM program, a series of free workshops will be offered over the winter 2016 term. The goal of the workshops is to help students prepare and review for their spring math class. This is discussed further in the following section.

Finally, the department is pleased to report that since the last six-year program review, we have hired six new full-time faculty members. We are pleased to be working with these highly qualified individuals. Below, in alphabetical order, are brief biographies of the new hires.

1. Hamed Herichi – Professor Herichi is originally from Ariana City, Tunisia. He earned his B.S. in mathematics from “Faculte des Sciences de Tunis at Universite de Tunis” and his M.S. in mathematics from California State University Los Angeles. He earned his PhD in mathematics from the University of California at Riverside, completing a thesis titled “*Generalized Fractal Strings, The Spectral Operation and a Reformulation of the Riemann Hypothesis.*” Professor Herichi joined the math department as a full-time faculty member in 2015. He will be teaching in a cross-level position and is looking forward to working and collaborating with the math department.
2. Ebrahim Janangard – Professor Janangard was born in Tehran, Iran. He studied pure mathematics, statistics, and logic as an undergraduate at CSU Northridge. His graduate work was concentrated in algebraic number theory at UC Berkeley. Professor Jahangard teaches transfer level courses, advises graduating students and chairs the technology committee in the mathematics department. He joined SMC’s full-time faculty in 2011.
3. Jamar London – Professor London has been a full-time faculty member at SMC since 2012. He earned his B.S. in mathematics from University of California Los Angeles and his M.S. from California State University Los

Angeles. At Santa Monica College, Professor London teaches a variety of courses ranging from basic arithmetic through Calculus.

4. Diem Nguyen – Professor Nguyen is from Vietnam. She earned her B.S. in Mathematics with a specialization in Mathematical Statistics, a B.A. in economics from U.C. Irvine, and her M.A. in statistics from the University of Michigan, Ann Arbor. Professor Nguyen is teaching in a cross-level/statistics position. She joined SMC’s full-time faculty in 2013.
5. Keith Ouellette - Professor Ouellette is from Lawrence, Massachusetts. He earned his B.S. in mathematics from College of the Holy Cross and his Ph.D. in mathematics from University of California Los Angeles, where his graduate work focused on Representation Theory and Automorphic Forms. Professor Ouellette will be teaching in a cross-level position and is looking forward to working with the math department. He joined SMC’s full-time faculty in 2015.
6. William Paches-Flores – Professor Paches-Flores was born in Lima, Peru. He started his undergraduate education at Mt. San Antonio College and then transferred to University of California, Irvine, where he completed his B.S. in mathematics. He earned his Ph.D. in mathematics from the University of California, Irvine, where his area of research was Probability Theory and Stochastic Analysis. Professor Paches-Flores is teaching in a cross-level/statistics position. He joined SMC’s full-time faculty in 2013.

**2. Summarize how the program or service area addressed the recommendations for program strengthening from the executive summary of the previous six-year program review.**

List below are the recommendations for program strengthening from the 2009-2010 program review.

**Recommendation #1:** Develop a pilot program to test the offering of online math courses.

Action: COMPLETED

Beginning with the fall 2015 semester, two sections of a hybrid Math 54, Statistics, course were offered. During the spring 2016 semester, four sections are planned. In addition two new instructors are training to teach hybrid statistics classes. The department is beginning to explore offering additional courses in the hybrid format.

**Recommendation #2:** Analyze the impact and relationship of tutoring, math lab use, and other interventions and strategies on student success.

Action: IN PROGRESS

The math lab coordinator currently tracks student usage of the Instructional Assistants (IAs) and tutors using a paper sign-in sheet. The students name and class number are recorded. The number of sessions is entered manually each month by class. The implementation of any plan to collect data related to math lab usage, beyond times with the IAs and tutors, would require clerical help that is not currently funded. A complete analysis of this recommendation would require not just data collected from the math lab and math lab staff, but data collected by all supplemental instruction and tutoring programs from other campus tutorial programs. Determining the impact and relationship of any of these factors would require a controlled study comparing students that have access to these interventions with students that do not, which could pose a serious disadvantage to students where access to assistance is limited.

The math department believes that all students should have access to the math lab and other tutoring programs and is hoping to expand the number of students served by each. In addition the department is focusing on data that will help us understand the components that we can control that relate to student success. Please see section D-6: Looking Back for the discussion regarding this data.

**Recommendation #3:** Further explore the development of a Liberal Arts Math class.

Action: On Hold

In order for a math course to transfer to CSU as a college level course, a prerequisite of intermediate algebra is required. At SMC this prerequisite is fulfilled by Math 18 or Math 20. The department currently offers Math 21 - Finite Mathematics, a survey course designed for a liberal arts student.

In October 2015, it was announced that both the CSU and UC system would accept an accelerated statistics pathway for transfer. Students could fulfill their college level math requirement by taking a new pre-statistics course that would incorporate the pre-algebra and algebra skills that are required for success in statistics and then follow this with our current math 54 course. Initial data from pilot schools is promising and the department has developed Math 50 - Pre-statistics. Math 50 will first be offered during the fall 2015 semester. After the development of the statistics pathway, the need for a Liberal Arts Math class will be re-examined.

**Recommendation #4:** Retool the Geometry course using data collected relative to success in Math 2 and the challenge test.

Action: IN PROGRESS

The COR for math 32, Geometry, has been rewritten. In response to a faculty survey of skills lacking in Math 2, 7 and 8, logic and reasoning were added as a mandatory component of math 32.

The department has been investigating whether or not a traditional plane geometry course should remain a prerequisite for Math 2. The data presented in the 2009-2010 program review indicated that 80% of the students who passed the department challenge exam for geometry were successful in Math 2, while only 46% of the students who completed the math 32 course were successful. There are many possible reasons for this, including the fact that math 32 is typically taken after math 20. Students who take math 20 followed by math 32 have a larger time gap between learning the algebra skills taught in math 20 which are critical for success in math 2.

**Recommendation #5:** Compare success and retention rates in short-term and full semester classes and determine if there are other variables affecting the rates.

Action: IN PROGRESS

A comparison of the success and retention rates is included in section D-1 and the attached report, Accelerated Course Report. For several semesters the department did offer short term 8-week paired courses during the fall and spring terms. Due to registration issues, it was decided that these courses would no longer be offered. Instead accelerated courses were developed:

- Math 85 – a combination of math 81 and math 84

- Math 49 – a combination of math 31 and math 18

It is too early to have reliable data on success and retention in math 49, but preliminary data for Math 85 is included in the Accelerated Course report.

**Recommendation #6:** Explore the creation of one-unit refresher courses – especially for the purpose of reviewing to take the placement exam – and build these into the way courses are scheduled.

Action: NO PROGRESS

The department has not explored the creation of new courses for the purpose of review for the placement exam, but several faculty members were involved in writing review questions that would be incorporated into an app that would allow students to access the review questions electronically. The math department portion of this project was completed and the remaining development and implementation is to be completed outside the department. The district has also developed “Prep to Test,” which provides a review for the placement exam. This makes the refresher courses unnecessary.

In conjunction with the STEM program, the department has created a series of free workshops for Math 31, 20 and 2, to be offered over the winter 2016 term. These workshops will target students who earned a grade of C in a prerequisite class or who will be repeating the class. (For example, the math 2 workshop would be for students who earned a C in Math 20 or who will be repeating math 2) Through a topic-by-topic review, the workshop would help prepare this group of students for their spring math class.

**3. Describe any changes or activities your program or service area has made that are not addressed in the objectives, identify the factors (e.g., licensure requirements, state or federal requirements, CCCO mandates, regulations, etc.) that triggered the changes, and indicate the expected or anticipated outcomes.**

C-ID course approval is needed for all courses that are required for AA-T/AS-T degrees. We are in the process of reviewing course outlines of record for several of our math courses to address concerns arising from C-ID reviews. Math 8, 11, 15, 13, and 54 have all initially received conditional approval. Necessary changes for full approval are being made for each course and Math 7, 8, 11 and 15 have been resubmitted for C-ID review. Math 54 has been submitted to Curriculum and then will be resubmitted. Math 13 is on conditional approval until the end of the year and the COR has been modified for resubmission.

**4. If your program received one time funding of any kind indicate the source, how the funds were spent and the impact on the program (benefits or challenges).**

Over the past six years, department members have received the following Margin of Excellence Grants:

- A grant enabling the purchase of 45 TI-84 calculators to be used by students enrolled in Math 54. These calculators are available through the math lab for semester long rentals at a rate of \$20 per semester. Students are able to save money by not having to purchase a \$100 calculator.
- A grant enabling the purchase of a classroom geometry tools, including a board sized protractor and compass. These tools enable an instructor to demonstrate geometric constructions on the board during class. Students are able to see and follow the instructor from all points in the classroom.
- Grants enabling the purchase of software used by the department including site licenses for EXP 5.1 and Math Type 6.8. Both of these are powerful programs used to create mathematical notation for word processing. Faculty use the programs regularly for the generation of worksheets, handouts and exams for student use. Also purchased was One Note Software that allows the generation of on-the-spot worksheets for student use.
- Two multimedia carts, one a replacement for an aging cart and one additional new one for department use. As the

- number of courses regularly using technology in the classroom increased, these were required to meet demand.
- Margin of excellence to provide food for the workshops related to Equity in celebration with the Center.

### **5. Describe departmental efforts to improve the teaching and learning environment.**

The faculty of the math department are deeply committed to continuously improving the teaching and learning environment. The department uses different opportunities, including faculty flex days, the peer evaluation process, and course related standing committees, to encourage ongoing discussion relating to the improvement of teaching and learning. The goal is to maintain an atmosphere of support and feedback that will allow all mathematics instructors to both try different methodologies and evaluate their effectiveness.

The department has participated in many campus programs that focus on improving teaching and learning, including the Summer Jams and Summer Bridge Programs, the HSI-STEM grant, the Basic Skills Initiative, the SMC-UCLA Summer Research Initiative, the Equity Grant, and the MUREP MC31 NASA Grant, all of which were discussed in section A-4. Additionally the development of course workshops, work with the Student Success Committee and the collaborative project with the business department were discussed above in section D-1: Looking Back.

Over the past three summers, several department members have participated in the Summer Faculty Institute offered through The Center for Teaching Excellence. Participants in this program discussed classroom challenges, developed strategies to address these challenges, and engaged in conversations about classroom practices that promote student success. After this program several participants effectively incorporated the use of flipped classroom techniques into their courses. After each summer, faculty who had participated in the program reported on their experiences at the department fall flex meeting and encouraged other department members to participate in the future. Several math department faculty have also participated in many of the other workshops offered through The Center for Teaching Excellence, both as attendees and presenters.

The department regularly offers courses linked to the Scholar's Program, the First Year Experience Program, Black Collegians, The Latino Center Adelante Program and Supplemental Instruction. Faculty teaching these sections are able to offer extra focus on the individual needs of students enrolled in these programs. During the fall 2014 term 34 of these program focused courses were offered.

During the fall 2014 term, the department offered 33 course sections that had a Supplemental Instruction component. Supplemental Instruction Program (SI) provides student participants additional academic support thought free, weekly, peer-assisted study sessions. Members of the math department have participated in the selection of supplemental instruction leaders and worked closely with those hired to develop session content.

In order to increase student access to assistance and tutoring, the department has instituted a system of shared office hours. Students enrolled in a particular course are given access to office hours offered by other instructors teaching the same course. For example, if a student is taking math 31, they have the option of attending office hours for not just their instructor, but for other instructors teaching the same class.

Over the past three years, the department has increased the number of full and part-time instructors evaluated each semester. The goal of the evaluation process is to provide a thorough and continuing process of discussion and support that will improve the education process for all students.

Ebrahim Jahangard and Hafedh Herichi have offered independent study courses for students who are interested in pursuing

advanced topics in mathematics that are not covered by current course offerings.

**6. If there is a tutoring component or other learning support service associated with the program, describe the relationship between the service(s) and the instructional program. If applicable, discuss any data you have compiled regarding student participation and the impact on student success.**

The Math Lab is a tutoring center that provides students with free services that will assist them in succeeding in their math courses. Students are encouraged to drop by the lab to study, complete homework assignments, use tutoring services, participate in workshops or complete required arranged hours for Math 81, 84, 85 or 31. The Math Lab staff strives to provide a warm welcoming environment for all students enrolled in a Santa Monica College math course.

Services are supervised by the Math Lab Coordinator and are offered to students in three locations:

- The Math Lab in MC-84. This area is open Monday – Thursday from 8 a.m. to 10 p.m. and Friday from 8 a.m. – 4 p.m. This lab services students enrolled in Math 2, 7, 8, 21, 26, 28, 29, 54 and 32. The Math Lab does not currently provide tutoring for Math 11, 10, 13 and 15, although when possible the instructional assistants and student tutors do try to assist students in these courses. The Math Lab employs 7 instructional assistants, 10 student tutors, 4 appointment only tutors and 12 clerks. Clerks and tutors may be assigned to MC-72 on an as needed basis. This area has a capacity of approximately 75 students.
- The Math Learning Resource Center in MC-72. This area is open Monday – Thursday from 9 a.m. – 7p.m. This lab provides services to basic skills students enrolled in Math 81, 84, 85, 18, 20, 31, 49 and 32. The Math Learning Resource Center employs three instructional assistants, student tutors and clerks are assigned to this area as needed. This area has a capacity of approximately 50 students. This is the newest math lab and was opened during the fall 2015 term.
- Bundy Campus, Room 116. This area is open Monday – Thursday from 9:30 a.m. to 4 p.m.. This lab services students enrolled in all math classes and is mostly utilized by students taking math classes that meet at the Bundy Campus. This area employs only 1 instructional assistant. This area has a capacity of approximately 16 students.

Full-time math department faculty are required to staff the math lab for one hour per week. This can be done by serving as an additional instructional assistant in any one of the three locations or by offering a subject specific workshop. The workshops are offered in MC84B and are open to all SMC students enrolled in the stated course. Several part-time faculty also complete their office hours by offering workshops.

All math lab locations offer drop-in tutoring. Students come to the lab, write their name on the waiting list of an instructional assistant or student tutor that covers their course, and when their turn comes, is given up to 10 minutes to get help or ask questions. At any given time of the day, between one and three tutors are available in each lab. Despite recent staffing increases, wait times are typically one hour or more for a 10 minute appointment. The department did briefly try to go to longer appointments in the Math Learning Resource Center, but the wait times only increased and too many students were unable to receive any assistance, so the 10 minute limit was reinstated. The availability of drop-in tutoring is an important component of student success in mathematics and the math lab staff works to reach as many students as possible, but resources are limited. There is a need for increased staffing in all labs, particularly at the Bundy Campus where there is only one instructional assistant staffing the entire lab.

The Math Lab does have four appointment only tutors who offer one hour appointments. These tutors are volunteers and availability is quite limited. Typically there are only 3 or 4 hour long appointments available per day. Students make arrangements for these times in advance, but the times go quickly and there is significantly more demand than availability. The college has decided that these tutors may continue to volunteer in the lab for as long as they choose, but going forward



volunteers will not be allowed in the math lab. As it stands now, in the future these limited hour long appoints will no longer be available.

In addition to tutoring the math lab also provides the following services:

- A calculator rental program for students enrolled in math 54 consisting of 45 TI-84 calculators. Students may rent the required statistical calculator for \$20 for the semester,
- A small library of math textbooks that students may use for reference.
- The recording and reporting of the some of the arranged hours for students enrolled in courses requiring arranged hours. This is completed by the Math Lab Coordinator.

Recording and tracking of usage of instructional assistants, student tutors and appointment tutors only began in 2015, so all data refers to the calendar year from Jan. 2015 – present. The full data set can be found in the attached file Math Lab Data.

Between January 2015 and September 2015, the math lab recorded a total of 24,824 student visits. This number represents 18,407 appointments with instructional assistants, 5962 with student tutors and 455 one hour appointments. This number does not include use by students attending course specific workshops or using the math lab for study space. Most requests for assistance come from math 20, 31, 54, 2, 7 and 8, accounting for about 71% of the total. The records show especially low numbers for the Math 81, 84 and 85 courses. Tutoring requests from these courses comprised only 5% of the total. The department hopes to increase the number of basic skills students using the math lab with the opening of the new Math Resource Center.

The recent increase in the number of instructional assistants has permitted an increase in the number of students served. In September 2015, 3569 students received assistance from an instructional assistant, this is an increase over the previous maximum of 2768 students from March 2015. The math lab is an important resource for students enrolled in math courses at Santa Monica College. The department believes that due to the limited resources provided to the lab, that there is a significant difference between the number of students who receive assistance and those that would like to receive assistance. If the math lab is to provide maximum benefit to students, this situation will have to be addressed.

## **D. Moving Forward**

**Discuss and summarize conclusions drawn from data, assessments (SLO, UO) or other evaluation measures identified in Section C and indicate responses or programmatic changes planned for the coming year(s) including:**

- **how the assessment results are informing program goals and objectives, program planning, and decision-making**
- **specific changes planned or made to the program based on the assessment results**

The vast majority, 89.3%, of the students enrolled in math department courses in fall 2014 have transfer as their stated goal. Since the completion of one college-level mathematics course is a transfer admissions requirement, mathematics courses at all levels are in high demand and success in mathematics is important for the completion of educational plans for many students. In this section the math department worked to understand some of the factors that contribute to success in mathematics courses. The department was particularly interested in those factors over which we can have some control or which would help in developing a department success plan. We reviewed not only SLO assessment data, but also success and retention data by various factors. In combination, all three were indicators of student success.

## **Curriculum**

For the purposes of this study, the courses offered by the department were placed into three groups: Basic Skills Classes, Transfer Applied Classes and Transfer Classes. The specific classes in each group are provided below.

**Basic Skills**

1. Math 18 - Intermediate Algebra for Statistics and Finite Mathematics
2. Math 20 - Intermediate Algebra
3. Math 31 - Beginning Algebra
4. Math 32 - Plane Geometry
5. Math 49 - Beginning and Intermediate Algebra for Statistics and Finite Mathematics
6. Math 81 - Basic Arithmetics
7. Math 84 - Prealgebra
8. Math 85 - Arithmetic and Prealgebra

**Transfer Applied**

1. Math 21 - Finite Mathematics
2. Math 26 - Functions and Modeling for Business and Social Sciences
3. Math 28 - Calculus 1 for Business and Social Sciences
4. Math 29 - Calculus 2 for Business and Social Sciences
5. Math 41 - Mathematics for Elementary School Teachers
6. Math 54 - Elementary Statistics

**Transfer**

1. Math 2 - Precalculus
2. Math 7 - Calculus 1
3. Math 8 - Calculus 2
4. Math 10 - Discrete Structures
5. Math 11 - Calculus 3
6. Math 13 - Linear Algebra
7. Math 15 - Ordinary Differential Equations

**Review of Success and Retention Rates by Curriculum**

Success and retention rates for the fall semesters between 2010 and 2014 are provided in the tables below.

	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014
Math Department Success Rate	49.8%	50.2%	48.3%	47.5%	49.0%
All SMC	68.2%	68.6%	68.3%	68.1%	67.6%

**Success**

## Retention

	Fall 2010	Fall 2011	Fall 2012	Fall 2013	Fall 2014
Math Department Retention	79.4%	80.5%	74.7%	74.4%	75.3%
All SMC	84.3%	85.2%	83.1%	83.3%	83.2%

The department-wide success rate has remained fairly constant over this time period. The small differences are all within the natural variation in the data set. So, despite curricular changes and involvement in multiple programs and initiatives, there have not been significant changes in overall department success rates. The success rate across the college was also flat over this time period, indicating the situation is not unique to the math department, but is a college-wide issue.

During the fall 2010 and fall 2014 terms, the retention rates were 79.4% and 75.3% respectively. A hypothesis test for a difference in these two values showed a p-value of .0000000000216, indicating that there is a statistically significant difference in the two values. While there could be many reasons for this decrease in the retention rate, it should be noted that beginning with the summer 2012 semester, there was a change in the Santa Monica College withdrawal policy. Prior to summer 2012, students could self-withdraw from a class up to the 50% point of the semester; after that a grade of W could only be assigned with instructor consent, if, in the instructor's judgement, there were extenuating circumstances (i.e. accident, illness, or other circumstances beyond the control of the student) which made the withdrawal necessary. Beginning with summer 2012, students could self-withdraw up to the 75% mark; instructor's permission and extenuating circumstances were no longer required.

A comparative review of the retention rates before and after the policy change show that the department retention rates were similar in fall 2010 and fall 2011, then decreased and have remained steady since. As indicated in the above table, the same could be said for campus-wide retention rates. Using the raw data supplied by the Santa Monica College institutional researcher, it was found that the combined math department retention rate for fall 2010 and fall 2011 was 80.0% and for fall 2012, fall 2013 and fall 2014 was 74.8%, a decrease of 5.2%. A hypothesis test for a difference in retention rates comparing the fall 2010 and fall 2011 semesters to fall 2012, 2013 and 2014 showed a p-value of  $6.6 \times 10^{-39}$ , indicating that there was a statistically significant difference. For the entire college, the retention rates for the same time periods were 84.8% and 83.2%, a decrease of 1.6%. In this time period there were no significant changes in the math department program, so it is apparent that the policy change did have a significant impact on the department retention rates. The impact of this change should be kept in mind as other comparative retention rates are considered. In the department's view, any discussion of retention rates should include a discussion of the impact of this policy change.

To examine success and retention rates more closely and to try to understand factors that contribute to student success, we compared the rates for the different categories of classes within the department during the fall 2014 term.

### Success Rates

	Fall 2014
Developmental	49.4%
Transfer Applied	47.9%
Transfer	48.6%
Department-wide	49.0%

## Retention Rates

	Fall 2014
Deveolopmental	78.0%
Transfer Applied	68.4%
Transfer	72.9%
Department-wide	75.3%

The success rates of each course group did not vary significantly from the overall department success rate. There were greater differences in the retention rates, but the reason for this is not clear at this time.

## Statewide Success and Retention Data

The data in the previous section provided comparative success and retention data for the Math Department and all of Santa Monica College. During the time period examined, both the retention and success rates for math department students were lower than the college as a whole.

To determine if this situation is unique to the SMC math department, data from math departments across the state were examined. The full data set source for this information came from the Chancellor's office website and can be found in the attached files *f10f14stateall.xlsx* and *f10f14statemath.xlsx*. The Chancellor's office separates the math department courses into just two categories: basic skills and transfer. The data below is for non-distance education courses only and the data for five other local colleges has been included. Retention rates are based on each schools individual withdrawal policies and, as seen in the previous section, that policy can have a direct effect on the overall retention rate.

## Statewide Data – fall 2010 to fall 2014 - Math Departments

	Basic Skills - Retention	Basic Skills - Success	Transfer - Retention	Transfer - Success
State	81.67%	55.40%	78.38%	60.32%
<b>SMC</b>	<b>82.37%</b>	<b>47.65%</b>	<b>76.28%</b>	<b>53.25%</b>
El Camino	75.40%	52.14%	74.07%	57.40%
Glendale	77.33%	55.17%	75.17%	60.25%
Pasadena	89.89%	64.87%	80.84%	64.86%
Pierce	84.48%	64.13%	76.82%	60.09%
West LA	69.03%	43.23%	59.00%	39.83%

It is interesting to note that in both the basic skills and transfer areas, the retention rate of the SMC math department is similar to that of the statewide average and to the rates of other local colleges; while the success rate is within the range of other local colleges, but lower than the statewide average.

As previously mentioned, the success and retention rates for the math department were lower than the overall success and retention rates of Santa Monica College as a whole. To determine if this was unique to our department or if this is a trend seen across the state, the college-wide data for the same time period was compared to the math department data for the state and each of the local colleges. The data is provided in the table below.

### Statewide Data – fall 2010 to fall 2014 – College-wide

	Basic Skills - Retention	Basic Skills - Success	Transfer - Retention	Transfer - Success
State	84.40%	62.56%	85.45%	70.19%
<b>SMC</b>	<b>84.98%</b>	<b>60.48%</b>	<b>85.15%</b>	<b>70.56%</b>
El Camino	80.32%	58.79%	82.00%	69.11%
Glendale	84.72%	63.96%	84.81%	70.36%
Pasadena	89.80%	68.71%	86.71%	72.73%
Pierce	86.23%	67.62%	83.95%	67.79%
West LA	80.76%	82.35%	80.59%	60.67%

Comparing the data in this table (college-wide success and retention) to the previous table (math department success and retention), it can be seen that at each individual college listed and statewide, the retention and success rates of math departments are, with only one exception, lower than the college-wide retention and success rates. The only exception is seen in the Pasadena Basic Skills retention rate where the math department retention rate was 89.89% and the college the retention rate was 89.80%, a difference of only 0.09%. Across the state, the difference in the college wide and math department success rate for basic skills was 7.16% and for transfer level courses 9.87%. At the individual colleges the success rates for basic skills courses in the math department was between 3.49% and 39.12% lower than the overall success rates for basic skills courses across the college. At Santa Monica College the difference was 13.15%. For transfer level courses, the math department was 7.7% to 20.84% lower than the overall success rates for transfer courses across the college. At Santa Monica College the difference was 17.31%. This comparison makes it clear that lower success and retention rates in the math department are not unique to Santa Monica College, but are, in fact, a statewide trend. The SMC math department is committed to continuing work on improving student success and retention rates in all categories.

### Review of Retention and Success Rates by Faculty Status

On a regular basis the department compares the success and retention rates of the courses taught by full-time faculty and those of courses taught by part-time faculty members in an effort to ensure part-time faculty members, especially those new to our program, hold students to the same requirements and standards as those of the experienced full-time faculty. The success and retention rates for the two groups are provided in the table below.

#### Success Rates

Course Category	Fall 2010	Fall 2014
<b>Developmental</b>	47.6%	49.4%
Part-time	43.0%	44.5%
Full-time	51.7%	53.3%
<b>Transfer Applied</b>	52.7%	47.9%
Part-time	43.9%	41.0%

Full-time	57.8%	52.6%
<b>Transfer</b>	53.4%	48.6%
Part-time	43.8%	39.1%
Full-time	56.7%	52.4%

### Retention Rates

Course Category	Fall 2010	Fall 2014
<b>Developmental</b>	81.4%	78.0%
Part-time	77.5%	74.2%
Full-Time	84.9%	80.9%
<b>Transfer Applied</b>	75.8%	68.4%
Part-time	69.3%	62.9%
Full-time	79.6%	72.2%
<b>Transfer</b>	76.7%	72.9%
Part-time	67.9%	61.8%
Full-time	79.7%	77.3%

In every category for both success and retention, the rates for full-time faculty were markedly higher than those of part-time faculty. During the fall 2014 semester, the success rates for full-time faculty were 8.8% higher in the basic skills category, 11.6% higher in the transfer applied category, and 13.3% higher in the transfer category. In addition, for fall 2014, the retention rates for full-time faculty were 6.7% higher in the basic skills category, 9.3% higher in the transfer applied category, and 15.5% higher in the transfer category. Similar differences can be seen in the fall 2010 data. It is clear that one way to increase retention and success rates for math courses is to increase the number of full-time faculty.

### Review of Success and Retention by Number of Attempts

In order to further understand some of the factors that might influence success and retention in our course categories, the department took one semester, fall 2014, and looked at success and retention rates relative to number of course attempts. A student was considered to have attempted a course if they enrolled and either received a W or a grade in the course.

The table below provides the percentage of students enrolled in each course by number of attempts during the fall 2014 term. For example, 81.5% of students enrolled in the basic skills classes were attempting their class for the first time, 14.7% were attempting their class for the second time.

### Percentage of Students by Number of Attempts

	1	2	3	4 or more
Basic Skills	81.5%	14.7%	3.7%	0.1%
Transfer Applied	80.4%	16.4%	3.2%	
Transfer	75.4%	17.8%	6.5%	0.3%

From this it is clear that in all course groups, the majority of enrolled students are attempting a course for the first time, but that in each group between 18.5% and 24.6% of enrolled students are repeating a course. This is the first time the department has looked at this data and we were interested to note that while there are small differences, the values for the course groups are similar. In the future it would be interesting to compare a fall and spring semester to see if there is any difference between the two semesters.

The department then compared success and retention rates in each course group by number of course attempts. The number of students enrolled for their fourth or fifth attempt were very small: two students in basic skills and 6 in the transfer group. For completeness the success and retention rates for this group have been included in the table, but they are not statistically significant.

	1	2	3	4 or more
<b>Basic Skills</b>				
<b>Success</b>	50.0%	43.8%	51.8%	50.0%
<b>Retention</b>	78.0%	73.3%	83.1%	100%
<b>Transfer Applied</b>				
<b>Success</b>	48.6%	46.6%	45.2%	
<b>Retention</b>	67.8%	71.7%	72.6%	
<b>Transfer</b>				
<b>Success</b>	47.8%	50.4%	51.9%	83.3%
<b>Retention</b>	70.9%	77.6%	82.2%	100%

The department was interested to learn that the differences in the success and retention rates by number of course attempts are small. This data is from one semester, fall 2014, and it would be interesting to compare this to future semesters to see if this remains consistent.

### Review of Success and Retention by Grade in Prerequisite Course (Math 20, 54, 2, 7)

The department is aware that there is a strong relationship between the grade earned in a prerequisite course and the outcome in the subsequent course. The department has been reviewing this data for four key courses: math 20, math 54, math 2 and math 7. Math 20, Intermediate Algebra, is the last algebra course in the basic skills sequence and is the

prerequisite course for Math 2, the first in the traditional college level sequence of courses required for a STEM major. Math 54, Elementary Statistics, is the most common college level course required of students transferring in non-STEM majors. Math 2, Precalculus, is the prerequisite course for math 7, Calculus 1, the first in the calculus course sequence.

The success rate by grade data was obtained for students who completed the prerequisite course at Santa Monica College for the 5 fall terms from 2010 to 2014. For each course there was a steady decrease in the success rate with the decrease in grade.

### **Math 20**

The prerequisite course for math 20 is math 31. The overall success rate for students in math 20 was 48%. When broken down by grade in math 31 the following success rates are found:

- Students with an A in math 31 had a success rate of 75.5%
- Students with a B in math 31 had a success rate of 52.7%
- Students with a C in math 31 had a success rate of 28.3%

### **Math 54**

Math 54 requires a prerequisite of math 18 or math 20. The success rates given below represent a grade earned in either prerequisite course. The overall success rate for students in math 54 was 37.5%. When broken down by grade in math 18/20 the following success rates are found:

- Students with an A in one of the prerequisite courses had a success rate of 64.3%
- Students with a B in one of the prerequisite courses had a success rate of 37.8%
- Students with a C in one of the prerequisite courses had a success rate of 23.0%

### **Math 2**

Math 2 requires a prerequisite of math 20, Intermediate Algebra. The overall success rate for math 2 was 44.9%. When broken down by grade in math 20, the following success rates are found:

- Students with an A had a success rate of 65.7%
- Students with a B in the prerequisite had a success rate of 33.0%
- Students with a C in the prerequisite had a success rate of 18.9%

### **Math 7**

Math 7 requires a prerequisite of math 2, Precalculus. The overall success rate for math 7 was 45.2%. When broken down by grade the following success rates are found:

- Students with an A in the prerequisite had a 71.0% success rate.
- Students with a B in the prerequisite had a 39.6% success rate.
- Students with a C in the prerequisite had a 21.2% success rate.



Of particular concern are the low success rates of the students in Math 54, 2, and 7 with a grade of B or C in the prerequisite and students in math 20 with a grade of C in math 31. It is clear that to improve overall success rates, particular attention should be paid to the students in these lower success groups. The department plans to work with all areas of the college, including counseling, special programs, and the administration to find ways to improve these numbers.

### Further factors contributing to success in Math 2

As previously mentioned, Math 2 – Precalculus, is traditionally the first college-level course required of STEM majors. As an important gateway class, the department decided to review some additional factors that could contribute to success in math 2. This information came from a separate data request and covers the period from summer 2011 through summer 2015.

The first table compares the success rates of students taking the class for the first time and for those that are repeating the course.

### Success Rates of Repeaters and First-Time Students in Math 2

Attempt Category	Count	Math 2 Success Rate	Math 2 GPA for Group
Repeater	358	52.0%	2.01
First Time	5037	50.1%	2.32
Grant Total	5395	50.2%	2.30

Interesting here is that although the success rate of the students repeating Math 2 and those taking the course for the first time are statistically equal, the overall GPA of the repeaters is lower. This indicates that while repeaters are completing the course, overall they are not doing as well as those taking the class for the first time. This is important for successive classes; the students with the lower grades in the prerequisite are more likely to have to repeat Math 7, the next course in the sequence.

The next tables look at success rates for math 2 by grade in each of the two prerequisite courses, Math 20 and Math 32.

### Success Rates for First Math 2 Attempt by Prerequisite Course Grade

Math 20 Grade	Count	Math 2 Success Rate	Math 2 GPA
A	810	64.8%	2.76
B	662	35.0%	1.68
C	555	18.4%	1.16
CR	1	0%	0
P	35	42.9%	2.22
Grand Total	2063	42.4%	2.10

<b>Math 32 Grade</b>	<b>Count</b>	<b>Math 2 Success Rate</b>	<b>Math 2 GPA</b>
A	617	65.3%	2.73
B	656	37.5%	1.79
C	630	19.2%	1.23
P	99	46.5%	2.53
CR	0		
Grand Total	2002	40.8%	2.04

These values are very similar to those found in the previous section and reinforce the observation that success rates decline significantly as the grade in the prerequisite course decreases. Note also that the overall GPA in Math 2 also declines significantly as the prerequisite grade declines. As previously mentioned this has significant implications for the overall success of each group in the next course, Math 7. The college and the department will have to work to find ways to support the students in the lower success groups.

The information about the importance of the Math 20 and Math 32 prerequisite was further explored by looking at success rates for students who took only math 20, only math 32 or both courses at SMC.

#### **Success Rates for First Math 2 Attempt by Previous SMC Enrollment**

<b>Qualification Type</b>	<b>Count</b>	<b>Math 2 Success Rate</b>	<b>Math 2 GPA</b>
Completed only Math 20 at SMC	331	54.1%	2.50
Completed only Math 32 at SMC	270	44.8%	2.22
Completed both at SMC	1732	40.1%	2.02
No previous Math 20 or Math 32 completions at SMC	2704	56.5%	2.46

In this table, there is a statistically significant difference in the success rates of the students that completed only Math 20 at SMC when compared to those that completed only Math 32 at SMC and those that completed both courses at SMC. There is no significant difference between this group and those that had neither course completed at SMC. This is important because it indicates that those students taking math 20 at SMC have about the same success rate as those that complete the equivalent of math 20 elsewhere. There is a significant difference between the success rates of those that take math 32 at SMC, either with or without Math 20 and those that take neither of the two courses here. The department has had many discussions about the importance of Math 32 and will use this data as part of an ongoing discussion about the structure of Math 20, Math 32 and Math 2.

Finally, the department looked at success rates in Math 2 by self-declared major.

Major	Count	Math 2 Success Rate	Math 2 GPA
"STEM" Major	1508	48.1%	2.26
Other	3529	50.9%	2.34
Grand Total	5037	50.1%	2.32

While it looks like there is a difference in the success rates of the two groups, this difference is not statistically significant (p-value = 0.07). The department will continue to follow this data in the future.

### Success and Retention by Semester Type

The success and retention rates of students during the full length semesters (fall and spring) and the short semesters (winter and summer) were compared for all three course areas: Developmental, Transfer and Transfer Applied. The data is summarized in the table below.

	Regular	Short	Total
<b>Developmental</b>			
Average of Success	47.2%	61.9%	49.6%
Average of Retention	78.8%	83.0%	79.5%
<b>Transfer</b>			
Average of Success	49.0%	59%	51.5%
Average of Retention	72.0%	74.9%	72.7%
<b>Transfer Applied</b>			
Average of Success	52.1%	68.2%	55.1%
Average of Retention	75.0%	82.8%	76.4%

The department did try to offer short term (8-week) sections of some courses during the fall and spring terms. Unfortunately, we did not see a similar increase in success rates in these sections. Ultimately the offerings were discontinued due to registration issues. A full report on these sections can be found in the attached file: *Accelerated Course Report*. We have long had anecdotal evidence of higher success rates during the short terms, but it is interesting to see that the difference is so dramatic. In each course area, success rates were 10% to 16.1% higher during the short terms, the retention rates were also noticeably higher. There are several factors that could contribute to this difference. For example, students usually only take one course during the short term, allowing intensive focus on just that one class. Also, we have found that it is usually the stronger math students who choose to take a short term course. Students who struggle with mathematics generally prefer not to take math during one of the short terms. Both of these factors could contribute to the higher success and retention rates.

### Review of SLO Achievement Rates

At the end of each semester math department faculty provide information on SLO achievement rates for every student enrolled. The table below provides the SLO achievement rates by course for the fall 2014 term.

Course	SLO Achievement Rate
Math 2	51.5%
Math 7	63.2%
Math 8	52.8%
Math 10	68.4%
Math 11	48.5%
Math 13	77.6%
Math 15	55.2%
Math 18	50.7%
Math 20	60.4%
Math 21	56.4%
Math 26	66.5%
Math 28	58.0%
Math 29	80.0%
Math 31	52.2%
Math 32	67.9%
Math 41	77.8%
Math 49	36.5%
Math 54	65.2%
Math 81	61.7%
Math 84	69.1%
Math 85	63.3%

It can be noted that the SLO achievement rates are higher than the overall course success rates. For fall 2014, the overall SLO achievement rate was 60.2% and the course success rate was 49%. This appears to be an indication that students are successful at some of the individual course requirements, but are not mastering all of the skills necessary to successfully pass the course. The department is still working to evaluate how to use the SLO achievement information. This will be a topic of future department discussion.

The department began this data review in order to try to understand some of the factors that contributed to student success, in particular those factors over which the department or college had some control. We are aware that there are other factors that could be important and studying success and retention by course type, faculty status, number of attempts, semester type and grade in previous course is just a beginning. The importance of full time faculty and the grade in the previous course are especially evident. In fact, based on this data, in conjunction with the STEM program, the department is offering review sessions during the Winter 2016 semester specifically targeting those students who earned a C or lower in Math 20. If successful, these students will gain additional skills that will aid them as they continue on to Math 2.

Institutional Research also supplied the department with data on successful course completion rates by time of day, gender, ethnicity/race and by age group. The full report of this data can be found in the attached file: *Math Annual Program Review Data(1).xlsx*. Notable in these results were the following:

- Success rates by course time of day did not vary significantly. Overall the success rates stayed close to the overall rates seen in the department. The one exception was for weekend classes, but enrollment in these sections is low and the data unreliable.
- There was a small difference in the successful course completion rates by gender. In each of the fall semesters between 2010 and 2014, the success rates for female students was between 2% and 6% higher.
- There were significant differences in success rates by ethnicity. For categories where there was sufficient data to provide meaningful results, success rates for fall 2014 ranged from 37.6% for Black students to 58% for Asian students. These results are similar to those seen in math programs nationwide. Across the board there were no significant differences in reported success rates by ethnicity between fall 2010 and fall 2014. The department is committed to working with the campus equity program to address these differences in success rates and will continue to work with Dr. Frank Harris of the Minority Male Community College Collaborative (M2C3) by developing workshops for both students and faculty to reduce the achievement gap for male students of color.

The department continues to work on strategies to improve success/retention rates. Basic Skills instructors through the Basic Skills Initiative, The Center, First Year Experience, Summer Jams, Supplemental Instruction as well as the STEM program have identified key area to address to improve student success. The Transfer and Transfer Applied instructors are also working with many of these same initiatives to review data that can be used to better understand the needs of our students.

It is clear that all of these are not area or course specific issues, but entire department issues. This data will be presented to the entire department at the spring 2016 flex day meeting. It is hoped that this information will result in a productive discussion of ideas and ways that, as a department, we can improve student success rates.

## **D2. Objectives (Moving Forward)**

Objective #1

**Objective:** Based on the Mathematics Department Equity Proposal, create and implement an action plan that involves faculty and staff to work toward addressing the disparities that exist within the African-American and Latino male students in basic skills math completion.

**Area/ Discipline/ Function Responsible:** All

**Assessment Data and Other Observations:**

**External Factors:**

**Timeline and activities to accomplish the objective:**

**Describe how objective will be assessed/measured:**

**Comments:**

Objective #2

**Objective:**

Improve methodology and testing related to classified staff hiring of Math Instructional Assistants

**Area/ Discipline/ Function Responsible:** All

**Assessment Data and Other Observations:**

Other data or observed trends

**External Factors:**

**Timeline and activities to accomplish the objective:** The 2015-2016 academic year.

**Describe how objective will be assessed/measured:** Success rates of applicants will be monitored.

**Comments:** With an improved exam we should see an increase in the quality of the math lab instructional assistants.

Objective #3

**Objective:**

Based on the Mathematics Department Equity Proposal, increase awareness of and address the disparities that exist within the African-American and Latino male students in basic skills math completion by providing professional development opportunities.

**Area/ Discipline/ Function Responsible:** All

**Assessment Data and Other Observations:**

TIMS Report Data

Institutional Research Data

**External Factors:**

<b>Timeline and activities to accomplish the objective:</b> 2015-2016 Academic Year
<b>Describe how objective will be assessed/measured:</b> IR Data, TIMS Reports
<b>Comments:</b> This objective was modified from the previous program review to better reflect the goals of the related grant. It is an ongoing objective for the department.
Objective #4 <b>Objective:</b>  Update department website to improve organization and access.
<b>Area/ Discipline/ Function Responsible:</b> All
<b>Assessment Data and Other Observations:</b> Other data or observed trends
<b>External Factors:</b>
<b>Timeline and activities to accomplish the objective:</b> 2015-2016 academic year
<b>Describe how objective will be assessed/measured:</b> Observation and use of the website.
<b>Comments:</b> Completion of this objective should improve communication with students and department members.
Objective #5 <b>Objective:</b>  Increase hybrid mathematics course offerings.
<b>Area/ Discipline/ Function Responsible:</b> All
<b>Assessment Data and Other Observations:</b>
<b>External Factors:</b> Program Review Committee Recommendation
<b>Timeline and activities to accomplish the objective:</b> First hybrid math 54 courses offered fall 2015 (two sections). This number was increased to four sections in spring 2016.
<b>Describe how objective will be assessed/measured:</b> IR data and TIMS report data
<b>Comments:</b> The department will evaluate the success of this first course and then consider adding additional hybrid courses in the future.
Objective #6 <b>Objective:</b>

Increase basic skills usage of the resources available in the Math Lab and the Math Learning Resource Center

**Area/ Discipline/ Function Responsible:** All

**Assessment Data and Other Observations:**

TIMS Report Data

Institutional Research Data

**External Factors:**

**Timeline and activities to accomplish the objective:** Fall 2015

**Describe how objective will be assessed/measured:** Course enrollment data will be gathered for every student using the math lab tutoring services.

**Comments:** The math department opened the Math Learning Resource Center in fall 2015. This new math lab is focused on the needs of basic skills students.

## **E. Curriculum Review**

*To comply with accreditation standards, programs are required to update their curriculum outlines of record (CORs) every six years. Be sure to submit your updated outlines to the Academic Senate Joint Curriculum Committee in time for them to be reviewed prior to or at the Curriculum Committee's last scheduled meeting of the year (check the committee's submittal deadlines at [click here for dates and deadlines](#)). The Program Review annual report will note whether course outlines are up to date.*

**1. Discuss how the department reviews, revises, and creates new curriculum. Include the following information:**

- **The process by which department members participate in the review and revision of curriculum.**
- **How program goals and SLOS are integrated into course design and curriculum planning.**
- **The relationship of program courses to other college programs (cross-listing, overlapping content)**
- **The rationale for any changes to pre-requisites, co-requisites and advisories.**
- **How the department ensures course syllabi are aligned with the course outline of record.**

All full-time faculty are involved in curriculum review and development through the standing committees (see section F-1 for a description of the standing committees) and through regular dialogues at department and flex day meetings. Part-time faculty are encouraged to participate in all discussions, but full-time faculty are ultimately responsible for curriculum decisions. Curriculum issues including course content, textbook discussions, SLO assessment, student success and retention, college priorities, and the regular review of CORs are first referred to the standing committees. Faculty who are on the committee and other faculty who wish to participate, use their expertise to make decisions. The department regularly reviews the course outlines of record for all courses; this can occur every six years or more frequently if warranted.

As indicated in section C-1, every course group, (Developmental, Transfer Applied and Transfer) has set overall goals for the course SLOs. Each SLO was chosen to reflect these overall goals and the goals of the department as articulated in the department mission statement. When an instructor is assigned to teach a particular course, they are supplied a copy of the



COR, which includes the SLOs for the course, all course objectives, and an example day-by-day schedule. CORs and SLOs are also included in the course information section on the department homepage. Instructors are encouraged to use the COR information when preparing their individual syllabi. When any faculty member, full or part time, is evaluated, part of the evaluation process includes a peer review of their course syllabi. This review checks for the inclusion of:

- Prerequisite skills
- Exit skills/course objectives/SLOs
- Course outline (weekly, daily timetable)
- Testing dates, including final
- Grading Policy
- Testing Policy (calculator, open book, etc.)
- Make-up Policy
- Homework Policy
- Absence Policy
- Calculator Policy
- Math Lab Requirements (Math 81, 84, 31)
- Contact Information
- Office hours and Location

At the August 2014 flex day meeting, a portion of the meeting was used to discuss the purpose of the syllabus, how it could be used to promote the classroom experience, and what content should be in all syllabi. During the fall 2014 semester, a complete review of every department syllabus was conducted. All instructors received feedback on the content and organization of their syllabi and were encouraged to make necessary changes in order to align with department standards. A second review was conducted during the spring 2015 semester.

Mathematics courses that are prerequisites for courses in other departments include:

- Math 31 or Math 49 for Chemistry 10, Economics 1, and Economics 2
- Math 20 for Chemistry 11 and Computer Science 42
- Math 2 for Chemistry 12, Physics 6 and Astronomy 8
- Math 7 for Physics 8, Engineering 12, and Computer Science 30
- Math 8 for Physics 22, Physics 23, Astronomy 8 and Computer Science 10
- Math 54 for Psychology 7

There is one cross-listed course in the department: Math 10, Discrete Mathematics is also listed as CS 10.

## F. Community Engagement

*In the prompts that follow, please delineate the partnerships you have with the rest of the SMC community as well as those you have with external organizations.*

**1. If applicable, describe how your department staff members engage in institutional efforts such as committees and presentations, and departmental activities.**

The math department is active in many areas of Santa Monica College and examples of the non-classroom activities and responsibilities of department members include:

- Representing the department in the Academic Senate and on Senate Committees
- Representing the department in the Faculty Association and on Association Committees
- Serving in leadership roles on the Center for Teaching Excellence and the Student Success Committee
- Working with programs such as First Year Experience, Summer Jams, Supplemental Instruction
- Working with STEM activities including STEM Bootcamp and Saturday workshops for STEM students
- Serving as faculty advisors for student clubs
- Supervising independent study students
- Administering the AMATYC Exam each year
- Serving on evaluation committees and tenure committees both within the math department and as out-of-department members in other disciplines
- Serving on hiring committees
- Serving on Equity Committee
- Serving on DPAC
- Serving on scholarship selection committee for the Foundation
- Serving as a presenter on the VIP day

The attached file *Community Engagement* provides detailed information on the involvement of all full-time department members.

### **Standing Committees**

Department business has been organized into 15 standing committees: Technology, Website, Counseling, Assessment, Library, Math 81/84/85, Math 31/18/49, Math 20/32/2, Math 26/28/29, Math 41, Math 7/8, Math 11/15, and Math 10/13, each chaired by one full-time faculty member. All full-time faculty serve on at least one committee. Course committees review curriculum, analyze curriculum content questions forwarded from Counseling, serve as mentors for new faculty, serve as a forum for improving course delivery, and provide feedback on adherence to course outlines of record.

### **2. If applicable, discuss the engagement of program members with the local community, industry, professional groups, etc.)**

Many faculty of the math department are members of professional organizations including:

- AMATYC – the American Mathematical Association of Two-Year Colleges
- MAA – the Mathematical Association of America
- CMC<sup>3</sup> – California Mathematics Council Community Colleges
- FACCC – Faculty Association of California Community Colleges

In addition several department faculty have held leadership positions within these organizations including:

- Maribel Lopez – President-elect of CMC<sup>3</sup>
- Mario Martinez – Governor at Large FACCC (2014-2015)
- Mitra Moassessi – Treasurer FACCC (2014 – 2015)
- Andrew Nestler – Serves on FACCC Publications Committee

### **3. Discuss the relationship among and between full and part-time faculty, involvement of part-time faculty in departmental activities, and part-time faculty access to resources and support.**

The part-time faculty of the math department are an active and essential component of all department activities. During the fall 2015 term 98 of 123 department members were employed part-time with 57 holding associate faculty status. The department employs talented and experienced part-time instructors in almost all courses and in all areas: basic skills, transfer applied and transfer level. The department is proud of the contributions that part-time faculty make to the department and is aware that they are an important part of what makes our department successful.

Part-time faculty are encouraged to participate in all department functions, including committees, department meetings, flex day activities and professional development opportunities. The department is pleased to say that many do participate. Every effort is made to keep all faculty informed of these activities and information is emailed to the entire department prior to each event.

All part-time faculty in the department hold office hours. This can be done in one of several offices available for their use or in the math lab. In the past few years a number of part-time faculty have opted to teach one of the course specific workshops offered through the math lab. In these workshops they assist not only their own students but students who are taking the same course from another instructor. Many of our part-time faculty spend more than the minimum required time providing assistance to students. In the future, availability of office space could become an issue. Right now, the 100+ part-time faculty share four offices in the department. The department hopes that we can continue to provide space for all faculty and that these needs are considered in all future planning.

When hired, all part-time faculty are provided with the course outline of record, all appropriate teaching materials and a suggested day-by-day schedule for the course that they will be teaching. In addition they are put in touch with the chair of the standing committee that represents their course. This person is a full-time faculty member who is entirely familiar with the course and can provide assistance with any questions relating to the course including syllabus preparation, exam format, department policies and procedures, and is there to discuss any other issues or concerns that may arise during the semester.

All part-time faculty are evaluated twice during their first four semester and every fourth semester thereafter by a full-time faculty member following the procedure in the faculty contract. The evaluation includes a syllabus review, a review of an exam, and a classroom visit. The feedback provided through this process is meant to promote constructive discussion between faculty members and provide information and knowledge that will improve the education process for both the faculty member and the students.

## **G1. Current Planning and Recommendations**

*The following items are intended to help programs identify, track, and document unit planning and actions and to assist the institution in broad planning efforts.*

**1. Identify any issues or needs impacting program effectiveness or efficiency for which institutional support or resources will be requested in the coming year. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request support or resources through established channels and processes].**

The math department is acutely aware of the fact that the college is interested in increasing student success and retention rates in mathematics. On October 9, 2015 the department, under the Math Equity Grant and The Center for Teaching and Learning, sponsored a presentation with Dr. Paul Nolting, learning specialist. Dr. Nolting consults with colleges and universities on strategies to help improve student success. In a follow-up email to the department he wrote, "Math success is an intitutional issue, not just a math department challenge. Math departments by themselves cannot provide all the solutions to improve student success. The math department and other institutional offices must work together to design and

sustain meaningful interventions."

All of Dr. Nolting's suggestions are documented in the attachment, *Dr. Nolting Report and Recommendations* and can provide a basis for future and continued discussion.

With his words and suggestions in mind, we have identified the following issues and needs:

- Increasing full-time faculty and math lab staff
- Creating additional contact time and/or assessment time with students
- Improvement of math lab conditions
- Addressing facilities related issues
- Increasing hours for DSPS testing

### **Increasing full-time faculty and math lab staff**

The 25 full-time faculty members of the math department are responsible for the program management of between 9,000 to 10,000 students each semester. While the department is fortunate to have dedicated adjunct faculty, the vast majority of the work falls to the full-time faculty. The two largest departments on campus are mathematics and English. Each of these subjects is required by students of all majors and both departments are asked to participate in a wide variety of campus programs and initiatives. During the fall 2014 semester, the English department had 252 enrolled students per full-time faculty member; comparatively, the math department was managing and participating in programming for 379 enrolled students per full-time faculty member. To achieve parity on this level with English, the math department should have 36 full-time faculty. The ratio in the Physical Science Department, arguably the most similar to math in terms of subject content, was approximately 104 students per full-time faculty member. To achieve parity with the Physical Science department, there would have to be 87 full-time math faculty. El Camino College, Pasadena City College, and Glendale College, similarly sized local colleges, have 40 or more full-time faculty members in the math department. If there are to be significant and lasting changes in student success and retention rates in mathematics this critical understaffing issue will have to be addressed.

As discussed in section D-6: Looking Back, to increase efficiency and best serve students, staffing levels in the math lab will also have to be increased. The math department believes that typical wait times of one hour or more for a 10 minute appointment with a tutor are unacceptable. The math lab staff are dedicated to doing their best to help students, but given the current situation, the math lab is not able to provide the help our students need and deserve.

### **Creating additional contact time and/or assessment time with students**

As described in this document, the math department is involved in many campus and department programs addressing issues related to student success and equity. The department believes that these programs have helped many students improve and succeed in mathematics, but the reality is that each of these programs reaches only a small fraction of the nearly 10,000 enrolled students each semester and will have, at best, an extremely small incremental effect on issues related to student success and equity. Every student is important and, provided there are sufficient staffing levels, programs of these types should be continued, but any strategy to improve success and/or equity must be one that reaches the entire enrollment of the department. The most effective methods of creating a lasting and statistically significant positive effects are those that involve increasing student time-on-task and/or student teacher contact time. It is interesting to note that both of these methods are incorporated into many of the initiatives and special programs currently active at SMC. With this in

mind, the department is willing to work with the college to explore any or all of the following suggestions:

- Reducing class size. Currently most math classes have an enrollment limit of 35 – 45. Reducing class size would provide more individual attention for students and increase the possibility of the instructor grading homework.
- Increasing the amount of time students spend in class. Several colleges in the state have had success with programs that lengthen the time students spend in class. The extra time is used for students to work on homework or additional problems. There are different variations on these programs, but one example is the Math Performance Success Program (MSP) at DeAnza College. The MSP program focuses on developmental and statistics courses. Students spend double the amount of time in class, receiving vital individualized attention that is not always possible in a traditional class.
- Teaching assistants to assist with grading of homework. Currently most math classes have 35 – 45 students and the typical faculty load is three or four classes. If instructors were to spend just 5 minutes on each student's assignment, enough time to briefly check the work, but not enough to provide meaningful feedback, this would require 40 to 60 hours per week. Due to time constraints it is impossible for faculty to collect and effectively grade homework from every class. Teaching assistants would allow faculty to collect and grade more work, and the more time students spend on their homework, the more likely they are to be successful.
- Classroom tutors to assist students during and after class. This would be different than the Supplemental Instructional Assistant as they would specifically work with students on homework problems.

The department is open to discussing other suggestions as they arise.

### **Improved Math Lab Conditions**

The staffing levels of the math lab were discussed above, but there are other issues pertaining to the math lab that should be addressed.

- Although there are policies relating to noise, noise is frequently an issue and needs to be addressed. Currently, the Math Lab Coordinator frequently interrupts and reminds students to be quiet.
- There are no Instructional Assistants available to tutor Math 11, 13, 10 and 15. A tiered system of IAs, where some are certified to tutor the upper level transfer courses, would be beneficial to students. This would provide tutor coverage for all department classes.
- Instructional Assistants for Math 54 are needed. Math 54 is one of the top ten enrollment courses on campus and there is a critical need for tutors in this subject.
- The appointment registration system has not been updated in two years.
- Instructional Assistants receive no tutor training. This type of training would improve effectiveness.

### **Facilities Issues**

Math classes are taught in several buildings across campus, but most classes are in the MC, LA and LS buildings. The LA and LS buildings are outdated and, as was discovered during the heat wave last fall, are unacceptable for teaching purposes during extreme temperature conditions.

Additionally, most of the classrooms in LA were not constructed with 35 or 45 students per class in mind. Frequently, our classrooms are overcrowded, with desks barely a few inches apart, making it impossible for an instructor to circulate through the room and address students individually.

As in other areas of the campus, general maintenance is an issue. Learning happens best in a comfortable and inviting environment. As a college we should be doing our best to provide this for all students, not expecting them to try to learn in overcrowded and hot (or cold) classrooms.

**Increased Hours for DSPS Testing**

Proctored testing for DSPS students is available Monday – Thursday from 8 a.m. to 5 p.m. and Friday from 8 a.m. – 3 p.m. during the fall and spring semester, with reduced hours during the winter and summer. The proctoring room is utilized by many math department students, but at times scheduling can be an issue. Math classes are offered Monday – Thursday from 6:45 a.m. - 10 p.m., Friday 7:45 a.m. – 4 p.m. and Saturday 9 a.m. – 1 p.m. There are classes that meet entirely or almost entirely outside of the available proctoring room hours, making it difficult for students to schedule exam time. Proctoring services should be conveniently available to all DSPS students, regardless of their scheduled class time.

**2. If applicable, list additional capital resources (facilities, technology, equipment) that are needed to support the program as it currently exists. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request resources through established channels and processes].**

The department will need the capital resources to implement an improvement plan resulting from a discussion of the data presented in this report. This could include data gathering, improving math lab conditions with furniture that encourages quiet study, and a noise mitigation system. Capital resources are needed for manipulatives for tactile and visual learners, software site-wide licenses for applications including document generation and classroom presentations. As more faculty move toward using tablet computers for classroom presentations and more courses are offered online, we will need appropriate technology, including computers and tablets, to make these offerings efficient and possible.

**3. If applicable, list additional human resources (staffing, professional development, staff training) needed to support the program as it currently exists. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request resources through established channels and processes].**

As discussed in question 1 above, the department is in need of extensive human resources. This includes full-time faculty, math lab instructional assistants and any additional human resources resulting from the implementation of a department improvement plan.

The current ratio of full-time to part-time faculty is 1 to 4. The department anticipates two to four retirements in the next 5 years, more over the next 10. Not only will these faculty have to be replaced, the current number of full-time faculty is insufficient to meet the current needs of the department.

As discussed above and in section D-6: Looking Back, the math lab requires significant staffing increases to meet student needs. Staffing in the lab would include both additional instructional assistants and student tutors.

**G2. Future Planning and Recommendations**

*The following items are intended to help programs identify, track, and document unit planning and actions and to assist the institution in broad planning efforts.*

**1. Projecting toward the future, what trends could potentially impact the program? What changes does the program anticipate in 5 years; 10 years? Where does the program want to be? How is the program planning for these changes?**

The department has identified several important trends that could impact the program over the next 5 to 10 years:

- The introduction of the Common Core Curriculum in the K-12 system. The department hopes to have flex day presentations on the anticipated changes resulting from the Common Core Curriculum.
- State mandated C-ID descriptors attached to AA-T/AA-S degrees.
- The use of multiple measures in course placement and the move away from the Compass Placement Exam.
- The trend toward the creation of accelerated pathways through the college math curriculum.
- Changes in technology and the increased use of technology in teaching and learning, including additional offerings of online courses.
- The anticipated move to the new math building.

The department is planning for all of these changes and hopes to be prepared and ready to continue to provide Santa Monica College students with continued excellence in mathematical preparation and instruction. Specific planning issues are addressed below.

### **Common Core**

The Common Core State Standards were adopted in California in 2010. According to the website [www.corestandards.org](http://www.corestandards.org), the Common Core Curriculum is, "A set of clear college- and career-ready standards for kindergarten through the 12th grade in English language arts/literacy and mathematics...which are designed to ensure that students graduating from high school are prepared to take credit bearing introductory courses in two- and four-year college programs or enter the workforce."

While Common Core Standards should increase the number of college-ready students in the next 5 - 10 years, the math department will also have to understand the standards to retool and align our courses with what incoming students have learned and mastered under the Common Core Curriculum.

The department is hoping to have flex day presentations that will help the department members become familiar with the Common Core Curriculum and provide information that will help students transitioning from the K - 12 Curriculum to the College Curriculum.

### **C-ID Descriptors**

The C-ID descriptors at the transfer level courses have not changed the outcomes attached to the classes, but the incoming skill levels may change. A complete discussion of C-ID progress can be found in section D-3: Looking Back. We will continue to work with the curriculum committee and the articulation officer to complete this process.

### **Multiple Measures and the elimination of the Compass Placement Exam**

There are two statewide initiatives that will affect math placement at Santa Monica College. One is the Common Assessment Initiative, which is working to develop a single assessment exam that will be used at all California Community Colleges. This exam will eliminate the need for students to take multiple placement exams if they take classes at more than one California Community College. At Santa Monica College, this exam will replace the Compass Exam which will be phased out of use by December 2016. The second initiative is The Multiple Measures Assessment Project, which will require the use of multiple measures in the placement process.

It is anticipated that both of these programs could affect the course offerings of the math department. If there is a significant change in the distribution of student placement, there will need to be a change in the distribution of class

offerings and in the educational support offered by the department.

The math department recognizes that proper placement into a first mathematics course is critical for student success and is following both of these projects. Several department members have been attending meetings related to the Multiple Measures Assessment Project. We have also had a presentation by members of the department of institutional research on data relating to using multiple assessment measures at SMC. Work on this will continue.

### **Accelerated Pathways**

Currently the math department has two accelerated courses: Math 85 (a combination of math 81 and 84) and Math 49 (a combination of math 31 and 18). A student that enrolls in and is successful in both of these courses could reduce the number of semesters required to reach a college level math course from four to two. Recently, the California State University System and the University of California System agreed to accept an accelerated statistics pathway for transfer. This would allow Santa Monica College to offer the current Math 54, Statistics, course without a prerequisite of Intermediate Algebra (Math 18 or Math 20). The department has created a new course, Math 50 Pre-Statistics, that would specifically prepare students for Math 54. With the implementation of this course and the change to the prerequisite for Math 54, the length of the pathway to the completion of a transferable college-level mathematics course would be reduced for many students.

It is anticipated that Math 50 will also have a significant impact on our course offerings. We believe that there will be strong demand for Math 50 and following success there, additional sections of Math 54 will be required.

### **Technology**

Today technology is essential for the teaching and learning of mathematics. At Santa Monica College, faculty in the math department use technology for both instruction and assessment. For instruction, technology is used for the preparation of lectures, for assistance in visualization and conceptual understanding, for the recording of lecture notes, and to provide an overall deeper understanding of course material. Many department instructors are using online homework systems as well. These systems provide instant feedback and assistance to students while they are completing their homework and provide instructors with information about homework completion rates. The department is continually working to stay informed about changes in technology and the ways technology can be used in the classroom through professional development opportunities.

### **New Building**

The long range facilities plan for Santa Monica College includes the construction of a new math and science building on the main campus. The building is only in the planning stage and there is no set date for construction to begin. The department is working with the district on the building plans, keeping the goals and needs of the department and students in mind.

**2. If applicable, list additional capital resources (facilities, technology, equipment) that will be needed to support proposed changes. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request resources through established channels and processes].**

The department will require updated computers, access to Smart Classrooms, including Smartboards, and increased access to the internet in classrooms. As the department increases offerings of hybrid courses and as the use of online homework increases, additional access to computers will be required, perhaps in the form of a computer lab. If such a lab is established, resources required would be the computers, software, furniture, and funding for computer and lab



maintenance.

Additionally, the department will require additional office space for new faculty, for part-time faculty office hours and space for additional math lab usage.

**3. If applicable, list additional human resources (staffing, professional development, staff training) that will be needed to support proposed changes. [This information will be reviewed and considered in institutional planning processes but does not supplant the need to request resources through established channels and processes].**

In the next 5 years, the department expects at least three full-time faculty members to retire. Over the next 10 years, additional retirements are expected. These full-time faculty will have to be replaced and any full-time hiring should work toward increasing the number of full-time faculty, always keeping retirements in mind.

The math department is committed to working toward the proposed changes and will continue to do so. At this point the department simply doesn't have enough full-time faculty to implement changes quickly, to keep up with ongoing department needs, and with the increased requests for department representation and input on campus-wide committees and initiatives.

The department will require:

- Full-time faculty to keep up with the increased administrative demands of the department.
- Experts to provide information and input on the Common Core Curriculum and to provide guidance to the department on how to help students successfully make the transition from Common Core to college.
- Additional clerical support
- More Instructional Assistants and student tutors in the math lab.

The current ratio of full-time to part-time faculty is 1 to 4, with 25 full-time faculty. With the addition of five new full-time faculty and 2 retirements, we will have 28 full-time faculty for 2016-17. At the same time the math department is constantly asked to offer more classes due to the increasing demand for mathematics courses. The need is especially critical in the basic skills and transfer applied areas where, during the fall 2015 semester, only 23% and 35% of courses respectively were staffed by full-time faculty. With the current staffing levels, the mathematics department does not have enough full-time faculty to keep up with ongoing department needs, to provide representation and input on campus-wide committees and initiatives and to work on projects that, we believe, will contribute to student success.

**4. If applicable, note particular challenges the program faces including those relating to categorical funding, budget, and staffing.**

Over the past few years, the department has participated in several short term programs addressing student success, including Summer Jams, STEM and the Basic Skills Initiative. In most cases, funding for these programs is terminal. Far too often, the funding ends just as participants are beginning to fully understand how ideas from the program can provide the most benefits to students. In a few cases, ideas from these programs can be incorporated into our existing courses, but in most cases this is not possible. The programs require work and meeting with students outside of class time and just as the program is gaining traction, funding ends and the program is cancelled. The faculty involved are then asked to move onto a new initiative and potential benefits are lost.

If we are serious about improving student success, retention, and overall experience, the college will need to find ways to support and fund ongoing long term changes. The short term programs are beneficial for exploring new ideas, but without a corresponding long term commitment, we cannot expect to see lasting changes.

**5. Summarize any conclusions and long term recommendations for the program resulting from the self evaluation process.**

The math department is a dedicated group of professionals working to provide the best possible experience for all Santa Monica College students enrolled our courses. As a department we are involved in many campus wide initiatives and programs that work to find ways to improve instruction and support for our students. As we move forward we will continue to look for ways to increase student success and equity and continue to develop and review our curriculum to meet the needs of a diverse student body as they work to meet their educational requirements.

**6. Please use this field to share any information the program feels is not covered under any other questions.**

No Response.

**Evaluation of Process**

**Please comment on the effectiveness of the Program Review process in focusing program planning.**

On March 4, 2016 the math department faculty met for the scheduled campus-wide departmental flex day. Most of the morning session was devoted to reviewing the data presented in this program review. What followed was a lively discussion on various topics, related to both improving student success and retention and future full-time faculty needs and requests. This discussion was productive and reviewing some of the data presented in this document was helpful for focusing program planning.

Many of the suggestions from this discussion have been incorporated into this review. It was generally agreed that to achieve lasting improvements in success and retention rates, there will have to be a significant commitment from both the department and the college. In the upcoming year the department will focus on implementing the development of a statistical pathway and do a complete review of Math 2 – Precalculus.

During the flex meeting, the department approved Math 50 – Prestatistics. This will be a new prerequisite class for students intending to complete their transfer math requirement with Math 54- Introduction to Statistics. Three sections of this course will be offered during the fall 2016 term.

The department has also formed a committee to look at Math 2. The committee will consist of faculty with expertise in both basic skills and transfer level courses. The goal will be to improve the transition between math 20 and math 2.

Finally, the department was able to use the information contained in program review to determine our new faculty requests. This included a discussion of future staffing needs, taking anticipated retirements and trends in student enrollment into account.

Overall the program review process has been interesting and informative.

We would like to thank the Program Review Committee for providing a both a helpful introductory session, an informative website and for the all of the work done in reading, reviewing and providing feedback for each department. Thank you to Institutional Research for providing the necessary data to complete the review. A special thanks to Daniel Brueman, who provided guidance and information throughout.

*These fields to be filled out by the Program Review committee. Reports will be sent to the program and will be available on-line to populate relevant fields in the annual report and the next 6 year report.*

**Narrative**

**Program Evaluation**

**Commendations**

**Recommendations for Program Strengthening**

**Recommendations for Institutional Support**

**Attached Files**

2016 SMC AMATYC Scores	
AMATYC National Team Standings	
Accelerated Course Report	
Community Engagement	
Current Faculty	
Dr. Nolting Report and Recommendations	
Full Time-Part Time Faculty	
List of Reference Documents	
Math 2 Data	
Math Annual Review 2014-2015	
Math Lab Data	
Math Standing Committees	
Program Review Data 1	
Program Review Data 2	
Program Review Data 3	
Statewide Data	
Syllabi Review	
Yi Lin 2013 AMATYC	