Department of Mathematics Education

Faculty Development Plan

I'm grateful for the opportunity to work at an institution such as Brigham Young University. The students are fantastic, my colleagues are helpful and supportive, and it is wonderful to know that BYU itself is interested in my success as a faculty member. I have felt very welcome here, which has greatly improved my productivity so far. The following are self-assessments of my teaching, scholarship, and citizenship, as well as goals I have in these three areas.

I. Teaching

Self-assessment

I have a strong background in teaching, including two years of teaching during my Masters' program here at BYU and four years of full-time teaching at a public community college near Sacramento, CA. By this point, I have been able to work through some of the blunders that I committed as a novice teacher. For example, when I began teaching lower-level undergraduate courses, I assumed that the students would naturally have the infectious desire to learn mathematics that I did as a student. Upon encountering the resistance I received when I first taught these courses, I had the opportunity to deeply reflect on how I could change my approach to better motivate my students. I surveyed the majors of the students who took my classes and began an examination of the applications of the mathematics to those specific disciplines. In particular, my calculus courses were largely populated by engineering, biology, and economics majors. Therefore, I searched through several physics, engineering, biology, and economics textbooks to find and include applications of calculus to these fields. I also searched

online for other applications to these fields to include in class, in homework, and on exams. After doing this, I noticed a significant improvement in student "buy-in" in my courses.

Another strength for me is that, as a mathematics education researcher, I am able to research how students come to learn and understand the fundamental mathematics concepts that we discuss in my classes. Thus the research I am involved in naturally lends itself to application to the classroom, where I can incorporate it in my own teaching methods and presentation of the material. For example, I have recently conducted research on how students make sense of the calculus concept of the definite integral and how they draw on that knowledge in science and engineering contexts. I am excited for the opportunity to incorporate this research into designing my integration lessons.

One weakness I still have is finding the best way to assess and grade weekly homework assignments. I view the homework as an opportunity for students to "play around" with the ideas and to think about them. Yet, I also want the students to take the challenging problems seriously and to attempt them with real effort. Consequently, I have placed emphasis on these more challenging problems when I have the homework graded, in order to motivate students to make a serious effort. However, I have received several comments on student evaluations that they felt the homework was too harshly graded. They expressed that they felt they had worked very hard on the homework and received scores below what they would expect. Thus, this is still an area that I need to improve in, in order to best serve the students and to help them feel they are succeeding in the course.

Goals

My self-assessment leads me to two natural goals I have in my teaching. First, I am excited to incorporate research I have done in student learning and understanding of definite

integrals into my own teaching. I will be teaching a first-semester calculus class in Fall 2014, where I can focus on developing and implementing introductory integration lessons. In fact, this will go hand in hand with my research, where I can evaluate the effectiveness of the lessons I develop and hopefully write up results that will be useful to the mathematics education community.

Second, I am going to rethink how I assess and grade the homework in order to hopefully straddle the conflicting goals of focusing on the more challenging homework problems, but fairly scoring students on the work and effort they have put into the homework. For both the first- and second-semester calculus courses that I will be teaching in Fall 2014, I am going to rethink how I distribute the homework points. I will assess the possibility of "completion" points that will reward students for their effort, while still retaining some points for the more challenging problems.

Third, as I will explain in my "Course Development Project proposal," I am interesting in incorporating more "formative" assessment in my classes that I can use to gage how well my students are understanding particular concepts and procedures. In brief, a formative assessment is one that gathers feedback that can be used by the instructor and the students in shaping future instruction and study. Since I will be teaching a large-lecture second-semester calculus course in Fall 2014, I plan on using regular iclicker quizzes to briefly get a sense of where students are, whether they understand a particular topic, and whether they recognize their own need for further help.

II. Scholarship

Self-assessment

I have identified two overall strengths in regards to my scholarship activities. First, I have been blessed to find myself in a research specialty that is of general interest to the field of mathematics education currently. Many national initiatives right now call for improved STEM (science, technology, engineering, and mathematics) education in both K-12 and university levels. My research focus is in the teaching and learning of calculus, which has a central role in STEM education. Not only is a "gateway" course of sorts for mathematics majors, but it also a highly applicable branch of mathematics in physics, engineering, economics, and so forth.

Second, I have also been blessed to end up with a research specialty that has not been particularly thoroughly-researched in the past, as many areas of mathematics education has been. Within calculus education, much prior research has focused on student understanding of limits and derivatives. Only in recent years has the calculus concept of the definite integral gained significant attention in mathematics education. Since my research focus is on student understanding of integration, I have entered the research field at an opportune time. My research has already been met with approval from the field at large from my publications and research conference presentations.

However, I have a significant weakness when it comes to my research activities. After completing my dissertation in 2010, I decided to teach full-time at a community college. As a result, all of my energies (and expectations at my institution) were centered on teaching. Consequently, I have done very little research activity in the past four years. It was not until I received a position at BYU that I have been able to re-devote a portion of my energies to research. My initial publications have been based off of my dissertation study, and I have spent the past year trying to "catch up" in terms of conceptualizing, designing, and implementing new research studies.

Goals

The expectations document for our department discusses "core," "surround," and "externally funded" research. The core consists of 1-2 publications per year in tier-1 and tier-2 mathematics education journals. The surround consists of publications in mathematics education practitioner journals (for current, practicing teachers) and presentations at research conferences. Externally funded research deals with seeking grants or funding sources outside of BYU. In order to make progress in each of these areas, I have developed the following goals for my research program.

First, I have developed a timeline of scholarship activities for the next 18 months that should lead to several publications in tier-1 and tier-2 mathematics education journals. The timelines for data collection, manuscript writing, and submission to journals is encapsulated in the following table.

Subject of paper	Timelines for work and submission
Investigation of the relative "productivity" of three conceptualizations of the definite integral.	Data collection: (from dissertation study) Manuscript writing: Winter 2014 Submission to journal: Summer 2014
Identify the prevalence of various conceptualizations of the integral in a general calculus student population.	Data collection: Fall 2013 Manuscript writing: Winter 2014 Submission to journal: Summer 2014
Students' notions of infinity and their relationship to students' understanding of limits.	Data collection: Fall 2013 Manuscript writing: Winter 2014 Submission to journal: Summer 2014
Evaluation of different types of introductory lessons on integration from three different instructors.	Data collection: Fall 2013/Winter 2014 Manuscript writing: Spring 2014 Submission to journal: Fall 2014
Student understanding of derivatives using applied formulas beyond simple velocity-position.	Data collection: Fall 2013 Manuscript writing: Summer 2014 Submission to journal: Fall 2014
Students' prototype images of concavity and inflection points.	Data collection: Fall 2013 Manuscript writing: Summer, Fall 2014 Submission to journal: Winter 2015
Student interpretations of indefinite versus definite integrals.	Data collection: Fall 2014 Manuscript writing: Winter 2015 Submission to journal: Summer 2015

Extending understanding of single-variable integration to multivariate integration.	Data collection: Winter, Summer 2014 Manuscript writing: Winter/Summer 2015 Submission to journal: Fall 2015
Student interpretations of independent versus dependent variables	Data collection: (from another study) Manuscript writing: Fall 2014/Winter 2015 Submission to journal: Fall 2015

Second, to meet the expectation of "surround" scholarship activities, I have also developed a schedule for submitting conference presentation proposals to mathematics education conferences. The following table includes the conference, the timeline for proposal submission, and when the actual conference would occur.

Conference	Topic	Timeline
PME	The prevalence of various integral conceptions in the general calculus students population.	Submission: Winter 2014 Conference: Summer 2014
RUME	The effects of redesigned integration lessons on student understanding.	Submission: Summer 2014 Conference: Winter 2015
RUME	Students' notions of infinity and their relationship to limits.	Submission: Summer 2014 Conference: Winter 2015
PME	Student interpretations of independent versus dependent variables	Submission: Winter 2015 Conference: Fall 2015
RUME	Students' understanding of derivatives in applied formulas.	Submission: Summer 2015 Conference: Winter 2016
TRUCE	How students think about limits, derivatives, and integrals in applied contexts.	Submission: Fall 2015 Conference: Summer 2016

Third, in order to work toward external funding, I have created the following goal. Dr. Michael Dorff, in the mathematics department at BYU, is currently involved in a National Science Foundation (NSF) project seeking to involve undergraduate mathematics students in faculty research in mathematics. Interested in this project, I inquired whether the project involved an education-research component to it, looking at several aspects of the learning and understanding of mathematics for these undergraduate students as they are mentored into the practice of mathematics research. Dr. Dorff said that currently there was no such component and expressed interest in including it. Thus, during the 2014-2015 academic year I will work on

conceptualizing “add-ons” to present to NSF in order to secure additional funding to carry out the educational research. Specifically, I am interested in learning how students’ beliefs and epistemology related to mathematics changes as they go through the experience. I am also interested in studying how students come to understand the practice of mathematics research. I will propose these add-ons to NSF during the upcoming year, in the hopes to securing funding to begin the research during the 2015-2016 academic year.

III. Citizenship

Self-assessment

In my first year at BYU I have strived to be a valuable member of the mathematics education department and to help serve the department, the college, and the university in any capacity that is within my ability. I have actively participated in department meetings and have accepted committee assignments to both the department’s Graduate Committee and the inter-department Calculus Committee (shared between mathematics and mathematics education). In the Graduate Committee, I have helped assess our graduate students, review requests from graduate students, and review applicants to our graduate program. In the Calculus Committee, I have assisted in developing a common schedule, common homework, course modules for instructors, course midterms, and course final exams. I have performed these responsibilities for both first- and second-semester calculus.

In reviewing my citizenship activities, I have received recommendations from my mentor and my department chair to be careful not to become so involved in department, college, and professional activities that I hamper my abilities to work on my teaching and scholarship. While I certainly plan on continuing to contribute to the needs of the department and the university, I

am aware that I need to plan my activities accordingly, in order to develop a well-balanced schedule for myself that includes time for all of the various requirements entailed by my faculty position at BYU.

Goals

During the past academic year, I, together with another new mathematics education faculty member, helped create a department "reading group," where we read each other's work and give critical feedback. This year, we thought it would be a good idea to extend this idea to the graduate students in our department, so they could also get feedback on their work. Thus, I will help convert part of the "reading group" into a "research discussion group" that the graduate students are also invited to participate in. This will serve our graduate students by giving them earlier feedback on critical elements of their theses, such as the development of research questions, theoretical framework, and methodology.

Next, our department has been discussing whether to add a new course to our major that would include a statistics education component to our mathematics education major, since many high schools are now offering AP statistics. I have a strong background in the teaching of statistics, since I taught it every semester for four years at the community college I worked at before coming to BYU. As a result, I plan on helping the department design and implement the course for our majors.

Third, in order to continue to develop cross-department collaboration, I will continue in my position in the Calculus Committee for both first- and second-semester calculus. In this way, I can continue to represent our department's views on mathematics and the nature of mathematics education to the mathematics department. By doing so, I can also bring my research

experience on how students draw on mathematical ideas in science and engineering in order to support our students who take these courses.

Lastly, I have been contacted by the "math lab," which is a tutor center for students taking undergraduate mathematics courses, about revising their hiring process. They are concerned that their hiring process is too cumbersome and may not address some important characteristics of the best being a good tutor. Therefore, I plan on working with them to revise their application examination (covering important mathematics that the applicants will be tutoring) and their interview.

Department of Mathematics Education

Scholarship Strategies Proposal

The purpose of this project is to create specific strategies for carrying out the goals outline in Faculty Development Plan (see attached). Our department's expectations include "core" research, "surround" research, and external funding. In my development plan, I outlined several papers that I plan to submit to tier-1 and tier-2 mathematics education research journal (which counts toward "core" research), several presentations I plan on submitting to mathematics education conferences (which counts toward "surround" research), and a plan for adding a mathematics education component to a current National Science Foundation (NSF) grant. In this proposal, I describe strategies I will implement for achieving these goals.

Core research

My first strategy for publishing papers on core mathematics education journals relates to data I have already collected for research purposes. Upon arriving at BYU, I embarked on a round of intense data collection during Fall 2013. From this set of data, I have results to create five separate papers on student understanding of various calculus topics. My goal involves spending Spring and Summer 2014 writing at least four of these papers for submission to research journals. As of the time of writing this proposal, I currently have one manuscript out for review, two more that should be under review within the month, and one more that I intend on completing by the summer's end. The fifth paper will be written during Fall 2014.

My second strategy for publishing core research deals with data collection I will conduct throughout this upcoming academic year. I have received IRB approval to collect data on students from my calculus courses in Fall 2014 and Winter 2015. The data I plan on collecting

deals with two separate components. First, quiz results pertaining to the calculus topics of integration, techniques of integration, series, and Taylor polynomials will be collected during the upcoming academic year. Second, interview data from individual students regarding these same topics will be collected by the graduate student TAs. By collecting this large corpus of data, I will be in a position to compile and analyze the results as well as to write and submit manuscripts for publication in research journals.

I will evaluate the effectiveness of these two strategies using two metrics. First, I will judge myself based on how many of the five manuscripts based on last year's data collection are submitted and/or accepted for publication by the end of 2014. Since the review process can take up to six months, I hope to have at least three papers accepted or under revision for acceptance. Second, by year's end I will determine whether the data I am collecting during Fall 2014 has been collected satisfactorily. That is, I will judge myself on whether I have successfully obtained the data needed to study student understanding of the calculus topics listed above. In my review, I will state the ways in which I will be able to make use of the data corpus.

Surround research

My strategy for successfully producing "surround" research largely rests in the conferences I plan on attending during the next two academic years. Two conferences in particular, the Conference on Research in Undergraduate Mathematics Education (RUME) and the Conference for the Psychology of Mathematics Education (PME), are attended by others conducting research related to my area of specialty. Thus, it is important to not only attend, but to present at these conferences. My strategy is to regularly check (on at least a monthly basis) the websites for these conferences to catch important deadlines for submitting proposal for presentations.

I will evaluate the effectiveness of this strategy by documenting how many of the planned conference presentations in my Faculty Development Plan (see attached) I am able to secure a spot for presenting my research. I am expected to present once at this year's PME conference, twice at next year's RUME conference, once at the following year's PME conference, and again once more at next year's RUME conference.

External funding

In my Faculty Development Plan, I have described an NSF-funded grant by Dr. Michael Dorff in BYU's mathematics department. I have discussed with Dr. Dorff the possibility of adding on an educational research component to this grant. Dr. Dorff has welcomed the opportunity to expand this current NSF project. Thus, my strategy is to spend Summer 2014 learning the details of the current project and then to spend Fall 2014 writing a proposal for the "add-on" to the existing project. If this is successful, I will be able to conduct research within this grant starting in 2015.

I will evaluate this strategy by whether I have completed a write-up for the proposed "add-on" by the end of 2014. Furthermore, I will judge the effectiveness of this strategy by whether the NSF will accept the proposed addition.

Department of Mathematics Education

Citizenship Proposal

The expectations of the university stipulate that faculty members should be engaged in "citizenship" work that meets the needs of the department, the college, or the university. I am interested in, and willing to comply with, this work that will further the objectives of the department and the university. In this proposal, I describe how I intend on completing the goals listed in my Faculty Development Plan (see attached).

In consultation with my department chair and my mentor, I have been cautioned against devoting too large of a portion of my weekly time to citizenship activities. Therefore, my main strategy is to budget my time so that I can efficiently accomplish all the citizenship-type work I hope to do, without interfering with my teaching and scholarship. Thus, I propose that I will budget my time in the following ways for Spring/Summer and Fall/Winter.

During Spring and Summer 2014, where I do not have any teaching responsibilities (as per my negotiated contract), I am able to focus a considerable amount of time to my research endeavors. This leaves me with a greater opportunity to devote some time this summer to accomplishing the citizenship goals I have outlined for myself. I plan on allowing myself an average of eight hours per week to take care of committee work, department requests, and university requests (such as attending the FDS seminars in May). Once the citizenship work has already taken up this much work in a given week, I will follow the advice of my mentor and department chair and will postpone further activities in these areas until the following week, so that I can make sure to fulfill my scholarship responsibilities.

During the Fall and Winter semester, where my teaching responsibilities will resume to normal levels, I must devote a significant portion of my time to my teaching and related duties. Therefore, I must work harder to accomplish a balance between research, teaching, and citizenship. My strategy is to allow for an average of five hours per week to citizenship work. I will follow a similar structure to what I described for Spring/Summer, but will simply reduce the number of hours (on average) I devote to these activities per week. If I notice that for a couple of weeks I am exceeding this average, then I will cut back for the next few weeks to give the necessary time to my teaching and research. In this way, I hope to achieve the balance recommended by my mentor and department chair.

I will evaluate the effectiveness of this strategy by (1) determining whether I was able to stick to this schedule, (2) determining whether this time structure helped me maintain a balance between teaching, research, and citizenship, and (3) determining whether the allotted time was sufficient, or not, for successfully carrying out my departmental or university responsibilities. In doing so, I will report on whether I was able to accomplish the citizenship goals I outlined for myself in my Faculty Development Plan with this planned time structure.

Department of Mathematics Education

Course Development Project

The purpose of this project is to implement "formative assessments" into a large-lecture second-semester calculus course (Math 113). In brief, a formative assessment is one that gathers feedback that can be used by the instructor and the students in shaping future instruction and study. I have chosen to focus on formative assessments, because the current design of mathematics curricula creates a flow in which topics sequentially build on each other. If a student struggles with one topic, it will also hurt them in subsequent units. Therefore, it becomes critical for both the instructor and the students to regularly "check in" on the students' comprehension and understanding of the material.

In the following section I provide some basic information on the course, including the learning goals, the format of the class, and the typical student population. Following this description, I will explain the types of formative assessment I plan on using in the course, how I will analyze it, and what I hope to achieve with it.

Math 113 – Second-semester Calculus

Math 113 is the second in the "calculus series," which typically includes a three-course progression. In Math 113, the students' understanding of integration is expanded and several applications of integrations are discussed. Furthermore, many intricate procedures and techniques for working out integrals are presented. After the units on integration, the students advance to a study of sequences and series. Many aspects of series are studied, including convergence and divergence, and special kinds of series. Lastly, the ideas of series are applied to

the concepts of power series and Taylor series, which can be used to approximate needed values to any degree of accuracy.

Since so many students need to take this course, it is often offered as a large-lecture class. The course cap is usually around 150-250, and is broken down into five or six sections of about 30-40 students each. The entire class meets together three times a week on Monday, Wednesday, and Friday, for an hour, and then each individual section meets twice a week on Tuesday and Thursday, also for an hour. Each section for my course will be led by a mathematics education graduate student.

The population in these calculus courses is largely made up of students planning on majoring in engineering, biology, computer science, physics, or another science discipline. Education research has shown that only a small percentage of these students (in fact, only around 2%) plan on majoring in pure mathematics. This means that these classes, in my opinion, should be treated specially and cannot only be taught through a narrow "pure-mathematics" perspective. The students have varied background and expect to get significantly different things out of this class. In fact, many students are merely trying to "survive" and pass, so they can check off the requirement for their major.

Formative assessments

The fact that the class I will be teaching is so large, it inhibits my ability to keep track of my students individually and to know how each one is doing. Thus, it becomes imperative to devise other methods for tracking student comprehension, understanding, and skill. I have never taught a large-lecture course before, and consequently I wish to focus this course development project on ways I can formatively assess the students. By doing so, I can personally get a better

sense of where my students are, and, perhaps more important, the students themselves will be able to gage where they are. This is a critical skill for students in such large classes.

I have decided to attempt to include formative assessments in the form of daily quizzes at the beginning of each large lecture session. I plan on requiring the students to have and bring iclickers in order to complete these quizzes. I have two main reasons for doing the formative assessments through iclicker quizzes. First, in a large lecture course, there is a significant temptation to miss class when other pressing demands pile up on students. By doing the iclicker quizzes in class, I receive the additional benefit of encouraging students to come to class regularly. Second, the iclicker technology allows for quick quizzes to be done in a matter of a couple minutes. This prevents the quizzes from taking up considerable time during the lectures, which is already strained for the purposes of accomplishing all that is required for Math 113.

The quizzes will be graded mostly on participation, so that these quizzes do not become a heavy burden in and of themselves for the students. This would defeat their purpose of being a formative assessment. Even if a student got every single quiz wrong in the semester, but was present to attempt each one, the quizzes would have essentially no impact on the student's grade. However, to incorporate incentives for answering correctly (to get more accurate data), a student's final grade may receive a small boost if they have a high quiz score at the end of the semester (see the attached syllabus for more details on this point).

Analyzing and using the formative assessments

The daily quizzes are not meant to be mere busy-work or to encourage attendance. I plan on using them to assess where my students are in their understanding and ability. I also plan on letting the quizzes help the students themselves be aware of where their weaknesses might be. To accomplish this, I plan on designing and analyzing the quizzes in the following way.

First, each quiz will deal with a recent topic, and will ask a simple question about that topic to see if the students are able to answer correctly. The questions will be multiple choice in format and will contain "distractors" that may hint at certain misconceptions or misunderstandings. The proportions of students that select both the correct answer and various distractors will inform me about the general student understanding. Furthermore, after each quiz, the correct answer will be displayed, so that the students can see whether they answered correctly or not.

If a significant portion of the students chose one particular distractor, then that will indicate to me that there is an important misunderstanding that has occurred in the class. This will enable me to either address it during lecture, or to instruct my graduate TAs to address it during the individual section meetings. In this way, it is hoped that this formative assessment will improve student understanding, and consequently student success, both in my class and in the students' future courses.

Final write-up

After I have completed the course using this formative assessment, I will write a summary and critique of this project. I will discuss the following elements of the results in the final write-up: (1) Amount of time taken to develop the daily quiz questions, (2) Usefulness of distractors in determining misconceptions or misunderstandings, (3) How often the quiz data was used to analyze student understanding, (4) How often that feedback was incorporated into lecture or individual section meetings, and (5) Student comments on the usefulness of the quizzes as formative assessment.

Math 113, Fall 2014 Calculus II

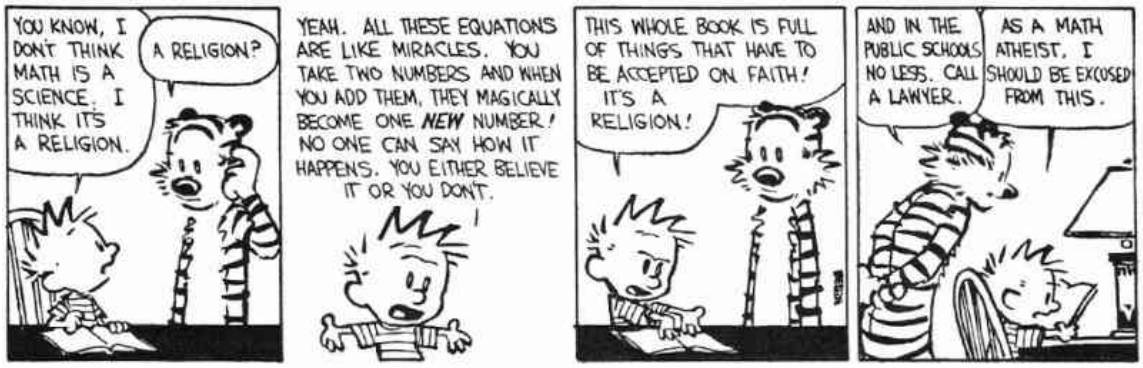
Instructor:

Office:
Office Hours:
TA1
TA2
TA3

Course Website: learningsuite.byu.edu. Log in using MyBYU info and look for Math 113.
Textbook: Stewart, "Calculus: *Early Transcendentals*" 7th edition.
Prerequisites: Your understanding of algebra, trigonometry, and calc I needs to be *very good*.

Learning Goals: You will work very hard in this course. However, I can promise you that by the end you will look back and be proud of your accomplishments and all you learned.

- The *main goal* for this course is to help you see that mathematics is a meaningful, useful discipline that can solve interesting problems in the real world.
- To achieve this goal, we will work on the following learning outcomes:
  - Successfully work through applied problems during homework and exams
  - Complete a project that explores the uses of calculus more in depth
  - Articulate, in words, an understanding of the mathematics principles we discuss
- In addition to this main goal, there are several *procedural* goals in this course. You will be expected to master the procedures listed on the website http://www.math.byu.edu/wiki/index.php/Math_113:_Calculus_2

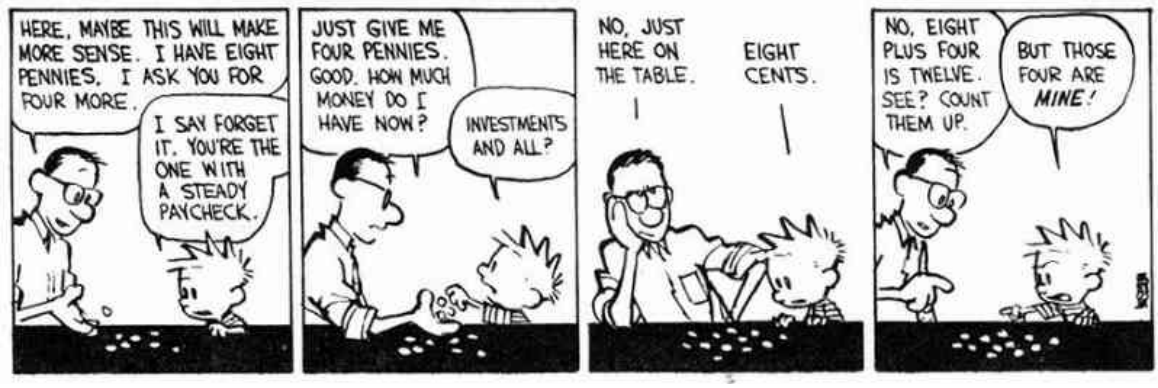


This Syllabus: All the basic, important information is on this syllabus. If you ask me a question that this syllabus has an answer to, I will simply say "look at your syllabus." If *too* many people are asking questions that the syllabus answers, the class will take a quiz on the syllabus.

Lecture vs. Lab: There is a *lot* of material that we are required to cover in second-semester calculus. We have to cover 34 textbook sections dealing with complex mathematical topics and we only have 35 fifty-minute lectures to cover them! Don't think that I can even *possibly* show you in lecture an example of every single type of problem you'll have in your homework. Thus,

your lab sections become an important place to continue your learning. Your TAs have been given additional examples to show you and can answer the specific questions that come up while you work on homework. *Your lab sections are an essential part of this course*!

Math Lab: You can get free help and tutoring at the math lab on the **1st floor of TMCB (room 159)**. The tutors there are very helpful. Take advantage of that!!



The All-important Grade: Your final grade will be calculated using the following breakdown:

15% Homework
60% 4 Midterm Exams (each exam is worth 15%)
25% Department Final Exam
+/– Grade modification from daily quizzes (see "Daily Quizzes" section)

The general grade breakdown for A, B, C, etc. can be found in Learning Suite in the grades section. However, a moderate "curve" *may* possibly be applied based on your overall performance on the final exam. So let's work together as a team to rock that final exam!!

There is *NO extra credit* in this class. It's good to know this now, right?

Homework works this way: Homework is due every **Tuesday** and **Thursday** at the **beginning** your individual lab sections (see the homework schedule for due dates). From each assignment I will select approximately 5 homework problems, which are the problems your TAs will actually grade. You will receive about ½ of your homework points (usually a little more) from these graded problems and about the other ½ (usually a little less) from overall "completion" of the assigned problems. Credit will *NOT* be given for problems copied from the solutions manual.

Midterm Exams: You will take 4 midterm exams this semester. Each exam runs for 2 ½ days. The test must be in your hand no later than 12:00pm (noon) on the last day of the exam. This gives you time to take the test, take a break, and still be in lecture that day at 3:00pm.

Common Final Exam: At the end of the semester, all sections of 113 will take a common department final exam, which is completely out of my hands (those of us teaching it are not allowed to participate in writing the final exam, so no class has an advantage). The final exam does NOT happen in accordance to BYU's normal final schedule. The date, time, and location will be announced toward the end of the semester.

Daily Quizzes: At the beginning of every lecture day (M-W-F), I will have a quiz up that is due by the time we start class. You need an iClicker to do these quizzes. Do NOT bring an iClicker for an absent classmate and punch in a response for them. *That is dishonest!*

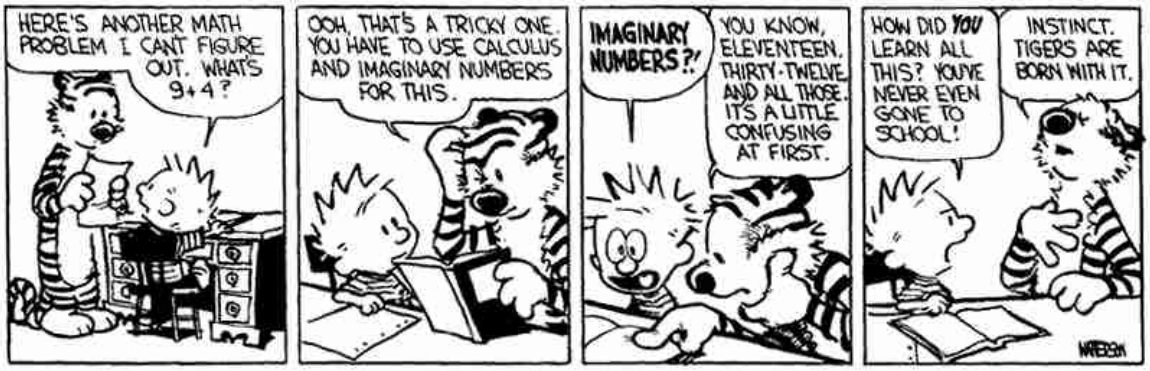
Your average daily quiz percentage will either add to or subtract from your final score at the end of the semester. This is exactly how I do it: Plug your overall daily quiz percentage (see Learning Suite grades) into the following formula, and then add or subtract that to your overall score:

Grade modification = 0.06*(quiz %) – 4

For example, suppose at the end of the semester you have a 88.5% overall score (from homework, midterms, and final exam combined) and you ended up with a daily quiz percent of 95%. Then your final score would receive a 0.06(95) – 4 = +1.7 boost. This makes your final score 88.5 + 1.7 = 90.2%, allowing you to receive an A– instead of a B+. On the other hand, if you have a quiz percent of 30%, then your final grade would receive a 0.06(30) – 4 = –2.2 drop. This makes your overall score 88.5 – 2.2 = 86.3%, which would be a B instead of a B+.

No Late/Make-Up Work or Exams: I do NOT accept late homework nor make up quizzes. I will drop your lowest 2 homework scores, and your lowest 3 daily quiz scores, which is *already* meant to account for illness, vacation, emergencies, problems with your iClicker, etc. Also, there are NO make-up exams. If an emergency comes up, you need to contact me immediately, BEFORE the exam occurs (email me or call my office phone) and we can work something out. If you wait until after the exam, you likely will not be able to make it up.

Is this the right class for you? In this class, we will focus on *understanding* the concepts and *applying* these to real-world contexts, *not* just on computing answers. While this might sound nice, you will soon find this can be difficult. So, if you want a class where you can just calculate an answer and not think about what it means, this is NOT the right class for you! You may want to try to switch to a different section or drop the class.



Leaving Early: Do not leave class a few minutes before it's over as this is distracting to me and to everybody else.

Behavior Issues: I do not respect any complaining, whining, or disruptive behavior. If you are disrespectful to me or other students, you will be asked to leave the classroom.

Changes to Syllabus: As the semester progresses, it may be necessary to make a change to this syllabus. If this happens, I will make the announcement in class and send you an email.

What to do with math? Here's a list of a few professions (obviously not all) that use math:

Requires a lot of math (at least calculus or beyond):
Computer Programmer, Systems Analyst, Mechanical Engineer, Civil Engineer, Chemical Engineer, Aerospace Engineer, Bioengineer, Electrical Engineer, Cryptologist, Economist, Banking and Insurance Policy (Actuary), Physicist, Environmental Research, Robotics, Chemistry, Geologist, Petroleum Engineer, Ecologist, Geomatics, Biologist, Meteorologist, Astronomer, etc, etc, etc.

Requires some math (college-level algebra, statistics, trigonometry, or pre-calculus):
Airplane Pilot, Military Officer, Store Manager, Air Traffic Control, Optometrist, Pharmacist, Psychologist, Agriculture, Sociologist, City Planner, Banker, Insurance Manager, Inventory Manager, Government Contractor, Acquisitions, Computer Technician, Graphic Designer, Business Consultant, Accountant, Architect, etc, etc, etc.

Requires a little math (at least some algebra, geometry, and/or statistics):
Lawyer, Nurse, Mechanic, Dentist, Electrician, Real Estate, Physician, Loan Officer, Veterinarian, Broadcast Technician, Carpenter, Construction Manager, Jeweler, Politician, Teacher, Sales Clerk, Office Clerk, etc, etc, etc.

BYU Honor Code
In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university. Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and my own expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

Preventing Sexual Discrimination and Harassment
Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education. Title IX covers discrimination in programs, admissions, activities, and student-to-student sexual harassment. BYU's policy against sexual harassment extends not only to employees of the university, but to students as well. If you encounter unlawful sexual harassment or gender-based discrimination, please talk to your professor; contact the Equal Employment Office at 422-5895 or 367-5689 (24-hours); or contact the Honor Code Office at 422-2847.

Students with Disabilities
Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the Services for Students with Disabilities Office (422-2767). Reasonable academic accommodations are reviewed for all students who have qualified, documented disabilities. Services are coordinated with the student and instructor by the SSD Office. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures by contacting the Equal Employment Office at 422-5895, D-285 ASB.

Fall 2014 Schedule:

	Mon - Lecture	Tue - Lab	Wed - Lecture	Thur - Lab	Fri - Lecture
Sep	Sep 1: *Holiday No class*	2: Intro to the course	3: Review from Chapter 5	4: Review from Chapter 5	5: 6.1
	8: 6.2	*9: cont 6.2	10: 6.3	11: cont 6.3	12: 6.4
	15: more 6.4, 6.5	16: cont 6.4 and 6.5	17: 7.1	18: cont 7.1	19: 7.2
	22: ***Review/take Exam 1***	23: ***Review/take Exam 1***	24: 7.3 ***Exam by 12pm***	25: cont 7.3	26: 7.4, 7.5
	29: 7.8	30: cont 7.4, 7.8	Oct 1: 7.7	2: cont 7.7	Oct 3: 8.1
Oct	6: 8.2	7: cont 8.2	8: 8.3	9: cont 8.3	10: more 8.3 and some 8.4
	13: 8.5	14: cont 8.5	15: ***Review/take Exam 2***	16: ***Review/take Exam 2***	17: 11.1 ***Exam by 12pm***
	20: 11.2	21: cont 11.1 and 11.2	22: 11.3	23: cont 11.3	24: 11.4
	27: 11.6 (ratio, root)	28: cont 11.4 and 11.6	29: 11.5	30: cont 11.5	31: 11.6 (alternating)
Nov	Nov 3: 11.7	4: cont 11.6 and 11.7	5: 11.11	6: cont 11.11	7: more 11.11
	10: ***Review/ take Exam 3*	11: ***Review/take Exam 3***	12: 11.10 ***Exam by 12pm***	13: cont 11.10	14: more 11.10
	17: 11.9	18: cont 11.9	19: 11.8	20: cont 11.8	21: 10.1
	24: 10.2	25: (***Lecture day!***) 10.3	*THANKSGIVING BREAK! Have a fun and safe holiday break! Come back ready to finish up!!*		
Dec	Dec 1: 10.4	2: review chapter 10	3: ***Review/take Exam 4***	4: ***Review/take Exam 4***	5: *Review* ***Exam by 12pm***
	8: *Review for final exam*	9: *Review for final exam*	10: *Review for final exam*	11: *Review for final exam*	*Exam prep day*
	Final Exam: time and location TBA—NOT at the regular final exam schedule (look for announcements toward the end of the semester)				
	*Add/Drop deadline: September 9		**Withdraw deadline: November 10		

MATH 113 homework and exam dates

HMK 1**: Due Tue Sep 9
***This homework reviews background topics. We won't cover every single problem-type for this in class. If you struggle with this homework you may not be prepared for this course.*
5.1 # 14, 15, 16
5.3 # 2, 3, 21—32, 67, 68
5.4 # 33—37, 57, 58
5.5 # 13—37(odds), 55—60

HMK 2: Due Thur Sep 11
6.1 # 1, 4, 8—13, 18, 20, 26, 46, 47ab
6.2 # 1—15(odds), 40, 41, 43*, 49, 54, 56, 57, 58
* use Right-hand (instead of Midpoint) with n = 10 sections

HMK 3: Due Tue Sep 16
6.3 # 2, 5—17(odds), 29, 30, 37—40

HMK 4: Due Thur Sep 18
6.4 # 2, 5, 7, 8, 13, 15, 19, 21, 22, 23, 29ab, 30ab
6.5 # 1, 3, 9, 10, 17, 21

HMK 5: Due Tue Sep 23
7.1 # 1—19(odds),18, 31, 51, 55, 64
7.2 # 1—5, 8—11, 21, 22, 29, 56, 61

Exam 1 Mon Sep 22 through 12:00pm Wed Sep 24
Nothing due Thur Sep 25

HMK 6: Due Tue Sep 30
7.3 # 1—11, 20, 31a

HMK 7: Due Thur Oct 2
7.4 # 7—10, 12—14, 18, 19, 22—24
7.5* # 1—17(odds), 14, 18
* See strategy tips on pgs. 495-496 and examples on pgs. 497-498

HMK 8: Due Tue Oct 7
7.8 # 2, 3, 5—35(odds), 32, 36, 39
7.7 # 1abcd, 2ab, 3, 19bc, 29, 37, 40, 47(use a sketch)

HMK 9: Due Thur Oct 9
8.1 # 1, 2, 7, 12, 14, 19, 40a
8.2 # 1a—4a (don't calculate), 5, 7, 9, 12, 13, 14, 15

HMK 10: Due Tue Oct 14
8.3 # 3, 4, 6, 8, 11, 14, 15, 21, 22, 25—31, 34, 35

HMK 11: Due Thur Oct 16
8.4 Gini index worksheet (found in Learning Suite)
8.5 # 1, 2, 5a, 7a, 10a(see ex.4),11ab(see ex.4),12*,15a*
* Just set up the integrals with numbers in all the appropriate places

Exam 2 Wed Oct 15 through 12:00pm Fri Oct 17
Nothing due Tue Oct 21

HMK 12: Due Thur Oct 23
11.1 # 2, 13—28, 65
11.2 # 5—8, 21—24, 29, 31, 37, 43, 44, 47

HMK 13: Due Tue Oct 28
11.3 # 2—8, 27, 29, 34, 36a, 36d, 37d, 38, 40, 41

HMK 14: Due Thur Oct 30
11.4 # 1, 2, 3—33(odds)
11.6* # 1, 3, 7, 8, 13, 18, 21, 23, 24, 25, 26
*For now, ignore "absolute" vs. "conditional." Just test convergence.

HMK 15: Due Tue Nov 4
11.5 # 2, 3—13(odds), 16—18, 23—29(odds), 32, 33
11.6 # 2, 4, 5, 6, 9, 10, 12, 14, 15, 19, 20, 22

HMK 16: Due Thur Nov 6
11.7 # 1—22

HMK 17: Due Tue Nov 11
11.11 # 3—8(yes, graph them!), 13ab—18ab, 23—26

Exam 3 Mon Nov 10 through 12:00pm Wed Nov 12
Nothing due Thur Nov 13

HMK 18: Due Tue Nov 18
11.10* # 6, 7, 8, 11, 12, 15—19, 29—34, 36, 43, 44
*For #6 through #19, create the series from scratch (don't use pg. 762)

HMK 19: Due Thur Nov 20
11.10 # 47—50
11.9 # 3—6, 13abc, 14ab, 16, 25—32

HMK 20: Due Tue Nov 25 (this is a **lecture day**, so turn homework into TA *before* lecture at 3:00pm)
11.8 # 2—10
10.1 # 6—14, 17, 24—27(do your best on 24-27!)

HMK 21: Due Tue Dec 2
10.2 # 3—6, 9, 10, 18, 19, 31, 32, 34, 41, 43

HMK 22: Due Thur Dec 4
10.3 # 7—10, 29, 30, 35, 37, 55—62
10.4 # 5—12, 17—21, 24—27

Exam 4 Wed Dec 3 through 12:00pm Fri Dec 5

HMK 23: Due Tue Dec 9
Two past final exams (posted in Learning Suite)