Basic Program Information

Department Name:

Mathematics

Division Name:

Physical Sciences, Mathematics and Engineering (PSME)

Program Mission(s):

In support of the college mission, the department commits itself to providing access to outstanding educational opportunities for all of our students to study developmental and undergraduate mathematics developed rigorously in a relevant contextual environment.

More specifically, it is our mission to provide every student the opportunity to pursue an outstanding math education, through a rigorous curriculum that develops students' quantitative skills and prepares them for success in courses at 2-year and 4-year institutions. We pledge to provide students with opportunities to become effective problem solvers and to use mathematics in a contextual and relevant environment. Through our pre-collegiate math program, we prepare students for the college-level opportunities that they are pursuing. Through both our transfer program and our pre-collegiate program, we strive to develop within our students an appreciation for the respected traditions of classical mathematical thought: rigorous thinking, reason, inquiry and beauty.

Please list all Program Review team members who participated in this Program Review:

Name	Department	Position
Jeffrey Anderson	Mathematics	Faculty
Zachary Cembellin	Mathematics	Faculty
Marnie Francisco	Mathematics	Faculty
Ion Georgiou	Mathematics	Faculty
Nicole Gray	Mathematics	Faculty
Marc Knobel	Mathematics	Faculty
Phuong Lam	Mathematics	Faculty
Debbie Lee	Mathematics	Faculty
Rick Martinez	Mathematics	Faculty
Patrick Morriss	Mathematics	Faculty
Rachel Mudge	Mathematics	Faculty
Sarah Munoz	Mathematics	Faculty
Young Hee Park Lee	Mathematics	Faculty
Kathy Perino	Mathematics	Faculty
John Sawka	Mathematics	Faculty
Lori Silverman	Mathematics	Faculty
Jennifer Sinclair	Mathematics	Faculty
Brian Stanley	Mathematics	Faculty

Sarah Williams	Mathematics	Faculty
Teresa Zwack	Mathematics	Faculty

Total number of Full Time Faculty:	20
Total number of Part Time Faculty:	27

Please list all existing Classified positions:
none

List all Programs* covered by this review & check the appropriate column for program type:

Program Name	**Certificate of Achievement Program**	**Associate Degree Program**	**Pathway Program**
Degree Program		✓	
Transfer Program **Culminating class: Math 10, 44 or 57** **Culminating class: Math 1C** **Culminating class: Math 12**			✓
Pre-collegiate Program **Math 230/235 (MathMyWay)** **Culminating class: Math 105/Math108**			✓

- If you have a supporting program or pathway in your area for which you will be making resource requests, please analyze it within this program review (i.e. Integrated Reading and Writing, Math My Way, etc.) You will only need to address those data elements that apply.

Section 1: Data and Trend Analysis

a. Program Data:

Data will be posted on http://foothill.edu/staff/irs/programplans/programreviewdata.php for all measures except non-transcriptable completion. You must manually copy data in the boxes below for every degree or certificate of achievement covered by this program review.

Transcriptable Programs	2010-2011	2011-2012	2012-2013	% Change
AS Math	1	1	**1**	**0%**

Please provide any non-transcriptable completion data you have available. Institutional Research does not track this data; you are responsible for tracking this data.

Non-Transcriptable Program	2010-2011	2011-2012	2012-2013	% Change
Example: Career Certificate				

If you have a non-transcriptable certificate that serves a workforce need, and/or has external certification, please provide a brief narrative explaining the industry need for this certificate, and attach any supporting data.

N/A The math department does not offer certificates.

If it does not have external certification, and/or is not a workforce program, please provide a brief narrative justifying the need for a certificate that is not state approved, and attach any supporting data.

N/A The math department does not offer certificates.

b. Department Level Data:

	2010-2011	2011-2012	2012-2013	% Change
Enrollment	10139	10147	9540	-6%
Productivity (College Goal 2013-14: 535)	690	544	512	-6%
Success	0.59	0.59	0.60	+2%

Full-time FTEF	11.3	13.9	14.2	+2%
Part-time FTEF	16.6	17.3	19.3	+12%

c. Associate Degree Transfer (ADT)

There is a fall 2014 legislated deadline for approval of ADTs (AA-T/AS/T degrees). **If there is a Transfer Model Curriculum (TMC) available in your discipline/program, you are *required* to offer an approved AA-T/AS-T.** Indicate the status of your program's ADT:

Check one	Associate Degree Transfer Status
✓	**State Approved**
	Submitted to State Chancellor's Office
	Submitted to Office of Instruction
	In Progress with Articulation
	Planning Stage with Department
	Not Applicable

If you are required to offer an approved ADT and it has not been state-approved, please comment on the program's progress/anticipated approval date.

Currently State Approved.

Using the prompts and the data from the tables above, provide a short, concise narrative analysis for each of the following indicators. If additional data is cited (beyond program review data sheet), please indicate your data source(s).

d. Enrollment trends: Over the last three years, is the enrollment in your program holding steady, or is there a noticeable increase or decline? Please comment on the data and analyze the trends.

The 6% year-over-year drop in 2012-2013 after a flat change from 2011 coincides with overall improvement in the local economy as Silicon Valley continues to emerge from the recession of 2008.

e. Student Demographics: Please comment on the enrollment data, comparing the program-level data with the college-level data. Discuss any noticeable differences in areas such as ethnicity, gender, age and highest degree.

Compared to students at the college as a whole, students enrolled in math courses are disproportionately young, Asian, and male. College-wide, 18% of students are over the age of 40, 25% are Asian, and 54% are female. In the math department, the corresponding proportions are 3%, 35%, and 45%.

f. Productivity: Although the college productivity goal is 535, there are many factors that affect productivity, i.e. seat count/facilities/accreditation restrictions. Please evaluate and discuss the productivity trends in *your program*, relative to the college goal and any additional factors that impact productivity. If your productivity is experiencing a declining trend, please address strategies that your program could adopt to increase productivity.

Seat counts in math classes are negotiated to be 35, equating to a "full productivity" metric of 525, below the college goal. The college was also in a WSCH gathering mode which might have lead to some classes running with lower enrollments than is usual. The productivity after 2011-12 drop was due to the removal of the TBA hours from the courses.

As detailed in the "innovation" section below, faculty have in the last two years implemented new courses and practices that have not yet reached maturity. We expect the initial time investment to pay off in increased productivity over the next few years. In particular, the accelerated algebra pathway through Math 108, the Statway pathway,

g. Course Offerings: Review the enrollment trends by course and consider the frequency, variety, demand, pre-requisites, etc. If there are particular courses that are not getting sufficient enrollment or are regularly cancelled due to low enrollment, please discuss how your program is addressing this issue.

Math 11 saw a decline when most of the CSU branches removed it as a requirement for some majors.

Math 44 has been offered sporadically over the past five terms, and would likely benefit from regular scheduling.

With the uncertainty engendered by the UCs delayed decision on the articulation of Math 57, Math 217 enrollment has consequently suffered.

For these courses and others, the department continues to explore offerings at different times, days, and configurations in an attempt to anticipate student demand.

h. Curriculum and SLOs: Comment on the currency of your curriculum, i.e. are all CORs reviewed for Title 5 compliance at least every five years and do all prerequisites and co-requisites undergo content review at that time? If not, what is your action plan for bringing your curriculum into compliance (Please use reports from the Curriculum Office to help you complete this prompt)?

Our curriculum is in compliance with Title V. Within our department, each full time instructor chooses one or more course to "manage", curriculum-wise. That instructor manages the SLO process (coordinates assessments and reflections) as well as the update of the COR. When issues arise, they are brought to department meetings to address.

i. Curriculum and SLOs: What are you doing to ensure that your curriculum is congruent with the most recent developments in your discipline?

There is growing interest in flipped classrooms. The MOOC trend is impossible to ignore, and is causing faculty to reassess what we do in the classroom to meet student needs as well as their changing cultural expectations.

The discussion of revising Intermediate Algebra to be appropriate for all majors continues. Faculty are investigating the needs of other departments as well as our own to determine what is expected of students completing that course.

j. Innovation: Please comment on any innovative initiatives within your program, this could include areas regarding sustainability, stewardship of resources, collaboration, grants and/or curriculum.

Innovative initiatives in the math department: Statway, 1A team cohorts, 108 accelerated algebra, qualitative grading, flipped classrooms, and Math My Way. STEMway? Take credit for CF initiatives?

Math 42- Math for Elementary Education was created but has not yet been offered.

Section 2: Student Equity and Institutional Standards

As part of an accreditation requirement, the college has established institution-set standards across specific indicators that are annual targets to be met and exceeded. Please comment on how these indicators compare at your program level and at the college level. (For a complete description of the institutional standard, please see the instructional cover sheet)

a. Institutional Standard for Course Completion Rate: 55%

Please comment on your program's course success data, including any differences in completion rates by student demographics as well as efforts to address these differences.

The overall course completion rate (using the definition of course completion from the Program Review Instructions document, which is what we generally call "success rates") for the mathematics department is 60%, with the completion rate of 51% for targeted groups and 64% for non-targeted groups. So, while we are meeting the overall course completion standard, we are not meeting the course completion standard for targeted groups. Specifically, we are not meeting the standard for African Americans (46%), Latinos (50%) and Pacific Islanders (47%).

When we consider the course completion rates for transfer level mathematics courses we find that most (17 out of 19) of those courses have completion rates that exceed the institutional standard with a range of success rates for those courses being (59% - 77%). The two transfer level mathematics courses that do not meet the institutional standard are Math 48A and Math 48B which have completion rates of 53%. The department is working to raise the completion rates for Math 48A and Math 48B and this effort can be seen in the increase of the completion rate for Math 48A going from 39% in 2011-2012 to 53% in 2012-2013.

When we consider the course completion rates for developmental mathematics courses we find that most (4 out of 6) of those courses have completion rates that exceed the institutional standard with a range of success rates for those courses being (58% - 79%). The two developmental mathematics courses that do not meet the institutional standard are Math 230 and Math 105, which have completion rates of 41% and 51% respectively.

Success rates for online sections of 105 are lower than comparable on-site courses (39% versus 49% or 2010-2011; 33% versus 44% for 2011-2012; and 28% versus 51% for 2012-2013). It is the belief of two instructors who taught this course for two full years that the majority of students who register for this online course do not possess the level of maturity, self-discipline, and sophistication necessary to succeed under the additional rigors or taking the course online. Given the very low success rates in this course, these instructors have made a recommendation to the department that math 105 online is not a course that makes the best use of resources in the department.

b. Institutional Standard for Degree Completion Number: 450

Has the number of students completing degrees in your program held steady or increased/declined in the last three years? Please comment on the data, analyze the trends, including any differences in completion rates by student demographics.

The number of degrees awarded in math is as follows:
2010-2011: 6
2011-2012: 3
2012-2013: 7
Our department largely serves to help students meet general education requirements, or satisfy quantitative pre-requisites for course in other departments.

c. Institutional Standard for Certificate Completion Number (Transcriptable): 325

Has the number of students completing certificates in your program held steady, or increased/declines in the last three years? Please comment on the data, analyze the trends, including any differences in completion rates by student demographics.

N/A
The mathematics department does not offer certificates.

d. Institutional Standard for Transfer to four-year colleges/universities: 775

Based on the transfer data provided, what role does your program play in the overall transfer rates? Please comment on any notable trends or data elements related to your program's role in transfer.

The number of students who earn mathematics transfer degrees was 6 in 2010-11 and 3 in 2011-12. As these numbers are so small it is not reasonable to discuss trends. It is important to note, however, that the transfer degree in mathematics was recently approved (summer 2013). This new transfer degree may increase the number of degrees granted in mathematics in coming years.

While we do not have many students that earn transfer degrees in mathematics, almost all transferring students need to take a mathematics class. So, the mathematics department definitely has an impact on transfer, but it is difficult to quantify or qualify what that impact might be. We do know that only a small percentage of the students that place into the developmental sequence ever complete a college level mathematics class, which is needed for transfer. While some of these students may not have had transfer as an academic goal, many of them do. There are likely a significant number of students who are not able to transfer in other academic disciplines because they are unable to complete the mathematics requirements.

Section 3: Core Mission and Support

Please address all prompts that apply to your program.

Basic Skills Programs (English, ESLL and Math): For more information about the Core Mission of Basic Skills, see the Basic Skills Workgroup website: http://foothill.edu/president/basicskills.php

a. Please comment on progression in sequenced courses, including ladder programs, alternative pathways and supplemental instruction. How successfully do students progress through the course sequence or pathways?

The Math My Way program consists of Math 235 and Math 230. The success rate for Math 235 decreased by 3% from 2011-2012 to 2012-2013. The success rates for Math 230 decreased by 7% from 2011-2012 to 2012-2013 and for Math 234 decreased by 28% from 2011-2012 to 2012-2013. A possible explanation for the decrease in success rates is the elimination of alternate credit, which occurred in the winter of 2012. Prior to the fall of 2011, a student who was registered for Math 230 and passed at least 2 modules, but not the final exam earned a Pass in Math 235, which was the alternate credit course. This is why the success rate for Math 235 in 2010-2011 was 100%. Starting in the fall of 2011, a student who was registered for Math 230 and passed at least 3 modules, but not the final exam earned a Pass in Math 235. In the winter of 2012, alternate credit was no longer an option. Therefore, students who started the quarter in any one of the first 4 modules (modules A through D) registered for Math 235 and received a Pass only if they passed module D by the end of the quarter. Students who started the quarter in any one of remaining modules E through I registered for Math 230 received a Pass only if they passed the final exam by the end of the quarter. Since Math 234 is the summer version of Math 230, students who registered for Math 234 received a pass only if they passed the final exam.
While the success rates decreased for Math My Way, the success rates increased for Math 220, Math 217, Math 105, and Math 108 from 2011-2012 to 2012-2013.

b. Based on your analysis of student success in these pathways, what initiatives or strategies are being considered to increase student success?

Transfer Programs: For more information about the Core Mission of Transfer, see the Transfer Workgroup website: http://foothill.edu/president/transfer.php

c. Please analyze and discuss the available Transfer data regarding your programs, and discuss strategies or initiatives to improve transfer rates.

In conjunction with the Basic Skills workgroup, the mathematics department continues to modify the Summer Bridge program to address placement issues in mathematics. The goal was to provide a short review course and allow students to re-take the math placement test at the end of the Summer Bridge program. On average, students in the 2013 summer bridge program who had an initial and final placement test score placed one class higher. Data from these students will be used to improve the program in the future.

In addition, the mathematics department has been working to select course materials that better support students in the beginning and intermediate algebra classes. For Math 220 and Math 105, we selected a textbook and software platform that not only provide a cohesive set of materials for full and part-time faculty, but also control costs for students. We will also work on revamping Math 105 in hopes that more students will successfully complete the class.

We have no transfer data. However, our courses do serve the transfer mission.

Most students enrolled in Math 10, Math 44, and Math 217/57 are taking them to fulfill a quantitative reasoning requirement for transfer. Combined enrollment in these courses last year was 2,368, up 24.3% from 2 years ago.

Students in Math 1A/1B claim to be pursuing a variety of majors—engineering, physics, biology, chemistry, business, economics, mathematics, computer science, computer engineering, premed, etc. These classes may be the last math class that a student takes before transferring to a university. Combined enrollment in these courses last year was 1533, down 11% from 2 years ago.
We assume that most students enrolled in Math 1C/1D/2A/2B are pursuing a STEM degree. Students "complete" their math studies at different levels, depending on what their transfer school requires. Combined enrollment in these courses last year was 988, down 7.2% from 2 years ago, but up 3.6% from one year ago.

The precalculus courses support progression into the calculus series. Combined enrollment in Math 48A/B/C,49,51 last year was 1934, up 31% from 2 years ago (Math 49/51). Some of this dramatic increase may be due to lower cut scores for 48A (as compared to Math 51) which resulted in students placing into Math 48A who would otherwise have been in Math 105.

d. Please analyze and discuss Articulation data regarding this program.

There was no articulation data that was given to the mathematics department. However, the math department has worked conscientiously to maintain good articulation agreements for our classes. In fact, this priority is often at odds with our professional opinions about curriculum. Historically, in order to get and maintain strong articulation agreements, we have written CORs that are broader than we would otherwise choose.

Workforce Programs: For more information about the Core Mission of Workforce, see the Workforce Workgroup website: http://www.foothill.edu/president/workforce.php

e. Discuss how this program continues to meet a documented labor market demand?

The math department does not have a designated workforce program. However, a number of workforce programs do rely on our basic skills level math courses for support in acquiring the mathematical knowledge, skills, and abilities needed for success in an associated workforce program.

f. Analyze your program in relation to other programs in our region, defined as San Mateo and Santa Clara counties.

Not applicable.

g. Discuss any job placement and/or salary data available for your students after graduation.

Not applicable.

h. Please analyze and comment on average salary/wage data in the region, defined as San Mateo and Santa Clara counties.

Not applicable.

i. Program accreditation: If applicable, please describe your program accreditation: the agency, the frequency of the process and the current status of the program by the accrediting body.

Not applicable.

j. Service to the community: Please describe community service, outreach and special projects or initiatives that the program provides.

As noted above the math department does not have a workforce program. However, the department does perform outreach for its classes in the form of the annual Let's Play Math event (which invites grade school students to the campus each winter to learn more about mathematics). And recently, the department has hosted a summer STEM program for students in local high schools.

k. Outcomes assessments: If applicable, please describe additional means of outcomes assessment for the program, such as graduate surveys, alumni surveys, employer surveys, national and state licensing board exams, etc.

Not applicable.

l. Please attach minutes from your advisory board meeting(s) and discuss key issues, outcomes and action plans as a result of these meetings.

Not applicable.

Section 4: Learning Outcomes Assessment Summary

a. Attach 2012-2013 Course-Level – Four Column Report for CL-SLO Assessment from TracDat, please contact the Office of Instruction to assist you with this step if needed.

b. Attach 2012-2013 Program Level – Four Column Report for PL-SLO Assessment from TracDat, please contact the Office of Instruction to assist you with this step if needed.

Section 5: SLO Assessment and Reflection

Based on your assessment data and reflections, please respond to the following prompts:

a. What curricular, pedagogical or other changes have you made as a result of your CL-SLO assessments?

1. The department experimented with common final exams but these have largely been abandoned for the following reasons:

(i) In some cases one person was writing the final exam and so there may have been a bias in favor of that instructor's students. It can be difficult to collaborate to write a common final since each instructor has "favorite" topics to include in the final, but others may not have covered those topics in as much depth.
(ii) Students were avoiding sections in which common finals exams were known to be held.

2. Instructors are experimenting with the flipped classroom. The definition of a flipped classroom is quite varied among instructors. Some instructors are having their students perform activities in their classes and that could be construed as conducting a flip classroom, while others are having students watch videos at home and coming to class doing activities. Instructors are creating more activities to be used in the classroom.

3. Some instructors are focusing more on applications and less on process-oriented problems.

4. Some instructors are looking to reach out to the students personally, not just academically. Examples are, sending individual e-mails to students who have not completed homework or missed classes. Weekly e-mails are being sent out to remind students of assignments. This could make students feel more inclusive.

5. Instructors are making attempts to guide students rather than lecture to students when solving problems.

6. Due to the new repeatability laws, the format of MathMyWay has changed. The students no longer receive alternative credit for making significant progress. The content has been divided into two courses, Math 235 or Math 230, and students must complete all the material in the course outline, for whichever course they are in enrolled in, to receive a passing grade.

7. Math 220 has been changed from 7 units to 5 units. There was no significant difference in the success rates between the 7-unit Math 220 (beginning algebra) and the 5-unit Math 101 (beginning algebra).

b. How do the objectives and outcomes in your courses relate to the program-level student learning outcomes and to the college mission?

Many of the course-level SLO's have some component in asking students to construct mathematical models of problem situations, interpret their mathematical results and communicate mathematical ideas through graphs, tables, equations and verbal descriptions to support the program-level SLO's.

Most of our courses support the college mission since our courses beginning from Math 10, Math 48A/B/C are UC and CSU transferable.

Math 230/235 and M220 serve our basic skills students and Math 105 is applicable to an AA/AS degree and prepares our students to take college level courses.
Basic skills courses also provide prerequisite skills necessary for work force programs.

c. How has assessment of program-level student learning outcomes led to certificate/degree program improvements? Have you made any changes to your program based on the findings?

No changes were made to the program. The AD-T Transfer degree in math was recently approved over the summer. There isn't any data on this yet. Prior to the transfer degree being approved, there were fewer than 10 people who graduated with an associate's degree in mathematics. Next year will be the year to look and see how those numbers have changed.

The majority of our classes are service classes (i.e., we aren't really a program; our courses serve as prerequisites for classes in other departments), so there has been more dialogue on improving the success in individual courses rather than in the program aggregate.

d. If your program has other outcomes assessments at the program level, comment on the findings.

None

e. What do faculty in your program do to ensure that meaningful dialogue takes place in both shaping and evaluating/assessing your program's student learning outcomes?

There has been dialogue among instructors at the course level, not at the program level. In particular, instructors teaching 1A have been convening weekly meetings. The dialogue has mainly focused on data collection and how to get students to use the PSME Center more. Faculty would like to continue having more dialogue on curriculum and pedagogy.

f. Reviewing your most recent annual program reviews, discuss any emerging trends related to SLO reflections and any action taken.

Some of the issues common to both this year's and last year's annual program review include the following:

1) Faculty are concerned that the cut scores used for placement are too low. Students seem to be woefully under-prepared especially in the prerequisite skills necessary to succeed in a class. The faculty last adjusted the cut scores in the fall quarter of 2011 and are hesitant to adjust them again so that we can have stability in the department.

2) Faculty have noticed that some students have poor study skills. These students may also not have enough time to dedicate to a math class. The combination of poor study habits and not being able to prioritize a math class may lead to success rates lower than the department would like. To address this issue, the PSME Center has offered workshops to supplement the students' learning. Also, some faculty are trying to reach out more to students via e-mail.

3) Faculty have noticed that students have a particularly difficult time with word problems and applications. These problems generally require more critical thinking than rote problems. Faculty are trying new teaching methods in the classroom such as having students learn the basic material at home on their own and working on more challenging problems in the classroom. Also, for the Math 48 series, the department adopted a new textbook that contains more word problems and applications so that students would have more exposure to these types of problems.

4) Faculty notice that some students have difficulty understanding and interpreting word problems. For some students, this is difficult because English is not their native language. For others, they may have difficulty in general with English comprehension.

g. What summative findings can be gathered from the Program Level Assessments?

There have been many changes in the department. At this point, the department is looking to let things stabilize a little, so that we can determine what works, what doesn't, and where we could make improvements.

Students in Math 1D performed very well in the program-level assessments given. We do not know whether or not these students took the prerequisite courses at Foothill. It appears that they are well-prepared to take higher level math courses.

Annual Action Plan and Summary: Using the information above, list the program's action steps, the related Core Mission objective, SLO assessment data and the expected impact on student success.

Action Step	Related SLO assessment (Note applicable data)	Related ESMP Core Mission Goals (Basic Skills, Transfer, Work Force, Stewardship of Resources)	How will this action improve student learning/success?
1. Get more tablet pc's or laptops for classrooms.	All assessments where target was not met, was just met or was inconsistently met.	Transfer/Basic Skills	With the increase in computer aided delivery of content and assessment, students will most likely benefit from having access to technology during class time.
2. Revise Math 105 (Intermediate Algebra) curriculum	All Math !05 SLOs.	Transfer/Basic Skills/Workforce Preparation	Many students who take math 105 drop the course or stop coming before the SLO assessment is given. To address the course success and retention issue the department seeks to develop a Math 105 course that would better serve all math tracks, and specially for non-STEM students.
3. Research Multiple measures to supplement placement test scores.	All assessments where target was not met, was just met or was inconsistently met.	Workforce Preparation/Transfer support	The dean notes that approximately 200 students per year challenge their math placement. We need to have a fair and consistent system for placing students into the courses using

			multiple measures. Appropriate student placement is vital to their success in math classes.
4. Continued support for Mathematica license	M1D-SLO (SLO success target was met (easily) in one section and some instructors feel that Mathematica played a part in helping students to successfully learn course concepts)	Transfer	Students can learn better when they see 3-D surfaces, which is not available through the graphing calculator. More robust computations. Interactive simulations and demos using Mathematica support student learning.
5. Stabilize availability of PSME Staff to answer questions from Math 1D	M1D – SLO (Target for success was not met in one sections for this SLO so action is warranted.	Transfer	Students rely on the PSME Center for support in learning the advanced mathematical concepts being studied in Math 1D. In the past there were some quarters where PSME Center staff were not able to answer questions at this level and student learning suffered.
6. Research ways of getting assistance in remedial courses	All SLOs whose target was not meet.	Transfer/Basic Skills/Workforce Preparation	The PSME Center is expanding to provide assistance to all students taking math. However, based on Eric Reed's data, the PSME Center is not being used much by remedial students. We need to look at different ways in helping these students.
7. Achieve consistencies in Math courses – through part-time mentoring	SLOs where the target is met in some cases and not in others.	Transfer/Basic Skills/Workforce Preparation	The math department needs to reach out to part-time faculty to have meaningful dialogue on student outcomes and expectations. This can be difficult to achieve when most of the evening courses are taught by part-time

			faculty very recently hired. We need to have a mentor who can be here in the late afternoons and early evenings to meet with part-time faculty.

Section 6: Program Goals and Rationale

Program goals address broad issues and concerns that incorporate some sort of measurable action and connect to Foothill's core missions, Educational & Strategic Master Plan (ESMP), the division plan, and SLOs. Goals/Outcomes are not resource requests.

List Previous Program Goals/Outcomes from last academic year: check the appropriate status box & provide explanation in the comment box.

Goal/Outcome (This is NOT a resource request)	Completed? (Y/N)	In Progress? (Y/N)	Comment on Status
1.Improve teaching consistency among instructors	N	Y	There is very little mentoring of adjunct faculty due to loss of reassigned time. This affects the quality of instruction, support for our adjuncts and our students.
2 Develop and disseminate course by course collection of teaching resources	N	Y	This is ongoing. Faculty are developing materials as needed and when time permits for their courses and sharing them in the department Group through Course Studio in MyPortal.fhda.edu.
3 Develop the means to track students across courses	N	Y	Through the STEMway grant and working with the PSME dean and Institutional Research we are working on a way to do this that provides meaningful actionable data.
4 Develop and nurture an ongoing conversation about pedagogy.	N	Y	As part of her work with Carnegie, Nicole Gray is developing some materials to share with the department on productive struggle . Some faculty are team teaching and course level meetings are happening for some courses. We continue to struggle with

			disseminating this information to part-time instructors.
5 Develop the PSME Center into a faculty resource to support student success.	N	Y	Eric Reed has been hired as the director of the PSME Center. More supplemental instructors have been hired to both tutor and lead workshop courses. The Center now offers help in Biology. Workshops are now being offered for 9 different math courses (Beginning Algebra up to Calculus III) , 3 chemistry courses, and physics. The Center also hosts guests speakers from various industries for students.
6 Enhance outreach to students to increase retention and success.	N	Y	Summer Bridge Math Program was expanded to 2 sessions this past summer. The department plans to continue its outreach on Day on the Hill and "Let's Play Math".
7 Respond effectively to the changing needs of students.	N	Y	More faculty have been experimenting with flip classes and team teaching.

New Goals: Goals can be multi-year (in Section 7 you will detail resources needed)

Goal/Outcome (This is NOT a resource request)	Timeline (long/short-term)	How will this goal improve student success or respond to other key college initiatives?	How will progress toward this goal be measured?
1. Provide much needed support and guidance for our adjuncts	Long term	This directly affects our instruction, outreach and overall support for our students	Feedback from our adjuncts
2.Improve teaching consistency among instructors	Long term	This will help students transition more easily from course to course in the sequence.	Student success and persistence data.
3. Develop and disseminate course by course collection of teaching resources	Long term	This will help improve consistency among instructors	Student success and persistence data
4. Develop the means to track students across courses	Long term	This will help us understand how students move through the math sequence and thereby help us to understand which transitions are most difficult.	Having the data
5. Develop and nurture an ongoing conversation about pedagogy.	Long term	This will help improve consistency among instructors	Student success and persistence data
6. Develop the PSME Center into a faculty resource to support student success.	Long term	As the PSME center more closely works with faculty the support given to students will align more with class work.	Student usage of PSME services.
7. Enhance outreach to students to increase retention and success.	Long term	Help students to stay current with course work to prevent falling behind which leads to course failures or withdrawals.	Student success and persistence data
8. Respond effectively to the changing needs of students.	Long term	Course and content that is most relevant to student's majors and career goals will lead to greater student interest and success.	Student success and persistence data

9. Build STEM career information resources in the PSME Center	Long term	This will help students link their course work to possible career options.	Student usage of PSME services.
10. Make videos and handouts to support flipped classroom implementation	Long term	Flipped classrooms are shown to be effective in increasing student success. Having our own video aligned to our curriculum will better support instructors who wish to make this pedagogical switch.	Student success and persistence data
11. Acquire equipment to facilitate faculty producing video to support in-class, flipped classes and online classes	Long term	Flipped classrooms are shown to be effective in increasing student success.	Student success and persistence data

Section 7: Program Resources and Support

Using the tables below, summarize your program's unfunded resource requests. Refer to the Operations Planning Committee website: http://foothill.edu/president/operations.php for current guiding principles, rubrics and resource allocation information.

Full Time Faculty and/or Staff Positions

Position	$ Amount	Related Goal from Table in section 6 and how this resource request supports this goal.	Was position previously approved in last 3 years? (y/n)
STEM Counselor		3,5,6,7,9 Many students who would benefit from the numerous resources that we provide are not accessing them. Furthermore, successful students are not necessarily enrolling in the next class. A dedicated PSME counselor could help students navigate more effectively through their math and science education.	N
Financial Aid Advisor to help students in conjunction with Stem Counselor			
PSME Center Staff to support and proctor student assessments		1, 3, 4, 5, 6, 7 We can better serve and place our students in the right courses if we have staffing to proctor various assessments in the PSME Center, including multiple measure assessments for course placements, gateway exams, etc.	N

Unbudgeted Reassigned Time (calculate by % reassign time x salary/benefits of FT)

Has the program received college funding for reassign time in the last three years? (y/n) y	If yes, indicate percent of time.
Has the program used division or department B-budget to fund reassign time? (y/n)	

Indicate duties covered by requested reassign time:

Responsibility	Estimated $	Related Goal from Table in section 6 and how this resource request supports this goal.	Est hours per month	% Time
Part time Mentor		1, 2, 4, 7, 8		
Scheduler		1, 7		
Professional Development		1, 2, 4,7 (We are reeling from the demands to become ADA compliant and to develop and conform to a Common Core. We need time together, away from teaching to figure out how we can accomplish these goals.)		

One Time B Budget Augmentation

Description	$ Amount	Related Goal from Table in section 6 and how this resource request supports this goal.	Previously funded in last 3 years? (y/n)
Lunch supplies for 15 lunches in the next year using Foundation Funds if available.	$600	2, 4, 7 (This nurtures relationships and discussions and the individuals who share the food.)	N
Funding for offsite retreats		1, 2, 4, 7, 12 This helps nurture ongoing conversations about pedagagoy, encourages new course development and experimentation	Y
Funding to develop multiple-measure assessments to assist in math placement of students		7 Students would be more properly placed in the right courses to help them achieve their educational goals	N
Support for faculty to generate content/activities for courses, including flipped courses		1, 2, 4, 7, 8, 10, 12 This would be more thorough and comprehensive material that faculty do not have time to generate in addition to their teaching load. Such material would be shared among the entire dept.	Y

Ongoing B Budget Augmentation

Description	$ Amount	Related Goal from Table in section 6 and how this resource request supports this goal.	Previously funded in last 3 years? (y/n)
Math My Way TA's		1, 7 (Allows teachers to maintain a student-centered learning environment)	Y
Let's Play Math Funding		6 (Provides outreach and possibly a feeling of belonging to local children. Also, advanced math students really enjoy the volunteer experience.)	Y
Log-in Person for PSME Center		5 (Allows us to maintain a more accurate record of center usage, thereby increasing the WSCH that we collect.)	Y
Printing Expenses for PSME Center		5, 7 (Allows for all PSME students to print computer project as assigned by faculty, gives tactile learners physical forms of their course assignments, and software is used to control amount of printing per student)	Y
Scanners for Math 220/105		7 (Students need opportunities to learn from their mistakes. Online homework systems can provide immediate feedback, but they are limited in the types of questions that they can ask. Students also can benefit by feedback on their paper and pencil work before they are tested using a paper and pencil environment. We limit the amount of feedback that we give students, according to the amount of time we have	Y

		to spend on the task. We can leverage our time by having scanners provide an initial review of the students' work.)	

Facilities and Equipment

Facilities/Equipment Description	$ Amount	Related Goal from Table in section 6 and how this resource request supports this goal.	Previously funded in last 3 years? (y/n)
Additional Tablets (Samsung, iPad) for instructor class-time use.		1, 7 (More instructors would like to experiment with using these tools in their teaching.)	N
Software (Mathematica site license, Matlab, MathType, TI-Emulator)		1, 2, 4, 7 (As we try to incorporate written papers/projects into our classes, we need to provide students with resources for producing them.)	Y
Support for Scantron machine in division office		1, 3, Allows faculty to do more student assessments. It is widely used in other departments including chemistry and astronomy. Assists with J3 faculty assessments.	Y
Two document scanners for student use (1 for PSME Center, 1 for PSEC)		5, 6, 7, 8, 9, Supports student success and accessibility. Students taking online, hybrid, and traditional courses can turn in their hand written work digitally.	N

a. Please review the goals and resource requests that were granted over the last three years and provide evidence that the resource allocations supported your goals and led to student success.

The part time-mentor and scheduler positions were funded in previous years but has ceased this year. The part- time mentor played a critical role in supporting the department adjuncts. The mentor provided much guidance, resources, and feedback to the adjuncts on an ongoing basis. This helped the adjuncts feel more inclusive, stay better informed with the department goals and objectives, and provide instruction that was more in-line with the expectations of the department.

Professional development such as allowing for off-site retreats have allowed faculty in the past years to address and explore pedagogical issues on a deeper level.

Providing Math My Way TAs continues to be a much needed and valuable resource to the program. TAs help instructors field student questions and provide student feedback constantly throughout each class session. This allows students to progress more quickly through their coursework.

"Let's Play Math" continues to grow and attract more kids and families from the local community each year. It is a great outreach effort by the department to get children to explore the wonders and beauty of mathematics.

Having the Log-In person to monitor student usage of the PSME center is critical to helping the division capture the proper apportionment from the state.

Printing expenses for the PSME Center to provide limited printing for students has been a valuable resource to our students. The convenience of it keeps students studying in the center longer and helps them complete their assignments in a timely fashion.

Funding to provide student scanners for Math 220 has been very helpful for faculty who choose to use it. Having a scanner allows faculty to assign more written work (in addition to online work). This teaches and gives students more practice with using proper math notation and makes them more mindful of how they communicate their mathematical thoughts on paper. More feedback can be given to students this way. It would be very helpful to extend this resource to instructors teaching Math 105 as well.

Funding for mathematical software such as Mathematica, Maple, MathType, etc. continues to help instructors provide better instruction for our students. Out of class assignments can be assigned requiring students to use such software and provides opportunities for students to have deeper learning experiences.

The department continues to rely on the Scantron machine to give them instant feedback on certain student assessments. The machine is also used for J2 faculty evaluations.

Section 8: Program Review Summary	
Address the concerns or recommendations that were made in prior program review cycles, including any feedback from Dean/VP, Program Review Committee, etc.	
Recommendation	**Comments**
1. Address decline in student success rates.	The math faculty are working to maintain and increase success rates. The PSME Center has developed, scheduled, and run workshops to provide remediation and support to students studying calculus and precalculus. The number of students who take advantage of these workshops has, so far, been small. The department shared some materials through Dropbox, and will transfer over that sharing to MyGroups on MyPortal. As a strategy to increase student success, we hope to grow the collection of shared lessons and activities available to instructors. The department faculty are working to improve the delivery of the calculus curriculum. A team of three faculty members are working to develop and test classroom activities that foster student discussions and improve the willingness and skill with which students attack difficult problems. In addition, these faculty are discussing pedagogical practices that encourage students to openly share strategies for working difficult problems, whether successful strategies or not. Educational theory suggests that discussion of incorrect approaches is just as important as the discussion of correct approaches when developing student understanding. Another subgroup of the department is contemplating two versions of intermediate algebra and is currently researching articulation issues. This workgroup is studying the common core standards in order to ensure both versions meet the "intermediate algebra" prerequisite for statistics. This common core study is based upon advice from UC. To address support for basic skills students, a

	faculty member (either PT or FT) representative of the PSME Center may reach out to Math 220 (beginning algebra) students by participating directly in some sections of the class. The thought is that direct involvement by PSME center staff will encourage algebra students to go to the center for support after class. Faculty have joined together to work in course-level teams to discuss challenges surrounding student learning. Some groups are using Improvement Science to develop interventions to increase student engagement and success. As part of our efforts to increase student success, we are exploring vehicles by which students can remediate. So far, the most promising options are workshops, increasing PSME Center use via outreach, summer bridge program, just-in-time review, and possibly assessment of prerequisite skills using online materials. As part of our efforts to increase student success, we are exploring vehicles by which students can accelerate their progress. Ideas include Summer Bridge Program, development of multiple measures for placement purposes, accelerated classes such as 108 and Statway™, and scholarship packages. Sadly, the students most drawn to these accelerated classes seem to be the most desperate ones rather than the ones most poised to succeed. We gave out our first scholarships this fall and are eager to see how those students do given this financial support. The development of the math 48 series was a direct attempt to improve the success rate of students who were studying math because they wanted to pursue a STEM major. Although the success of 48 compared to 49/51 shows that there is no significant change, it is very much worth noting that the cut scores to get into 48A, 48B and 48C are different from what the cut scores were to get into 51/49. Some students who used to place into M105 are now placing into 48A and some students who would have placed

	into 51 are now placing into 48B. This does not increase the number of math classes that students need to take in order to get into Math 1A. Furthermore, the change in the order of topics from 51/49 to 48A/B/C has been a welcome one. In the past, calculus instructors complained that their students lacked trig knowledge. In particular, international students from Asia tended not to take trig because it was not UC transferable, thereby going into 1A unfamiliar with trig concepts. But now, with the switch in topics, students who take 48 before taking 1A have the trig knowledge necessary for the calculus curriculum. Additionally, the data provided by Institutional Research shows that the success in 48A has increased quite a bit from the 11-12 school year to the 12-13 school year. In 11-12, the success was around 40% while in 12-13, it is now over 50%. We expect this trend to continue as instructors get better at teaching this new course. Many of the pre-calculus instructors, both PT and FT faculty, have reported back that the pre-calculus sequence is done right by looking at contents with more depth and really preparing students for those "oh, you should have learned this before" topics in calculus such as knowing how functions behave, having familiarity with trig functions, etc. We think that this curriculum change is a positive one and that the benefits will grow over the next year. We will monitor the data for the next year or two to further assess the effectiveness of this change.
2. Anticipate growth/expansion and prepare accordingly by asking for appropriate resources.	We articulated projected needs during our last program review cycle and the administration has shown support for growing our enrollment. The 5600 buildings are being renovated and furnished as lab classrooms. Two new math faculty were hired starting this fall, as well as a Director for the PSME Center. To seek WSCH and to poise the department for growth, the Dean offered many extra sections of classes this fall and last year. We will pay for this WSCH

	and enrollment through reduced productivity and through the inconvenience of having some sections cancelled (requiring a late adjustment in some instructors' schedules). We continue to seek out a counselor to serve our student population; we believe that this is a key component in increasing student success and supporting growth. If we continue to get the support of the college and if the demand is present, we should be able to accommodate the growth that is expected in the number of students majoring in PSME.
3. Identify partnerships, projects, and professional development opportunities that individuals would like to pursue and request support.	We had a student success/technology retreat last winter. Some faculty members requested stipends for development of shared materials. Some received funding; some did not. Faculty need to have a consistent set of guidelines in terms of what gets funded, how materials are shared and how the results of these projects get reported back to the department. We are planning to organize a 1 or 2 day retreat this winter quarter to compare notes, take stock, and decide what development projects to focus on.

a. After reviewing the data, what would you like to highlight about your program?

We are a dedicated faculty, working together to address long-standing and difficult issues. We are often very tired from our efforts but believe the work is worth the effort. We work to develop curriculum, to develop effective classroom materials, to provide feedback to our students through graded work, and to remediate them when they need to improve their prerequisite skills. We work to be compliant with CID's, with online accessibility, with SLO procedures, and with Program Review. We work to keep up with technological advances and opportunities to leverage that technology.

With the additional compliance and report writing, one aspect of our work that is impossible to document is the opportunity for a first, second, or third chance for students. Many of our students are "reverse transfer" students who have decided to change major, others are students who are convinced that they will never earn a college degree because of the math requirement. We, as a department, value these students and the importance of providing a positive experience for these students. The underlying theme of all of our efforts is our desire for ALL students to succeed and reach whatever goal they have. We are making every effort possible for mathematics to OPEN doors for students, not close them.

We often feel that we don't spend nearly enough time reflecting and discussing our efforts and their effect. Too much of our time is spent complying with outside requirements. We would rather spend our time working for student success instead of documenting these efforts.

Section 9: Feedback and Follow Up

This section is for the Dean to provide feedback.

a. Strengths and successes of the program as evidenced by the data and analysis:

Some of the key strengths of the Math Program are the Faculty's goal to have all the students succeed. They resist the temptation to reduce course standards to improve the pass/fail ratio or become popular with students seeking an easy grade. They look for new ways to engage the students as well overcome student's past negative experiences. The other strengths are:

1. The FT Faculty work very hard to maintain their teaching skills and regularly update their courses to keep the materials fresh. Many of the changes have been documented above and won't repeat them.
2. They lead the division in investigating/implementing new technology and pedagogy.
3. They continue to support grants and scholarships. The Most recent are NSF STEMway and STEM scholarships.
4. They realize the impact of MOOCs and taking the opportunity to start developing online course materials. The also realize that offering pre-collegiate math online is a non-starter and Math 105 online has not be scheduled.
5. Continued tighter coupling of the Math Program with the PSME Center should produce better success rates.

The Math Program is primarily a support program and is a core element for basic skills, workforce and transfer.

Within PSME, Computer Science and Engineering will be the growth areas in WSCH. Because they both require an extensive about of math, the Math Program will grow faster with this additional stimulus. It should be noted that the TBA hour which was removed in 2011-12 has been partially offset by the PSME WSCH. The unduplicated headcount continues to increase which is a better reflection of the programs demand than WSCH and productivity (function of WSCH).

The faculty have provided a well crafted document that reflects their professionalism and commitment.

b. Areas of concern, if any:

There are a number of concerns, some identified above.

1) Many of our students are capable of being successful mathematically but are not "college ready".
2) The placement test (ACCUPLACER), especially below Math 1A is very inaccurate. At least a 1/3 of all students are placed too low or too high. The worse area is Math 105 and below.
3) Placement for International students. Many of them arrive in the morning and provided a battery of placement exams. They also are not familiar with some of our terminology as well as weak in trigonometric functions. They do come with high school grades from prestigious private schools, Cambridge IGSCE scores, International Bachelorette (IB) grades which are often more comprehensive indicators than the AP scores.
4) The Math department needs to identify how best to support the students. There are a number of new ideas and approaches that are having trouble gaining traction for various reasons, one being inertia.
5) STEM Students need experienced counseling to navigate the courses and provide timely advice for mid-course changes.
6) The 1st quarter (Math 1A) enrollment has declined even though there are more international students filling the pipeline.
7) Student success rates.
8) The new Math 230/235 sequence has reduced the number of quarters a student has to complete Math 230/235 from 6 quarters (alternate credit) to 2 quarters. The 7% decrease is actually surprisingly low. This also means, more students are moving through the pipe in less time. This needs to be continually evaluated.

c. Recommendations for improvement:

Mapped to section b above:
b.1) The Freshman STEM students should have an orientation prior to school or first week of school. As noted in the math program review, many students are 25 years or less.
b.2) Need to review cut scores, especially Math 48 series. The dept should look at a second level testing in Math 1A and below to ensure the students are prepared. Propose looking at system from NROC.
b.3) The testing center needs to be able to accommodate influx of International students. The questions for test selection should reflect country or origin not just US HS. Most students should be given CCPT.
Develop a mapping of International exams to placement (IB, IGSE, others) and place similar to US Calc AP scores.
b.4) The Math dept should reflect on the number of different changes are in place and as a department actively support them.
b.5) At one time PSME had a dedicated Counselor that could address STEM careers and transfer. Since Math has many options depending on student's goals as well as a gateway for most students, this is key for both work force and transfer goals.

b.6) Foothill continues to be less than successful in outreach to domestic STEM transfer students. Recommend that two out reach staff be focused on 2014 freshman registration.
b.7) Math success rates are a challenge at all CC. A combination of new pedagogy that focuses on retention as well as skills, PSME Center, faculty mentoring and new tools to assist students.
Providing mentoring to PT Faculty to fold them into the Math needs to be supported.

This section is for the Vice President/President to provide feedback.

d. Strengths and successes of the program as evidenced by the data and analysis:

The Math department continues to work closely together, and across the campus, to increase student success. They are highly active in college committees, professional development, academic integrity and basic skills to name a few. They are conscientious and thoughtful with regards to the assessment of student learning, and regularly review and revise their practices to best serve students.

e. Areas of concern, if any:

The low success rates in the developmental sequence are a concern. The department accurately points out that these students are not college ready. However, these are the students we need to reach in order to increase graduation and transfer over all. I encourage the department to continue their reflection, analysis and pedagogical exploration to try to increase student success.

f. Recommendations for improvement:

Continue to work with Institutional Research, the testing center, and math colleagues to refine the placement process, and to develop a systematic approach to validating cut scores.

g. Recommended Next steps:

_X__ Proceed as planned on program review schedule
___ Further review/Out of cycle in-depth review

Upon completion of section 9, the Program Review should be returned to department faculty and staff for review, then submitted to the Office of Instruction and Institutional Research for public posting. See timeline on Program Review Cover Sheet.

Unit Course Assessment Report - Four Column

Foothill College

Department - Mathematics (MATH)

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 10 - ELEMENTARY STATISTICS - Summarize - The student will be able to describe and summarize data effectively. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students are given a question related to the particular learning objective. See Related Documents for a list of the questions. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of students will get the question correct.	06/03/2013 - 76% of 105 students correctly answered problem two on the related document. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** tablet pc's or laptops for classrooms **GE/IL-SLO Reflection:** Based on this SLO Math 10 is meeting this particular aspect of a transfer level general ed math requirement. **Related Documents:** 10_SLO_Sp2013	06/03/2013 - The students appeared to be able to correctly interpret a histogram graph. That is, the ability to summarizing data graphically appears to have been mastered by the students.
Department - Mathematics (MATH) - MATH 10 - ELEMENTARY STATISTICS - Probability - The student will be able to determine the likelihood of events. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students are given a question related to the particular learning objective. See Related Documents for a list of the questions. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of the students will get the question correct.	06/03/2013 - 71% of 105 students answered problem four correctly on the related document. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** see "summarize" slo. **GE/IL-SLO Reflection:** Knowledge of probability can aid in developing quantitative reasoning skills. **Related Documents:** 10_SLO_Sp2013	06/03/2013 - More than 70% of the students were able to answer a basic probability questions related to the experiment of rolling 2 dice and recording the sum.
Department - Mathematics (MATH) - MATH 10 - ELEMENTARY STATISTICS - Inferences/Predictions - The student will be able to make accurate inferences or predictions about	**Assessment Method:** Students are given a question related to the particular learning objective. See Related Documents for a list of the questions. **Assessment Method Type:**	06/03/2013 - 68% of the students correctly answered problem three on the related document. **Result:** Target Met **Year This Assessment Occurred:**	06/03/2013 - When told a data set was skewed right, 70% of the students understood that the mean for that data set would be greater than the median. Even though the

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
groups of interest using limited information. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	Exam - Course Test/Quiz **Target for Success:** 70% of the students will get the question correct.	2012-2013 **Resource Request:** See "Summarize" slo. **GE/IL-SLO Reflection:** The ability to infer and predict based on data can aid in developing quantitative reasoning skills. **Related Documents:** 10_SLO_Sp2013	target was not met, this is an improvement from last year.
Department - Mathematics (MATH) - MATH 105 - INTERMEDIATE ALGEBRA - Graphs of Functions - Identify and describe the basic shape of the graph of the following functions: absolute value, rational, radical, quadratic, cubic, exponential, and logarithmic (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Online assessment using Coursecompass from Pearson given to all sections: Recognize the graph of a polynomial function from the degree of the polynomial. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students who took the assessment will answer correctly		
	Assessment Method: multiple choice question **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% answer correctly	04/08/2013 - 17/29 students (58.6%) answered correctly **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Reassign time to develop new Intermediate Algebra course **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question.	04/09/2013 - The students have trouble working with graphs and this is one of the most important topics in Intermediate Algebra for success in future math, science courses as well as other courses and outside of the classroom. We need to redesign our Intermediate Algebra class to focus on of analysis of graphs and applications.
	Assessment Method: A multiple choice question on the final exam was used to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz	05/08/2013 - 30% of the students in my class were able to properly identify graphs of functions. I was class testing a book that did not emphasize graphs enough. We as a department have decided not to adopt the book.	05/08/2013 - Many of the developmental classes are taught by part-time instructors. And while there will always be some inconsitencies, in different sections

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Target for Success: At least 70% answered correctly.	**Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** none	meeting the targets for success, the high number of part-time faculty is likely a contributing factor. We could alleviate this by having a part-time faculty mentor for the department. 05/08/2013 - The Department could create resources that could be used by any instructor in order to help students, in different sections with different instructors, to be able to consistently meet the goals. However, in order be sure that the materials created help student to successfully meet the targets for success, they would need to be co-developed and tested with different instructors. This requires time beyond the normal prep time needed to create a worksheet for your own class.
		04/11/2013 - 69% of students answered the problem correctly. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This problem required students to select from a list of functions the correct function based on a graph. It requires students to think analytically and does not assume only knowledge of the basic skills.	
Department - Mathematics (MATH) - MATH 105 - INTERMEDIATE ALGEBRA - Solving	**Assessment Method:** Online assessment using Coursecompass		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Equations - Solve algebraically, graphically, or numerically the following: linear inequalities and absolute value, rational, radical, polynomial, exponential, and logarithmic equations (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	from Pearson given to all sections: Solve equations that contain radical expressions. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students who took the assessment will answer correctly		
	Assessment Method: multiple choice question **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% answer correctly	04/08/2013 - 23/29 (79.3%) answered correctly **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Reassign time to develop new Intermediate Algebra course **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question.	04/09/2013 - The students can solve equations at the required level proficiently. We should concentrate our efforts on graphing and applications.
	Assessment Method: A multiple choice question on the final exam was used to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70 % answered correctly.	05/08/2013 - 70%+ students were able to solve radical, polynomial and logarithmic equations. (non multiple choice), while fewer than 70% could solve linear inequalities, absolute value and exponential equations. 30% of the students were able to approximate the solutions of the equation 2^x=x+2 given the graphs of y=2^x and y=x+2 on the same coordinate axes. This was not a multiple choice question. Given that the book did not have many problems of this sort and didn't emphasize graphing, this is a good result. While the target was not met in all areas, my students did exhibit strong algebraic manipulation skills. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013	
		04/11/2013 - 62% of students answered this	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		assessment correctly. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This problem required students to solve an equation algebraically. It requires students to think analytically and does not assume only knowledge of the basic skills.	
Department - Mathematics (MATH) - MATH 105 - INTERMEDIATE ALGEBRA - Simplifying Expressions - Simplify the following expressions: rational, radical, polynomial, exponential, and logarithmic (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Online assessment using Coursecompass from Pearson given to all sections: Use rational exponents to simplify radical expressions. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students who took the assessment will answer correctly		
	Assessment Method: multiple choice question **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% answer correctly	04/08/2013 - 23/29 (79.3%) answered correctly **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Reassign time to develop new Intermediate Algebra course **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question.	04/09/2013 - The students can simplify expressions at the required level proficiently. We should concentrate our efforts on graphing and applications.
	Assessment Method: A multiple choice question on the final exam was used to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:**	05/08/2013 - 70%+ students were able to simplify rational, radical, polynomial, and exponential expressions. They feel just shy of this mark for logarithmic expressions. Overall the students showed good algebraic manipulation skills with 80% getting 75% or more of the points in this	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	At least 70% answered correctly	category. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
		04/11/2013 - 69% of students answered this assessment correctly. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This problem required students to a radical expression. It requires students to think computationally and does not assume only knowledge of the basic skills.	
Department - Mathematics (MATH) - MATH 105 - INTERMEDIATE ALGEBRA - Applications and Modeling - Apply appropriate function in a contextualized situation (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Online assessment using Coursecompass from Pearson given to all sections: Solve problems by writing equations containing rational expressions. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students who took the assessment will answer correctly		
	Assessment Method: open ended question **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of students get 9 or more of 12 possible points	05/08/2013 - 50% of the students for 75% or more of the points on this section of the final exam. There is little opportunity for students to practice choosing a method/model for solving applications questions because usually they know what chapter/section they come from and that gives away the method. That makes it hard to sort it all out on a final exam. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		04/08/2013 - 22/29 (76%) of students earned the required number of points **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Reassign time to develop new Intermediate Algebra course **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question.	04/09/2013 - I spent more than the usual amount of time on applications in the class as part of a class test of new materials. The course needs to be redesigned so that applications are given more time in all Intermediate Algebra classes.
	Assessment Method: A multiple choice question on the final exam was used to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% answered correctly.	04/11/2013 - 15% of students answered this assessment correctly. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This problem required students to use a logarithmic model to solve an application problem. It requires students to think analytically and does not assume only knowledge of the basic skills.	
Department - Mathematics (MATH) - MATH 108 - ACCELERATED ALGEBRA - Graphs of Functions - Identify and describe the basic shape of the graph of the following functions: linear, absolute value, rational, radical, quadratic, cubic, exponential, and logarithmic (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Online assessment using internet course management assesessment system administered to students: Recognize the graph of a polynomial function from the degree of the polynomial. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students taking taking the assessment will answer correctly.	06/24/2013 - Out of 25 students who took the assessment, 79% of the students answered correctly. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** computers with internet available for student to use **Resource Request:** computers with internet available for student to use	06/24/2013 - Online resources will continue to be a big part of student learning in mathematics. As a result, students need to have access to computers with internet and any appropriate software to run mathematical displays and interactions.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		GE/IL-SLO Reflection: Students had to apply mathematical concepts and reasoning to answer this question. **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question.	
Department - Mathematics (MATH) - MATH 108 - ACCELERATED ALGEBRA - Solving Equations - Solve algebraically, graphically, or numerically the following: linear inequalities and linear, absolute value, rational, radical, polynomial, exponential, and logarithmic equations (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Online assessment using internet course management assesessment system administered to students: Solve equations that contain radical expressions. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students taking taking the assessment will answer correctly.	06/24/2013 - Out of 25 students who took the assessment, 70% of the students answered correctly. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** computers with internet available for student to use **Resource Request:** computers with internet available for student to use **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question. **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question.	06/24/2013 - Students appear to have difficulty working with radical expressions. Even though the target success rate was met, applicable problems should still be increasingly emphasized in class.
Department - Mathematics (MATH) - MATH 108 - ACCELERATED ALGEBRA - Simplifying Expressions - Simplify the following expressions: linear, rational, radical, polynomial, exponential, and logarithmic (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:**	**Assessment Method:** Online assessment using internet course management assesessment system administered to students: Use rational exponents to simplify radical expressions. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:**	06/24/2013 - Out of the 25 students who took the assessment, 72% answered correctly. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** computers with internet available for student	09/24/2013 - The students can simplify expressions at the required level proficiently; although further emphasis on simplifying radicals and exponential expressions should be applied.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Active	At least 70% of the students taking taking the assessment will answer correctly.	to use **Resource Request:** computers with internet available for student to use **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question. **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question.	
Department - Mathematics (MATH) - MATH 108 - ACCELERATED ALGEBRA - Applications and Modeling - Apply appropriate function in a contextualized situation (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Online assessment using internet course management assesessment system administered to students: Solve problems by writing equations containing rational expressions. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students taking taking the assessment will answer correctly.	06/24/2013 - Out of the 25 students who took the assessment, 73% answered correctly. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** computers with internet available for student to use **GE/IL-SLO Reflection:** Students had to apply mathematical concepts and reasoning to answer this question.	06/24/2013 - Students typically find word problems difficult to master. Increase time covering applications and modeling.
Department - Mathematics (MATH) - MATH 11 - FINITE MATHEMATICS - Probability - Student will be able to find the probability of various events. (Created By Department - Mathematics (MATH)) **Start Date:** 04/08/2013 **End Date:** 06/28/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Students were given a chart of data and asked to compute 6 probabilities (including conditional probability) based on the data. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80%	07/26/2013 - Students did well and averaged 84% overall on the 6 questions. Most students were able to answer the questions correctly, including conditional probability. The errors were mostly in finding the probability of a union of 2 sets (P(A or B)) where students averaged 55% on that question. Students were unable to use the formula or reason out that some things were counted twice in that problem. **Result:** Target Met **Year This Assessment Occurred:**	07/26/2013 - Assign a few more P(A or B) type problems for students to practice.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		2012-2013 **GE/IL-SLO Reflection:** Student seem to have a good overall understanding of basic probability.	
	Assessment Method: Students answered a question on the final exam related to this topic. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 60%		
Department - Mathematics (MATH) - MATH 11 - FINITE MATHEMATICS - Financial Math - Student will be able to use financial math to compute the interest. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students completed a problem on the final exam to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 60%		
Department - Mathematics (MATH) - MATH 11 - FINITE MATHEMATICS - Linear Programing - Student will be able to use linear programming to optimize a function. (Created By Department - Mathematics (MATH)) **Start Date:** 04/08/2013 **End Date:** 06/28/2013 **Course-Level SLO Status:** Active	**Assessment Method:** Students were given a word problem and asked to maximize the profit. The problem required students to model the scenario with a system of linear inequalities and to solve using the Simplex method. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70%	07/26/2013 - Average score was 67%. If students were able to set up the linear model correctly, most were able to do the calculations and apply the Simplex method to solve the problem. Students still struggle with reading comprehension and converting English to Math. They still get confused with phrases like, "no more than" or "no less than" which is very common. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013	07/26/2013 - Spend a bit more time in class helping students translate written English to mathematical phrases. English 1A or ESLL 26 is the current ADVISORY for this class. It would help if it were a prerequisite instead.
	Assessment Method: Students answered a question on the final exam related to this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 60%		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 12 - CALCULUS FOR BUSINESS & ECONOMICS - Applications - A student will be able to apply elementary ideas of single variable differential and integral calculus and multivariable differential calculus to the solution of application problems from the business, economics, and the social sciences. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** A multiple choice question was created to address this SLO **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70 % correct.	01/28/2013 - 9 out of 12 students answered this correctly. Target met. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** None **GE/IL-SLO Reflection:** To answer this question, the students needed to be able to interpret partial derivatives in applied contexts. This requires students to have good critical thinking and communication skills. **Related Documents:** M12_SLO_Sp12.pdf	01/28/2013 - None. Target met.
		01/28/2013 - 4 students out of 12 answered this correctly. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** None **GE/IL-SLO Reflection:** To answer this question, the students needed to determine that this problem involved integral calculus and then the student needed to be able to calculate the integral. This would require both critical thinking and computational skills. **Related Documents:** M12_SLO_Sp12.pdf	01/28/2013 - Increased emphasis needed on relationship between rates of change and total change.
		01/28/2013 - 10 out of 12 students correctly answered this question. **Result:** Target Met	01/28/2013 - None. Target met.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		Year This Assessment Occurred: 2012-2013 **Resource Request:** None. **GE/IL-SLO Reflection:** This question gave the population at a time t and asked the students to estimate the population at a nearby time. It required critical thinking skills. **Related Documents:** M12_SLO_Sp12.pdf	
Department - Mathematics (MATH) - MATH 12 - CALCULUS FOR BUSINESS & ECONOMICS - Mathematical Language and Notation - A student will be able to discuss and write solutions to applied calculus problems from business, economics, and the social sciences using appropriate mathematical language and notation. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** A three-part question was administered to the students. The question required students to compute, discuss and write up a solution. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70 % average on this question.	01/28/2013 - The students achieved an average score of 78.75% on this question. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** None **GE/IL-SLO Reflection:** This question involved the students having to discuss the notion of market demand versus price and having to make a decision as to whether there was a consumer surplus. It involves a fair amount of writing and the ability to articulate the meaning of mathematical parameters. **Related Documents:** M12_SLO_Sp12.pdf	01/28/2013 - None. Target met.
Department - Mathematics (MATH) - MATH 1A - CALCULUS - Differentiation - Use derivatives to graph, and to model and solve application problems using accurate mathematical notation. (Created By Department - Mathematics (MATH))	**Assessment Method:** common final: Suppose f(x) and g(x) are both differentiable at x=a. Let h(x)=f(x)/F(x), where F(x)=f(g(x)). If f and g are defined in the table, find h'(a) x f(x) f'(x) g(x) g'(x) a -1 -2 2 1/2		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Course-Level SLO Status: Active	2 3 -3 7 5 **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% success rate		
	Assessment Method: Common Final - Written/Open ended problem on using calculus to minimize the cost of making a certain box (see attached related document). **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of the students will get at least a C (70%) or better on this problem. **Related Documents:** MATH 1A SLO #2 W'13	04/21/2013 - 99/214 = 46.26% of the students got a 70% or better on this problem. This does not come close the 70% success rate which was sought after. Many students were not able to even get the correct objective function correct on this problem. Many students also did not verify through calculus techniques that the value which was optimal was the absolute minimum value. Since this was assessed on a common final, the findings (and overall observation of the students) suggest that the common final may add extra stress on the students. It would be worth the effort to evaluate a similar problem which does not appear on a common final exam. Note that this problem was written and not multiple choice. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** No further resources are requested. Though, continuing the efforts through the MATH 1A supplemental workshops in the PSME Center is recommended. **Related Documents:** SLO(1A)2doc12-13.pdf	04/21/2013 - Evaluate the SLOs for this course on an assessment which does not appear on a common final and compare results. Also, introduce application type problems such as optimization and related rates earlier in the course so that students are exposed to these types of problems earlier. These types of problems typically get introduced during the last few weeks of the course. Continue offering MATH 1A workshops in the PSME Center.
	Assessment Method: A multiple choice question common to instructor's final exams. (See attached document). **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% or more of the students will select the correct answer choice for each question.		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 1A - CALCULUS - Limits and Derivatives - Define, calculate with various techniques, and demonstrate an understanding of, limits, derivatives, and simple antiderivatives using accurate mathematical notation. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** common final: Find the vales of a and b that make the following function differentiable everywhere: f(x)= {x^2 for x less or equal to 2; ax+b for x >2} **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% success rate		
	Assessment Method: Open Ended Question on a Common Final - Use the definition of the derivative to find the derivative function given some f(x) and using correct limit notation and algebra skills. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of the students will get a C (70%) or better on this question.	04/21/2013 - 115/214 = 53.75% of the students who took the common final exam got a C (70%) or better on this assessment question. Common mistakes included using f '(a) rather than f '(x) (derivative at a point vs. derivative function), algebra mistakes, and limit notation was not used throughout the problem. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** No further resources are requested at this time. Continue with offering MATH 1A workshops in the PSME Center. **Related Documents:** MATH 1A SLO #1 W'13	04/21/2013 - Since many students displayed poor algebra skills on this problem, it is encouraged that students attend the MATH 1A workshops in the PSME Center. Also, it is difficult to understand how some of the students would have poor algebra skills displayed in this problem having met the prerequisites for MATH 1A. Perhaps revisiting the cutoff scores for the placement exam or altering the procedure in which students can place into MATH 1A should be considered. The majority of students in this course do not come from the prerequisite courses offered at Foothill College. Since this question was assessed on a common final, perhaps it would be beneficial to assess a similar problem on an assessment which is not a common final exam as it seems these exams add extra stress on the students.
	Assessment Method: Multiple Choice question appearing on each instructor's final exam. (See attached		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	document). **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% or more of the students will select the correct answer choice for this problem.		
Department - Mathematics (MATH) - MATH 1B - CALCULUS - Fundamental Theorem of Calculus - A student will be able to approximate definite integrals and apply the first and second fundamental theorems of calculus to help evaluate them exactly. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Two multiple choice questions: one for evaluating with the FTC and the other for estimating. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% correct		
	Assessment Method: An open-ended two part question was given on the final exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** Target for success to be at least 70% on both parts.		
	Assessment Method: Multiple-choice question on common final exam **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of students get question correct.	01/27/2013 - 40.7% of students answered correctly. This question was not straight-forward. It required synthesis of several techniques of integration as well as attention to detail and perseverance and flexibility of thinking. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This problem required computation skills as well as critical/analytical thinking. **Related Documents:** M1B.SLO Problems.F2012.pdf	01/27/2013 - It is possible that this final exam had too many questions that required higher-level thinking skills. If the required skills to answer a question are substantial, then many students will miss that question and we will not really be able to tell why. One student may miss because they have NO skills while another may miss due to clerical error and another due to missing ONE of the numerous skills. After experimenting this last year with common finals, we will have to discuss/share our observations about the implications for students and grades.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 1B - CALCULUS - Applications - A student will be able to model and solve application problems involving the definite integral or first order separable differential equations, and interpret their solutions in context. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** open ended question about differential equations **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students answer correctly		
	Assessment Method: Three part problem involving the first order separable differential equation was given on the final exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the class achieves at least 75% of the problems correct.		
	Assessment Method: A four-part open-ended question was given on a common final exam **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** Average score above 70%. **Related Documents:** 1B.SLO Problem.F2012	01/25/2013 - Average score on this problem was 59.3%. Only 45.8% of students who took the final scored 70% or better on this application. This is very disappointing. The problem, itself, is straight-forward, but long. 7 students (out of 83) scored zero, and 24 students scored 5 or less. This suggests that they either had NO IDEA how to do this problem or they felt pressed for time while taking the final. I suspect that they were pressed for time. This supports my prior sense that common finals may not be the positive change that we thought they might be. Instructors convey their priorities daily to their students. But when constructing a common final, instructors want these priorities represented. The greater the number of collaborators, the greater the number of problems that MUST show up on the final. A possible alternative is to create a core of routine type problems that every student be tested on...either on the final or prior to the final. Then individual instructors can choose their personal	09/02/2012 - -

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		favorite "challenge" problems for their group of students **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This problem does a great job of requiring communication, computation, and critical thinking skills. Perhaps the poor results are due to the load being so great on the students. It's possible that the kind of thinking we want them to do requires a lot more time than we're allowing during the final. Some instructors are giving Take-home exams that are really projects. That might be a better experience for the students and also a better way to assess their learning. But it takes a lot of faith and work to create assessments that are not proctored and yet still have integrity. **Related Documents:** M1B.SLO Problems.F2012.pdf	
Department - Mathematics (MATH) - MATH 1B - CALCULUS - Mathematical Language and Notation - A student will be able to discuss integration problems and write solutions to them in appropriate mathematical language and notation. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students asked to briefly discuss the meaning of half-life. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% give clear, correct answers		
	Assessment Method: A four part question was given on the final exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of the class achieves at least 75% correct.		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Assessment Method: Open-ended question on final exam **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** Average score above 70%.	01/27/2013 - Average score on this problem was 62.9%. I believe that some sections had seen similar problems on earlier exams while other sections had done very little with this kind of problem. It was also the case that many students had trouble applying a simple geometry formula (given, C=2*pi*r) appropriately to the problem. If radii were given rather than circumferences, I suspect that MANY more students would have answered correctly. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** None **GE/IL-SLO Reflection:** This problem required written communication skills, computation skills, and critical thinking. **Related Documents:** M1B.SLO Problems.F2012.pdf	01/27/2013 - I think it would be a good idea to refine our vision of common finals. It might be better to identify a core of problems that we think EVERY* student should be able to do upon completion of the class. (*I mean all the students who have applied themselves according to the rule of a Carnegie Unit.) These would be fairly straight-forward. And if a student missed such a question, it would generally be obvious which skill they lack. A final consisting of such problems would not be very "worthy."
Department - Mathematics (MATH) - MATH 1C - CALCULUS - Sequences and Series - Students will be able to apply the theories and techniques of sequences and series to solve application problems. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** In class #1, students were given 20 minutes to complete the three assessment questions. The teacher graded the results. In class #2, each student was given 25 minutes to complete the three assessment questions. They exchanged papers and graded each others paper on a scale of 0 -5. A score of 3 or higher is considered at least a C grade. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students will get at least a C grade. **Related Documents:** SLOfor Math1CQuestions.doc		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Assessment Method: Students were given the question and asked to answer the question. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students will get a grade of C or better.	04/15/2013 - 54/73 students got at least a C grade on this question. Many students wante dto do this by definition and not by manipulating a known Maclaurin series. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** None **GE/IL-SLO Reflection:** This question involves both computation and critical thinking.	04/15/2013 - No action plan needed since target was met.
	Assessment Method: The students were given a free-response question on the final exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students will score 70% or better on this question.		
Department - Mathematics (MATH) - MATH 1C - CALCULUS - Multivariable functions and relations - Students will be able to apply the theories and techniques of functions and relations of many variables to solve problems. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** In class #1, students were given 20 minutes to complete the three questions. The teacher graded the papers. In class #2, each student was given 25 minutes to complete the questions. The students then exchanged papers with other students and graded other student's papers on a scale of 0 - 5. A score of 3 or higher is considered at least a C grade. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students will get a grade of C or higher. **Related Documents:** SLOfor Math1CQuestions.doc		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Assessment Method: Students were given the question and asked to answer the question **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students will get a grade of C or higher.	04/15/2013 - 48/73 of students got at least a C grade. Many students did not recognize third variable. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** None **GE/IL-SLO Reflection:** This question involved critical thinking.	04/15/2013 - Faculty need to talk about how to better explain these important concepts. Maybe there are other ways of explaining this to students and maybe students need more practice.
	Assessment Method: The students were given a free-response question on the final exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students will score 70% or higher.		
Department - Mathematics (MATH) - MATH 1C - CALCULUS - Applications involving Differential Calculus - Students will be able to apply the theories and techniques of differential calculus including directional derivatives and gradient vectors to solve application problems. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** In Class #1, students were given 20 minutes to complete the three assessment questions. The teacher graded the papers. In class #2, each student was given 25 minutes to complete the questions. The students then exchanged papers with other students and graded other student's papers on a scale of 0 - 5. A score of 3 or higher is considered at least a C grade. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students will score a grade of C or higher. **Related Documents:** SLOfor Math1CQuestions.doc		
	Assessment Method: Students were asked the question and then answered the question	04/15/2013 - 59/73 students got at least a C grade on this question. **Result:**	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Assessment Method Type: Exam - Course Test/Quiz **Target for Success:** At least 70% of the students will get a C grade or higher	Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** None **GE/IL-SLO Reflection:** This question involved both computation and critical thinking.	04/15/2013 - No action plan needed
	Assessment Method: The students were given a free response question on the final exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students should score 70% or higher.		
Department - Mathematics (MATH) - MATH 1D - CALCULUS - Computation - A student will be able to perform various types of computations involving double and triple integrals, parameterization of curves and surfaces, and line and flux integrals. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** A multiple choice pop quiz was given during class time. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students should be able to answer this correctly.		
	Assessment Method: Multiple-choice problem requiring students to compute the value of a double integral **Assessment Method Type:** Exam - Standardized **Target for Success:** 70% or more of students can answer the problem correctly.	12/17/2012 - 89% of students answered this problem correctly. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Continue support of license that allows use of Mathematica in upper level courses. **GE/IL-SLO Reflection:** The ability to perform a complex computation like a double integral successfully indicates that students in this assessment were ably satisfying the	12/17/2012 - Students capably answered the assessment question. No further follow up is suggested.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		computation core competency of the Foothill ILOs.	
	Assessment Method: Written answer to question prompt on an exam. **Assessment Method Type:** Exam - Standardized **Target for Success:** 70% or more of students are able to answer the prompt correctly, with minimal error on the part of students.	01/08/2013 - Two problems involving computation were given on the exam. On the first one, which involved a line integral computation, 55% of students were able to answer the question correctly. The second problem, which involved a parametric representation of a surface had 33% of students able to answer the question correctly. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** The PSME Center is often lacking in staff able to answer questions at this level of mathematics. Recommend hiring more staff able to answer questions at this level. **GE/IL-SLO Reflection:** The ability to perform a complex computation like a line integral successfully indicates that students in this assessment were ably satisfying the computation core competency of the Foothill ILOs.	01/08/2013 - Work with PSME Coordinator to ensure that the PSME Center has staff able to answer questions from Math 1D.
Department - Mathematics (MATH) - MATH 1D - CALCULUS - Divergence and Curl - A student will be able to demonstrate an understanding of the concepts of divergence and curl as well as key theorems related to these concepts (e.g., the Divergence Theorem and Stoke's theorem). (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** A multiple choice problem with answers supported by written explanation for choice of answer was given on the topic of Green's Theorem on a scheduled exam. **Assessment Method Type:** Exam - Standardized **Target for Success:** At least 70% of students can answer the question correctly and support with a coherent explanation for their choice.		
	Assessment Method: Multiple-choice problem from final exam requiring students to compute a line integral	12/17/2012 - 83% of students answered the problem correctly. **Result:**	12/17/2012 - With such a high level of success evidenced in this assessment, no additional follow up

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	using Stoke's Theorem **Assessment Method Type:** Exam - Standardized **Target for Success:** 70% or more of students can answer this question correctly.	Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Continue support of license that allows use of Mathematica in upper level courses. **GE/IL-SLO Reflection:** The ability to use Stoke's Theorem to compute a line integral requires not only complex computation but also a great deal of analytical thinking is required to apply the theorem correctly in performing the computation. That 83% of students were able to do this is strong evidence that students are acquiring these competencies.	is suggested for this SLO.
	Assessment Method: Written response question testing student knowledge of the Divergence Theorem **Assessment Method Type:** Exam - Standardized **Target for Success:** 70% of students are able to answer the question correctly.	01/08/2013 - 56% of students were able to successfully answer this question. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Funding so that the PSME Center is able to employ staff able to successfully help students at this level of math **GE/IL-SLO Reflection:** The ability to use a complex theorem like the Divergence Theorem to compute flux through a closed surface requires computational ability but also the ability to analyze a complex problem creatively and analytically. Students successfully answering this question are therefore satisfying the computational and analytical reasoning requirements of Foothill IL-SLOs.	01/08/2013 - To increase student success with this SLO, the department should increase funding to the PSME Center so that it is able to employ staff able to assist students in completing the work required in this course. HIstorically, the center has had difficulty in finding students able to competently help with course work at this level. Instructors could then use the center to support students in the class and by extension increase student success with this SLO. Additional homework and /or group work on this SLO might also help in increasing success rates in the future.
Department - Mathematics (MATH) - MATH 217 - INTEGRATED STATISTICS I - Experimental Design - Successful students	**Assessment Method:** Problem #6 from the Carnegie Mid-Course assessment package. See related		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
will be able to assess the design of a study or experiment to determine which conclusions or generalizations would be appropriate. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	document. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of student should get the correct answer. **Related Documents:** Math217Problem6.JPG		
	Assessment Method: #8 on the Carnegie Foundation Common, MidCourse Exam #8 was about random assignment **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% correct	01/04/2013 - 65% correct **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** They were able to analyze a sampling technique and communicate it's effectiveness.	01/17/2013 - The students had to recall this information from the first and second weeks of class. A more substantial review of Module one is recommended.
Department - Mathematics (MATH) - MATH 217 - INTEGRATED STATISTICS I - Data Analysis and Displays - Successful students will be able to analyze, summarize and interpret data, making appropriate choices regarding numerical summaries and graphical displays. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Problem #11 from the Carnegie Mid-Course assessment **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of the student will get it correct. **Related Documents:** Math217Problem11.JPG		
	Assessment Method: #12 on the Carnegie Foundation midcourse exam #12 was about choosing the most appropriate display **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% correct	01/04/2013 - 71% correct **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** The students were able to read a scenario, analyze different graphical displays and make a decision as to which display was the most appropriate.	01/17/2013 - This target was met. The students understood well how to analyze graphical displays. no action plan needed

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 217 - INTEGRATED STATISTICS I - Using Models to Make Predictions - Successful students will be able to interpret the parameters of both linear and exponential models and use these models to make predictions. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Problem #24 from the Carnegie Mid-Course assessment **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of student get it correct **Related Documents:** Math217Problem24.JPG		
	Assessment Method: #18 on the Carnegie Foundation Common, MidCourse Exam #18 -interpret the slope of an LSR **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% correct	01/04/2013 - 82% correct **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** The students were able to read a scenario, analyze the least squares regression line and form a ratio to represent the slope. They also gave a real-life interpretation of that slope.	01/17/2013 - I was surprised at this high result. Many of my students were stronger in lines than I had anticipated.
Department - Mathematics (MATH) - MATH 217 - INTEGRATED STATISTICS I - Probability - Successful students will be able to determine the likelihood of events. (Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **End Date:** 12/14/2012 **Course-Level SLO Status:** Active	**Assessment Method:** #38 on the Carnegie Foundation Common, MidCourse Exam #38 was about long run behavior **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% correct	01/04/2013 - 88% **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** The students were able to read a context with a graph displaying long run behavior and interpret that long run behavior.	01/17/2013 - This high result is partially due to recency in the curriculum but it also was not a very difficult problem. No action plan needed
Department - Mathematics (MATH) - MATH 22 - DISCRETE MATHEMATICS - Relations - Identify salient properties of relations	**Assessment Method:** Count the number of correct responses **Assessment Method Type:**	12/10/2012 - 21 students took the assessment and 20 of them answered the question correctly. **Result:**	12/10/2012 - The students seem to understand this topic very well.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
(Created By Department - Mathematics (MATH)) **Assessment Cycles:** End of Academic Year **Start Date:** 09/24/2012 **End Date:** 06/28/2013 **Course-Level SLO Status:** Active	Exam - Course Test/Quiz **Target for Success:** 70% of the students will answer the question correctly	Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** The students exhibited strong analytical skills and reasoning in solving this problem.	Devote more time to other topics in the class.
Department - Mathematics (MATH) - MATH 22 - DISCRETE MATHEMATICS - Logic and Proofs - Use formal logic and various methods of arguments to formally write proofs involving number theory, set theory, combinatorics, and discrete probability. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** On the final exam, students are to use formal logic to determine the validity of a series of given arguments. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the students will correctly apply formal logic to draw valid conclusions.	12/06/2012 - 95% of students answered the answer correctly **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 22 - DISCRETE MATHEMATICS - Number Theory and Applications - Apply number theory, combinatorics, discrete probability, graph theory, and recursion to solve various application problems. (Created By Department - Mathematics (MATH)) **Start Date:** 09/26/2011 **End Date:** 06/29/2012 **Course-Level SLO Status:** Active	**Assessment Method:** Students are given a written final exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of the students will earn 75% or better questions related to this SLO	12/06/2012 - 95% of the students answered the answer correclty **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** The class performed well	
Department - Mathematics (MATH) - MATH 220 - ELEMENTARY ALGEBRA - Linear and Quadratic equations - Solve algebraically, graphically, and numerically linear equations, linear inequalities in one variable, linear systems of equations, and quadratic equations. (Created By Department -	**Assessment Method:** Multiple choice question on determining the correct solution set in interval notation to a linear inequality in one variable. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:**	04/04/2013 - 62 out of 89 students (about 70%) answered this question correctly. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Related Documents:**	04/04/2013 - More time spent on this topic during class is recommended.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Mathematics (MATH)) **Course-Level SLO Status:** Active	75% of the students select the correct answer **Related Documents:** MATH 220 SLOs Spring 2012	Math 220 SLOs W13.doc	
Department - Mathematics (MATH) - MATH 220 - ELEMENTARY ALGEBRA - Applications - Model and solve application problems using linear equations, linear inequalities, and linear systems of equations. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Multiple choice problem in which the student must determine the correct linear model which reflects the description given in words. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 75% of the students select the correct answer **Related Documents:** MATH 220 SLOs Spring 2012	04/04/2013 - 82 out of 89 students (about 92%) answered this question correctly. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Related Documents:** Math 220 SLOs W13.doc	04/04/2013 - The target was met so no action is necessary.
Department - Mathematics (MATH) - MATH 220 - ELEMENTARY ALGEBRA - Polynomials and Exponents - Simplify polynomial expressions and exponential expressions with integer exponents. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Multiple choice problem in which the student must determine the correct answer to a problem involving simplifying an expression using the correct rules of exponents. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 75% of the students select the correct answer. **Related Documents:** MATH 220 SLOs Spring 2012	04/04/2013 - 67 out of 89 students (about 75%) answered this question correctly. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Related Documents:** Math 220 SLOs W13.doc	04/04/2013 - The target was met so no further action is necessary.
Department - Mathematics (MATH) - MATH 221 - ACTIVITIES FOR MASTERY OF BEGINNING ALGEBRA CONCEPTS - Linear and Quadratic equations - Solve algebraically, graphically, and numerically linear equations, linear inequalities, linear systems of equations, and quadratic equations. (Created By Department -	**Assessment Method:** Multiple choice question on determining the correct solution set in interval notation to a linear inequality in one variable. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 75% of the students select the correct	09/13/2013 - This course is no longer offered. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Mathematics (MATH)) **Course-Level SLO Status:** Active	answer		
Department - Mathematics (MATH) - MATH 221 - ACTIVITIES FOR MASTERY OF BEGINNING ALGEBRA CONCEPTS - Applications - Model and solve application problems using linear equations, linear inequalities, and linear systems of equations. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Multiple choice problem in which the student must determine the correct linear model which reflects the description given in words. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 75% of the students select the correct answer		
Department - Mathematics (MATH) - MATH 221 - ACTIVITIES FOR MASTERY OF BEGINNING ALGEBRA CONCEPTS - Polynomials and Exponents - Simplify polynomial expressions and exponential expressions with integer exponents. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Multiple choice problem in which the student must determine the correct answer to a problem involving simplifying an expression using the correct rules of exponents. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 75% of the students select the correct answer.		
Department - Mathematics (MATH) - MATH 224 - ELEMENTARY ALGEBRA: SUMMER EDITION - Linear and Quadratic equations - Solve algebraically, graphically, and numerically linear equations, linear inequalities, linear systems of equations, and quadratic equations. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Multiple choice question on determining the correct solution set in interval notation to a linear inequality in one variable. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 75% of the students select the correct answer.	09/13/2013 - This course is no longer offered. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 08/09/2013 - Course not offered. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 224 - ELEMENTARY ALGEBRA: SUMMER EDITION - Applications - Model and solve	**Assessment Method:** Multiple choice problem in which the student must determine the correct linear model	08/09/2013 - Course not offered. **Result:** Target Not Met	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
application problems using linear equations, linear inequalities, and linear systems of equations. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	which reflects the description given in words. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 75% of the students select the correct answer.	**Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 224 - ELEMENTARY ALGEBRA: SUMMER EDITION - Polynomials and Exponents - Simplify polynomial expressions and exponential expressions with integer exponents. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Multiple choice problem in which the student must determine the correct answer to a problem involving simplifying an expression using the correct rules of exponents. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 75% of the students select the correct answer.	08/09/2013 - Course not offered. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 230 - PREPARING FOR ALGEBRA - Solve Linear Equation - Solve a linear equation (in one variable) containing rational coefficients and grouping symbols. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** All students will take an exam requiring them to solve equations with fractional coefficients, decimal coefficients, and multiple grouping symbols. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students who pass the course will earn 84% or higher on the exam.	05/08/2013 - Although many students need to take the exam 2 or 3 times, the students are consistently able to get 84% or higher on the exam. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 230 - PREPARING FOR ALGEBRA - Apply linear equations - Write a linear equation to represent a real world application, and interpret the solution in context. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will complete an exam including two or three word problems in which they must define variables or variable expressions, write an equation associated with the problem, and clearly state the conclusion in a sentence. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:**	05/08/2013 - Many students need to take the exam 2 or 3 times (different versions) to reach the 84% goal, but they are consistently able to to do so and the work they produce is well organized using proper mathematical notation. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	All students who pass the course will earn 84% or higher on the exam.		
Department - Mathematics (MATH) - MATH 230 - PREPARING FOR ALGEBRA - Proportions and percent - Apply knowledge of proportional reasoning and percent to real applications. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Two exams, one on proportional reasoning, one on percent applications. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students who pass the course will earn 84% or higher on each exam.	05/08/2013 - All students who pass the course earn 84% or higher on 2 exams, one covering proportions and one covering percentages. Most students pass the exam on proportions without needing multiple attempts, but many students need to take the exam on percentages more than once (different versions) to achieve this level of proficiency. They are able to calculate direct percentages, but do struggle with application problems requiring percent increase and decrease. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 230 - PREPARING FOR ALGEBRA - Geometric Formulas - Apply geometric formulas to solve applications involving perimeter, area, and volume. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** An exam requiring knowledge of formulas for perimeter and area of rectangles, triangles and circles. Students must also calculate a volume given a formula. Students not reaching mastery will retake a different version of the exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students who pass the course will earn 84% or higher on the exam.	05/08/2013 - All students who pass the class pass an exam covering this outcome with a 84% or higher. For some students this is outcome is easily achieved, but many students struggle with the concepts of area and perimeter in application problems. The students also frequently have difficulty calculating areas and perimeters of shapes that are the composites of basic shapes (circles, triangles, rectangles). **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 230J - PREPARING FOR ALGEBRA - Percent - Apply knowledge of percent to real applications. (Created By Department - Mathematics (MATH))	**Assessment Method:** Students will take a final exam that contains a problem involving an application of percent. **Assessment Method Type:** Exam - Course Test/Quiz	08/01/2013 - Of the 18 students who took the final exam, 15 answered the question correctly. This is equivalent to about 83% of the students answering the question correctly. **Result:** Target Met	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Course-Level SLO Status: Active	**Target for Success:** At least 75% of the students who take the final exam will solve the problem correctly.	**Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 230J - PREPARING FOR ALGEBRA - Geometric Formulas - Apply geometric formulas to solve applications involving perimeter, area, and volume. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will take a final exam that contains a problem in which they find the perimeter of a figure that is composed of more than one shape. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 75% of the students who take the final exam will solve the problem correctly.	08/01/2013 - Of the 18 students who took the final exam, 12 answered the question correctly. This is equivalent to about 67% of the students answering the question correctly. Although the target was not met, this is an improvement over last year. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013	08/14/2012 - Instructors could give more examples on how to find the perimeter of a figure that is composed of more than one shape. An example of such a figure is one that is composed of a rectangle and two semi-circles.
Department - Mathematics (MATH) - MATH 234 - PREPARING FOR ALGEBRA: SUMMER EDITION - Solve Linear Equation - Solve a linear equation (in one variable) containing rational coefficients and grouping symbols. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** All students will take an exam requiring them to solve equations with fractional coefficients, decimal coefficients, and multiple grouping symbols. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students who pass the course will earn 84% or higher on the exam.	08/09/2013 - Although many students need to take the exam 2 or 3 times, the students are consistently able to get 84% or higher on the exam. The most difficult topic for students tends to be solving an equation involving fractions. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 234 - PREPARING FOR ALGEBRA: SUMMER EDITION - Apply linear equations - Write a linear equation to represent a real world application, and interpret the solution in context. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will complete an exam including two to three word problems in which they must define variables or variable expressions, write an equation associated with the problem, and clearly state the conclusion in a sentence. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:**	08/09/2013 - Many students need to take this exam 2 or 3 times (different versions) to reach the 84% goal, but they are consistently able to to do so and the work they produce is well organized using proper mathematical notation. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	All students who pass the course will earn 84% or higher on the exam.		
Department - Mathematics (MATH) - MATH 234 - PREPARING FOR ALGEBRA: SUMMER EDITION - Proportions and percent - Apply knowledge of proportional reasoning and percent to real applications. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Two exams, one on proportional reasoning and one on percent applications. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students who pass the course will earn 84% or higher on the exam.	08/09/2013 - All students who pass the course earn 84% or higher on 2 exams, one covering proportions and one covering percentages. Most students pass the exam on proportions without needing multiple attempts, but many students need to take the exam on percentages more than once (different versions) to achieve this level of proficiency. They are able to calculate direct percentages, but do struggle with application problems. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 234 - PREPARING FOR ALGEBRA: SUMMER EDITION - Geometric Formulas - Apply geometric formulas to solve applications involving perimeter, area, and volume. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** An exam requiring knowledge of formulas for perimeter and area of rectangles, triangles and circles. Students must also calculate a volume given a formula. Students not reaching mastery will retake a different version of the exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students who pass the course will earn 84% or higher on the exam.	08/09/2013 - All students who pass this course earn 84% or higher on this exam. For some students this is outcome is easily achieved, but many students struggle with the concepts of area and perimeter in application problems. The students also frequently have difficulty calculating areas and perimeters of shapes that are the composites of basic shapes (circles, triangles, rectangles). **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 235 - PREPARING FOR ALGEBRA: REAL NUMBERS - Order of Operations - Without a calculator, perform the order of operations to	**Assessment Method:** The students will complete 4 exams (whole numbers, fractions, decimals, signed numbers) involving these calculations.	05/08/2013 - Because students are allowed to retake a different version of the exam if 87% is not reached, all students passing did reach the 87%. Order of operations with fractions and signed	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
find the value of an expression involving whole numbers, fractions, decimals, and/or signed numbers. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students passing the class will earn 87% or higher on each exam.	numbers seem to be the toughest for students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 235 - PREPARING FOR ALGEBRA: REAL NUMBERS - Convert between number forms - Convert between whole numbers, fractions, mixed numbers, and decimals. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students will complete a module B and module C exam requiring conversion between these number forms. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students passing the course will earn 87% or higher on both exams.	05/08/2013 - All students reached 87% or higher on the exams. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 235 - PREPARING FOR ALGEBRA: REAL NUMBERS - Apply operations with rational numbers - Apply operations with whole numbers, fractions, decimals, and mixed numbers to real world problems and interpret the answer in context. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Each exam (whole numbers, fractions, decimals, signed numbers) includes at least two problems requiring real world application of operations. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** All students passing the exam and course will earn 87% or higher on the exams.	05/08/2013 - Because students are allowed to retake exams if 87% is not achieved, all students eventually earned 87% or higher on these exams. However, the applications involving fractions operations seem to give the students the most difficulty as students often do not know which operation to use in order to solve the problem. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 2A - DIFFERENTIAL EQUATIONS - Analytic Techniques - Solve differential equations with appropriate analytic techniques. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Instructor-generated prompt **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of responses adequate or better	01/25/2013 - As the owner of Math 2A who did not teach this course this academic term, I again received no assessment data from the instructors who taught the course. The results recorded here for this and the previous assessment cycle are vacuously true, as is last term's reflection. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 2B - LINEAR ALGEBRA - Vector Spaces - Students will be able to understand the concepts of a vector space and prove facts about them. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students are asked to prove why a given set with specified characteristics is a vector space. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% of students will receive at least 7 points on a 10-point rubric		
	Assessment Method: In the final exam, the students were given a vector space problem. Given a subset of R^3, they determined whether the set was a vector subspace or not. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** class average of 70%	04/01/2013 - The class average was 74.4%. 64% of the class performed over 90%. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	04/23/2013 - Students felt that the abstract proofs were difficult. More in-class practices will increase the success rate.
Department - Mathematics (MATH) - MATH 2B - LINEAR ALGEBRA - Modeling - Students will be able to use a linear system to model a problem. They will use techniques learned in class to solve the system, and interpret the result. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Students are given two modeling problems to solve and interpret. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 80% of students will receive 14 points or higher on a 20 point rubric.		
	Assessment Method: In the final exam, the students were asked to model a real-life scenario using a linear system, and solve it. Then, they were asked to write a practical interpretation of the solution. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** class average of 70%	04/01/2013 - The class average was 98%. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	04/23/2013 - More complex real-life examples can be given to challenge students.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 36 - SPECIAL PROJECTS IN MATHEMATICS - Research Question - Define a research question and locate appropriate sources of information. (Created By Department - Mathematics (MATH))	**Assessment Method:** The student will need to submit the research topic to the instructor for approval. **Assessment Method Type:** Case Study/Analysis	09/13/2013 - This course was not offered in 2012-2013. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 36 - SPECIAL PROJECTS IN MATHEMATICS - Analyze Mathematical Research - Critically analyze mathematical research data and present an answer to their defined research question(s) orally or in writing using appropriate mathematical language. (Created By Department - Mathematics (MATH))	**Assessment Method:** The student will submit a research paper to the instructor. **Assessment Method Type:** Case Study/Analysis		
Department - Mathematics (MATH) - MATH 44 - MATH FOR THE LIBERAL ARTS - Problem Investigation - Investigate problems analytically, numerically, graphically, and verbally. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Development of a mathematical model appropriate for a given data set **Assessment Method Type:** Case Study/Analysis **Target for Success:** 80% of students should successfully complete the assessment **Related Documents:** Moon phase model prompt Data for moon phase prompt		
	Assessment Method: Develop and analyze a mathematical model from a qualitative description **Assessment Method Type:** Case Study/Analysis **Related Documents:** Malthusian Prosperity	01/25/2013 - The prompt for developing a mathematical model appropriate to compare the long-term behavior of linear and exponential functions is attached as the related document "Malthusian Prosperity." All students who completed the assessment did so successfully. Of the 21 students left in the course at the time of the assessment in the seventh week of fall quarter, only 11 handed the asssessment in on time, and just 3 others completed the assessment later. I	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		judged the 14 papers to be adequate or better. Of the seven students who failed to complete the assessment, three failed the course. The others that passed the course missed no other assessments. Seeing as many as four otherwise adequately-performing students choose to miss this assessment (and not make it up as I allowed) suggests to me that some some find this, the most equation-driven assessment prompt in the course that term, to be especially challenging. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 48A - PRECALCULUS I - Function Analysis - A successful student will be able to graph, analyze and transform polynomial, power, and root functions. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** A multiple choice question was given to the students. This question provided a graph of the original function and its transformation. The students were to determine what the function of the transformed graph. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% correct		
	Assessment Method: Two multiple choice questions were placed on the final exam to assess these SLOs. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% correct on each problem		
	Assessment Method: multiple choice question **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% correct	07/08/2013 - 48.8% of students answered correctly (62/127) **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013	07/08/2013 - We have a new book for the Math 48 series(PreCalculus: A Make it Real Approach by Wilson) that focuses more on the critical thinking problems. The book we were using (PreCalculus with Limits

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Related Documents: Questions	**Resource Request:** funding for PSME Center, Homework scanner **Resource Request:** funding for PSME Center, Homework scanner **Resource Request:** funding for PSME Center, Homework scanner **GE/IL-SLO Reflection:** Multiple choice questions may not be the best way to measure a students ability. It was noted that A and D are very similar. If a student chooses an answer that is "almost correct" should they be counted as not understanding at all? We may get higher and more accurate results by not including wrong answers that may result from a small error. **GE/IL-SLO Reflection:** Multiple choice questions may not be the best way to measure a students ability. It was noted that A and D are very similar. If a student chooses an answer that is "almost correct" should they be counted as not understanding at all? We may get higher and more accurate results by not including wrong answers that may result from a small error. **GE/IL-SLO Reflection:** Multiple choice questions may not be the best way to measure a students ability. It was noted that A and D are very similar. If a student chooses an answer that is "almost correct" should they be counted as not understanding at all? We may get higher and more accurate results by not including wrong answers that may result from a small error.	by Hornsby) focused more on rote problems instead of critical thinking problems. We hope to get better results with a book that focuses more on developing critical thinking. The transition from Algebra to PreCalculus is a difficult one and we continue to look for ways to increase student success.

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Department - Mathematics (MATH) - MATH 48A - PRECALCULUS I - Modeling - A successful student will be able to model real-life phenomenon using polynomial, power & root functions, use the model to make predictions, and interpret solutions within the context of the real-life phenomenon (Created By Department - Mathematics (MATH)) **Start Date:** 10/13/2011 **Course-Level SLO Status:** Active	**Assessment Method:** Students were given a free-response question that contained 5 parts. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% for each of the 5 parts. **Related Documents:** M48A_SLOQuestions.doc		
	Assessment Method: One multiple choice question from the final exam was given to students to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 50% or higher success rate on assessment question		
	Assessment Method: multiple choice question **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** 70% **Related Documents:** Questions	07/08/2013 - 46.8% answered correctly (58/124) **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** funding for PSME Center, Homework scanner **GE/IL-SLO Reflection:** The instructor believes that it was the writing of the equation not finding the vertex of the parabola that was difficult for the students. Overall student have a hard time modeling and instructors do not have enough time to focus on this in class.	07/08/2013 - We have a new book for the Math 48 series(PreCalculus: A Make it Real Approach by Wilson) that focuses more on the critical thinking problems. The book we were using (PreCalculus with Limits by Hornsby) focused more on rote problems instead of critical thinking problems. We hope to get better results with a book that focuses more on developing critical thinking. The transition from Algebra to PreCalculus is a difficult one and we continue to look for ways to increase student success.
Department - Mathematics (MATH) - MATH 48B - PRECALCULUS II - Modeling - A	**Assessment Method:** We will give students a multiple choice	01/10/2013 - 54 % of students were able to answer the problem correctly.	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
successful student will be able to model real-life phenomenon using rational, trigonometric, exponential and logarithmic functions, use the model to make predictions, and interpret solutions within the context of the real-life phenomenon. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	question that asks them to interpret an inverse function in the context of a real-life situation. **Assessment Method Type:** Exam - Standardized **Target for Success:** We hope that at least 70% of the students gets this problem correct.	**Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** Students who can answer this question must use analytical thinking and therefore are satisfying the Creative, Critical, and Analytical Thinking core competency of the foothill ILO's.	01/10/2013 - The current textbook we are using is not providing sufficiently robust problems for students practice. We are in the process of class testing a new book that we hope will provide students with better preparation for assessments and a better overall understanding of the concepts.
	Assessment Method: We will give a question that contains multiple parts. Some of the parts are free-response while others are multiple choice. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** We expect an average score of 70% or higher.	12/26/2012 - For one instructor, the mean score was 72% on this question. For another instructor, the mean score was 77%. For another instructor, 85% of the students answered part (a) correctly, 80% of them answered part (b) correctly and 30% answered part (c) correctly. Thus, the mean score would be 65% for this set of students. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Research from known educational institutions on what works for students at this level. **GE/IL-SLO Reflection:** This question required students to be able to develop a model for a real-life situation and use the model to compute a future value. Also, the question required students to interpret the meaning of an inverse function in the context of the problem. These tasks require students to be able to compute and communicate effectively.	12/26/2012 - This question contained multiple parts. The first part was to see if the students could determine a mathematical model for a given situation. The second part was to see if the students could use that model to compute a value. The third part was to see if the students could interpret the meaning of the inverse function in the context of the situation. For all three instructors, the common strengths and weaknesses were the same. The students could use the model to compute values, but the students showed that they had difficulty in the interpretation part of this problem. Students definitely need to work more on their interpretations. Interpretations are important as they demonstrate whether or not a student truly understands what a function is. This notion is something that we try to develop in our students starting in Math 48A, if not sooner, as they will need to have a strong understanding of functions by the time they take calculus. Most textbooks lack exercises that require

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
			students to interpret functions. Also, since these problems are difficult to put online, faculty need to create more problems for students to work on and they need to assign these problems as paper and pencil problems.
Department - Mathematics (MATH) - MATH 48B - PRECALCULUS II - Function Analysis - A successful student will be able to graph, analyze and transform rational, exponential and logarithmic functions. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** The students will be given a multiple choice question regarding transformations of a trigonometric function. **Assessment Method Type:** Exam - Standardized **Target for Success:** We are hoping that at least 50% of the students gets this problem correct.	01/10/2013 - 12 % of the students got this problem correct. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** Students who can answer this question must use analytical thinking and therefore are satisfying the computational core competency of the foothill ILO's.	01/10/2013 - The current textbook we are using is not providing sufficiently robust problems for students practice. We are in the process of class testing a new book that we hope will provide students with better preparation for assessments and a better overall understanding of the concepts.
	Assessment Method: We will give a multiple part free-response question asking students to analyze the graph of a rational function. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** We expect the average score on this question to be 70% or higher.	12/26/2012 - For one instructor, the average score was 84%. For another instructor, the average score was 35%. For another instructor, the average score was 81%. Combining all the students' results would yield an average score of 72%. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Research from known educational institutions on what works for students at this level. **GE/IL-SLO Reflection:**	12/26/2012 - This problem contained multiple parts. It asked the students to find the x-intercepts, y-intercept and any vertical and horizontal asymptotes. The tactics in how the three instructors assessed their students were very different. The first instructor had provided a lot of scaffolding and had given a simpler but very similar problem on a separate assessment. The second instructor used the same problem on the assessment but did not give a similar problem on a separate assessment. The third instructor changed the original problem so that the students had a function that had

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		This problem required students to compute x-intercepts, y-intercepts, horizontal and vertical asymptotes. Also, it required students to explain how they found their answers and to justify why a graph would look a certain way without the aid of a calculator.	numbers rather than variables as parameters. Based on these results, it shows that faculty should provide students with opportunities to work more with abstract problems so students are accustomed to seeing these types of problems. The problem is that many textbooks do not have very many types of these problems so faculty need to develop more of these types of problems for the students.
Department - Mathematics (MATH) - MATH 48C - PRECALCULUS III - Modeling - A successful student will be able to model real-life phenomenon using linear, polynomial, trigonometric, exponential, logarithmic and rational functions, use the model to make predictions, and interpret solutions within the context of the real-life phenomenon. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** The students were asked to solve a problem containing multiple parts on the final exam. The format of the question was free-response and there were different point values assigned to each part of the question. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students would receive a score of at least 70% on the problem. **Related Documents:** M48C_SLOs.doc		
	Assessment Method: Students were given a multiple choice problem on the final exam addressing this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students answer the assessment correctly.		
	Assessment Method: A multiple choice question on the final exam	04/11/2013 - 53 students out of 61 got this	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	was used to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** AT least 70 % correct.	problem correct (87%). **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This problem required students to compute a model for a given data set. It requires students to think analytically and does not assume only knowledge of the basic skills.	
	Assessment Method: A multiple part question will be given to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students should score at least 70% on this problem.	04/12/2013 - For one class, 18/29 (62%) students got at least 70% on this problem. For a second class, 8/20 (40%) students got at least 70% on this problem. For a third class, 28/41 (68%) students got at least 70% on this problem. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Extra Help for Math 48 students -- recognition that these students are still remedial students even though their mathematical level is not at the level of algebra students. **GE/IL-SLO Reflection:** This problem required a lot of critical thinking and some computation. The students were asked to determine an equation for a function that best models the height of a rider on a Ferris Wheel as a function of time.	04/12/2013 - An instructor thought that there should just be one book for the course rather than a book and a supplement. The faculty are working on finding a precalculus book now. This problem was particularly challenging as it was not a simple multiple choice problem where students could pick a model that would work; instead, students needed to determine the model. Faculty should work on giving students less routine problems and provide students more challenging questions to develop students' critical thinking.
Department - Mathematics (MATH) - MATH 48C - PRECALCULUS III - Vectors and Parametric equations - A successful student will be able to define, graph, and demonstrate appropriate applications of vectors and parametric equations. (Created By Department - Mathematics (MATH))	**Assessment Method:** The students were asked to solve a problem containing multiple parts on the final exam. The format of the question was free-response and there were different point values assigned to each part of the question.		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Course-Level SLO Status: Active	**Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students would receive a score of at least 70% on the problem. **Related Documents:** M48C_SLOs.doc		
	Assessment Method: Students were given a multiple choice question on the final exam addressing this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of students answered the assessment question correctly.		
	Assessment Method: A multiple choice question was used to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70 % correct.	04/11/2013 - 44 out of 54 students answered this correctly (81%) **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Funding for development of flipped classroom activity/lab manual. **GE/IL-SLO Reflection:** This problem required students to parametrize a projectile problem. It requires students to think analytically and does not assume only knowledge of the basic skills.	
	Assessment Method: The students will be given a multiple part question to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students should score 70% or above.	04/12/2013 - 12/29 (41%) of students got 70% or above in one class. 11/20 (55%) of students got 70% or above in a second class. The previous 2 instructors gave a problem on parametric equations. Another instructor gave a problem on vectors and 31/41 (76%) of students got 70% or above in a third class. **Result:** Target Not Met **Year This Assessment Occurred:**	04/12/2013 - An instructor thought that there should just be one book for the course rather than a book and a supplement. The faculty are working on finding a precalculus book now. Parametric equations are taught towards the end of the course and students may not have had much time to digest the material. One instructor ran out of

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		2012-2013 **Resource Request:** Extra Help for Math 48 students -- recognition that these students are still remedial students even though their mathematical level is not at the level of algebra students. **GE/IL-SLO Reflection:** These problems required both computation and critical thinking skills.	time and did not feel that the students could handle the SLO question that the other instructors gave. Faculty should work on giving students less routine problems and provide students more challenging questions to develop students' critical thinking.
Department - Mathematics (MATH) - MATH 48C - PRECALCULUS III - Trigonometry - A successful student will be able to apply trigonometric functions, identities, and Laws of Sine and Cosine to solve applications problems. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** The students were given a multiple choice problem addressing this SLO on the final exam. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70% of the students will answer this question correctly. **Related Documents:** M48C_SLOs.doc	04/12/2013 - For one class 6/29 (21%) students got this problem correct. For a second class, 10/20 (50%) students got this problem correct. For a third class, 6/41 (15%) students got this problem correct. **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Extra Help for Math 48 students -- recognition that these students are still remedial students even though their mathematical level is not at the level of algebra students. **GE/IL-SLO Reflection:** This question required some computation and a lot of critical thinking. The students were given an acute angle and 1 side of a triangle. The problem was asking them to provide the length of a side of the triangle that could produce 2 different triangles, 1 triangle or no triangles.	04/12/2013 - An instructor thought that there should just be one book for the course rather than a book and a supplement. The faculty are working on finding a precalculus book now. This problem was particularly challenging as it was more abstract than typical Law of Sine problems and required quite a bit of thinking. Faculty should work on giving students less routine problems and provide students more challenging questions to develop students' critical thinking.
	Assessment Method: The students were given a multiple choice question on the final exam addressing this SLO. **Assessment Method Type:**		

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
	Exam - Course Test/Quiz **Target for Success:** At least 70% of students answered this correctly.		
	Assessment Method: A multiple choice questions was used to assess this SLO. **Assessment Method Type:** Exam - Course Test/Quiz **Target for Success:** At least 70 % correct.	04/11/2013 - 30 out of 57 students answered this incorrectly (53%) **Result:** Target Not Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This problem required students to interpret and solve a vector diagram using the law of cosines. It requires students to think analytically and does not assume only knowledge of the basic skills.	
Department - Mathematics (MATH) - MATH 54H - HONORS INSTITUTE SEMINAR IN MATHEMATICS - Using Appropriate sources of information - Analyze research questions posed by the instructor using appropriate sources of information. (Created By Department - Mathematics (MATH))	**Assessment Method:** The instructor will grade the students' research presentation based on a rubric to be included with the assessment findings. **Assessment Method Type:** Research Paper	11/22/2013 - This course was not offered for the 2012-2013 school year. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013	
Department - Mathematics (MATH) - MATH 54H - HONORS INSTITUTE SEMINAR IN MATHEMATICS - Presenting answers - Present answers to the defined research questions orally or in writing using appropriate mathematical language (Created By Department - Mathematics (MATH))	**Assessment Method:** The instructor will grade the students' research presentation based on a rubric to be included with the assessment findings. **Assessment Method Type:** Presentation/Performance		
Department - Mathematics (MATH) - MATH 57 - INTEGRATED STATISTICS II - Inferences - Successful students will be able to draw appropriate inferences from data in the presence of uncertainty. (Created By Department - Mathematics (MATH))	**Assessment Method:** All students were required to complete a culminating project (usually as part of a group) that required all of the following: formulation of research question, collection and analysis of data, and creation of a paper which documents all aspects of the study,	10/18/2013 - 14/16 (87.5%) students did a quarter long project of their choosing and received a C or better. They designed observational studies, gathered data, organized data, constructed confidence intervals, ran a hypothesis test and presented the results to the class.	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Assessment Cycles: End of Academic Year **Start Date:** 09/23/2013 **End Date:** 06/27/2014 **Course-Level SLO Status:** Active	including presentation of both the descriptive and inferential statistics as well as appropriate interpretations. **Assessment Method Type:** Class/Lab Project **Target for Success:** At least 80% of students will earn a grade of C or better on their project. (Although we would really like for 100% of the students to get a grade of C or better on this assignment, a goal of 80% is probably more realistic. **Related Documents:** Math 17 SLO reflections S2012.docx	**Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** Two of the big gains of the individual projects is the design of their study and the education they bestow onto their classmates with their findings. This project relates to all four of the Institutional Level SLO's	
Department - Mathematics (MATH) - MATH 57 - INTEGRATED STATISTICS II - Using Models to Make Predictions - Successful students will be able to make predictions using linear and exponential models. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	**Assessment Method:** Multiple Choice Questions #14,20,31,32 from Carnegie "End of Course Assessment" were used to assess this SLO. **Assessment Method Type:** Exam - Standardized **Target for Success:** 70% of students will get at least 3 of these 4 problems correct.		
	Assessment Method: questions 6, 14, 20, and 31 on the carnegie summative common assessment exam. **Target for Success:** 70% correct on these questions	10/18/2013 - over 76% success rate on these questions. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** These assessment items satisfy the first three IL-SLO's. They require good analytical skills, comprehension of contexts and graphical analysis.	
Department - Mathematics (MATH) - MATH 57 - INTEGRATED STATISTICS II - Hypothesis Testing - Successful students will	**Assessment Method:** All students were required to complete a culminating project (usually as part of a	10/18/2013 - 14/16 of the students earned a C or better on their project. This year they were required to do an individual project instead of a	

Course-Level SLOs	Means of Assessment & Targets for Success / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
be able to carry out and critically assess all steps in a hypothesis test, from the design of the study and the collection of data to the production of a report which summarizes the data and the statistical findings. (Created By Department - Mathematics (MATH)) **Course-Level SLO Status:** Active	group) that required all of the following: formulation of research question, collection and analysis of data, and creation of a paper which documents all aspects of the study, including presentation of both the descriptive and inferential statistics as well as appropriate interpretations. **Assessment Method Type:** Class/Lab Project **Target for Success:** At least 80% of students will earn a grade of C or better on their project.	group project. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **GE/IL-SLO Reflection:** This project was very difficult for most students to design and required a lot of one on one guidance from the instructor. Each task though was easy for them to do as long as they knew how to do it. It was ultimately time intensive for the instructor but the pay off for the students was great. They got first hand design experience AND were able to present their finding to the class. They were able to express what they were truly interested in and educate their fellow students on areas that new and noteworthy.	

Unit Assessment Report - Four Column

Foothill College

Program (PSME - MATH) - Mathematics AS

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
Program (PSME - MATH) - Mathematics AS - 1 - Students completing their math program at Foothill College will be able to clearly communicate mathematical ideas through graphs, tables of data, equations, and verbal descriptions. **SLO Status:** Active	**Assessment Method:** Instructor-generated research assignment will be given in one of the Math 2A classes during the winter quarter of 2012. The assignment will be graded using a qualitative rubric. **Assessment Method Type:** Research Paper **Target:** 70% of the students will earn a "C" grade or better on the assignment. **Related Documents:** AS math P-SLO assessment prompt		
	Assessment Method: Comprehensive final exam given to students at the end of the course in the fall 2012 quarter **Assessment Method Type:** Exam - Standardized **Target:** 70% of the students will earn a "C" grade or better on the exam.	12/17/2012 - Of the 36 students taking the final exam in the fall 2012 quarter, 28 achieved a score of 70% or higher on the final exam (78% success rate) **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Continue support of license that allows use of Mathematica in upper level courses. **GE/IL-SLO Reflection:** To be able to successfully complete 70% or more of problems at the level of calculus IV, students must be able to perform complex computations and think creatively, critically, and analytically as they solve the wide range of problem topics covered by the exam.	01/03/2013 - The Math 1D final exam was comprised of 40 problems that required students to interpret graphs of objects such as vector fields (flux), curves (parameterizations and line integrals), tables of data (functions of two variables), and solve a variety of problems involving both equations and verbal descriptions of ideas learned during the quarter (e.g., T/F questions testing understanding of theorems). Given the relatively high success rate of 78%, students seem to be achieving a level of competence in communicating ideas learned in the course.

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
			12/17/2012 - In its totality, a final exam comprised of 40 problems of mid-level complexity, which tests a majority of the key concepts learned in math 1d (vector calculus), is an excellent measure of this PL-SLO. Moreover, to be able to complete problems in vector calculus, students must be able to draw upon knowledge learned in multiple previous math courses in the program. For example, a line integral or flux integral computation requires the ability to integrate a function (integral calculus) and this ability in turn requires the ability to simplify algebraically, use appropriate identities, and even perform basic arithmetic. It is therefore heartening to see almost 80% of the class able to draw upon an extensive body of knowledge to pass this exam. I believe that part of this success is due to the use of Mathematica software in the classroom. This software allows students to explore concepts both visually and computationally at a level not achievable by pencil-and-paper methods alone. To improve upon these results, additional class activities exploring higher-level concepts learned in the class might be created. For example, additional labs supported by Mathematica would allow students to explore more sophisticated problems taken from

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
			engineering and physics, which should help establish even stronger connections between concepts learned in the coursed, which in turn should increase overall success rates for the course and hence the math program by extension.
Program (PSME - MATH) - Mathematics AS - 2 - Students completing their math program at Foothill College will be able to construct appropriate mathematical models of natural phenomena, develop those models with appropriate mathematical techniques, and interpret results of those models **SLO Status:** Active	**Assessment Method:** Common assessments given at the end of all terminal classes. These questions will be given to all sections of the course. **Assessment Method Type:** Departmental Questions **Target:** 70% Success.		
	Assessment Method: A subset of four problems tested on the final exam, which together require students construct a model of natural phenomena and then use the model to answer questions and interpret results will be used to assess this PL-SLO. **Assessment Method Type:** Exam - Standardized **Target:** An average score of 70% or higher on the 4-problem assessment	12/17/2012 - The average score for students on the 4-problem assessment was 86%. **Result:** Target Met **Year This Assessment Occurred:** 2012-2013 **Resource Request:** Continue support of license that allows use of Mathematica in upper level courses. **GE/IL-SLO Reflection:** The ability to construct a mathematical model of natural phenomena at the level of vector calculus and successfully answer a cohort of questions about this model requires students to be able to think creatively and analytically and also involves complex computations. The success rate of 86% on this assessment shows that students are meeting the GE/IL-SLOs of the college. **Related Documents:**	12/17/2012 - The success rate of students on this assessment was quite high and shows that students are able to meet the requirements of this PL-SLO. Looking at the individual results for each problem, 96%, 73%, 91%, and 83%, respectively, the second problem on the assessment had a noticeably lower result. Since this problem required to compute an arc length on the surface of a sphere, additional class activities involving computation of arc length in 3-space that are supported by visualization via Mathematica might be developed to increase the success on this prompt.

PL-SLOs	Means of Assessment & Target / Tasks	Assessment Findings/Reflections	Action Plan & Follow-Up
		M1D Four problem assessment prompts	