TEACHING PORTFOLIO

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Contents

1 Teaching Philosophy

Students build math knowledge and skills over time, so the intuition that students develop early on in their education helps direct them to becoming more successful mathematicians later in their learning career. Hence I believe that it is my responsibility as a teacher of introductory math courses to guide students towards developing this intuition. Many students believe that intuition for mathematics is binary: you either have it or you don't. Though it seems true that the most successful students have already built a strong intuition for the topics presented in a class, it is possible for a student to develop and hone this ability with good instruction. Students can learn how to look at a problem and see potential approaches – and possibly determine the entire solution – without writing anything down. Using this carefully cultivated intuition, they generate an initial insight, and then proceed to build a complete solution using the knowledge and techniques they have learned in class.

I have found that leading active learning-style problem-solving sessions is the most effective way for me to help students efficiently develop their intuition and ultimately build their confidence and competency in calculus. I think of myself as a math *coach*: I have goals (learning outcomes) I want my team (the class) to accomplish, and I help them reach those goals through guided practice and then assess their progress. Having students work on problems in class provides a focus on problem solving that is not achieved by traditional homework problem sets, and allows students to get immediate feedback from the instructor and their peers. Group-based problem solving also has the added benefit of helping students develop socially as they begin their college experience.

In this document I expand upon this teaching philosophy. I provide a brief overview of how my experiences as a teacher in graduate school have lead me to this perspective on teaching, and I include examples and explanations of the materials I have used to facilitate the problem-solving-based approach to teaching mentioned above. Finally, I reflect on how effective my techniques have been and on how I can improve upon them based on feedback and my own observations.

2 Growth as a Teacher

2.1 Teaching Assistant for Engineering Calculus

Soon after I started leading calculus recitation classes during my first year of graduate school, I found that I was most effective as a teacher when I knew how well my students could apply what they had learned. If I had a sense for what aspects of the course material they did and did not understand, then I could tailor the class to my students' specific learning needs instead of guessing what would be best to review.

Thus I devoted as much class time as possible towards putting my students in a challenging problem-solving environment where I could watch them work and discuss

the material with them in smaller groups. I used the information I gathered from these class observations to inform what I would review during the next meeting.

Appendix A contains a typical worksheet that I distributed in recitation for a Multivariable Calculus for Engineers class. I handed out worksheets like this at the start of each class, and would then go over the "One-Page Review" at a pace dictated by my perception of my students' comfort with the material. Following the review, I would have the students work in groups on a selection of practice problems that I had chosen to reinforce the concepts from the section.

The feedback I received from my students at the end of each semester was overwhelmingly positive: many students explicitly mentioned how much they appreciated the review sessions I led, and how much the challenging problem sets helped them prepare for exams.

Courses Taught as a Teaching Assistant

Multivariable Calculus for Engineers Recitation, Spring 2015
Calculus II for Engineers Recitation, Fall 2014
Multivariable Calculus for Engineers Recitation, Spring 2013
Calculus II for Engineers Recitation, Fall 2012

2.2 Instructor for Engineering Calculus

After years of honing this in-class problem-solving approach in my discussion sessions as a teaching assistant, I had the opportunity to use it in my own course. During the summer semester of 2017, I was the primary instructor for an engineering calculus class at Cornell. I have included the syllabus for this class in Appendix B.

Throughout the course (which met every weekday for six weeks), I applied my ideas for a problem-solving-oriented class and directly observed the results. Two days per week were designated as "problem session" days, during which I would break the students into groups and have them work on practice problems for most of the class. Appendix C contains an example problem session worksheet. While the students were working, I would move around the room, answer questions, and watch and listen to students attempt the problems. Just as when I was a teaching assistant, this helped me develop a strong sense for how adept each student was with the material, and what topics I should focus on reviewing.

Because the problem sessions came at the expense of time that would otherwise be spent lecturing, I compensated by producing video lectures for the students to watch at home. Below is a link to the YouTube page containing the videos I produced for the course.

https://tinyurl.com/math-with-drew

Besides freeing up class time, the benefit of the video lectures was that the students could watch the lectures at their own pace, with the ability to pause and rewind the

video as needed. They were then able to apply the knowledge and techniques presented in the video lectures to the material in the problem sessions. By focusing more class time on actually practicing calculus rather than just observing it, I provided my students with a structured environment to build the problem-solving intuition that I believe is paramount to their success.

Courses Taught as an Instructor

Calculus II for Engineers, Summer 2017
Calculus II for Engineers, Summer 2015
Calculus I, Fall 2013

2.3 Additional Teaching Responsibilities

Head Teaching Assistant for Engineering Calculus

As a Head TA, I managed the administrative aspect of the same engineering calculus courses for which I had been a recitation TA. This primarily entailed communicating information between the lead instructor and the other TAs, managing the course website, and organizing exams.

Multivariable Calculus for Engineers, Spring 2016
Calculus II for Engineers, Fall 2015

Grader for Undergraduate Math Major Courses

Besides grading homework assignments and exams, my responsibilities as a grader involved holding office hours and writing solutions to homework problems.

Manifolds and Differential Forms, Fall 2016
History of Mathematics, Spring 2014

3 Improvement

3.1 Seeking Feedback from Students

Just as I wish to develop my students' intuition for mathematical problem solving, I would like to develop my own intuition for individualized teaching. That is, I wish to enhance my ability to identify what a student needs to improve based on what I see in their group performance and written work.

To that end, I regularly seek feedback from my students. I ask questions like "is the way the class is being run working for you? What type of in-class activities would you like to see more of? Less of?" I occasionally ask these questions to students in person (e.g., one-on-one in office hours), but I find that I get more honest feedback through anonymous surveys, which I collect at least once a semester in addition to the formal

end-of-semester course evaluations. In Appendix D I have included the feedback form that I used for my summer course.

Using the feedback I receive by talking to my students, from reading their surveys, and from observing their performance in class, I am able to make adjustments throughout a course to better meet students' learning needs. By the end of the course I taught this past summer, many of the students who struggled the most at the beginning of the class were showing the most drastic improvements during the problem solving sessions; their final exam scores also reflected this.

3.2 Striving for Continuous Improvement

After collecting evidence on problem-solving sessions during the summer course, I feel confident that this is an effective way for me to organize a first-year math course. Supervised problem solving provides a focused environment in which students can apply and expand upon the skills and intuition they have acquired in class, and it allows me as the instructor to monitor students' progress and adapt my lesson plans based on what I observe.

At the conclusion of the course, I spent some time reflecting on the successes and shortcomings of the problem sessions and the associated video lessons. I have identified two significant ways in which my techniques can be improved.

Problem Set Structure

I created some of the problems for problem sessions on my own, but most of them were selected from the textbook or from handouts that I have used in previous classes. As a result, the problem sets often ended up as an unorganized collection of problems that fit the theme of the sections that the problem session was covering. A majority of the problems are stated in the shortest way possible, with the expectation that students will check their notes, talk to their classmates, or ask the instructor if they need assistance. This is not the most optimal form for a problem set like this: I could increase the effectiveness of the problem sessions by rewriting the problems so that they lead the students through an idea or procedure.

For example, in Problem 2 on the problem session handout in Appendix C, students must compute the work done in pumping water out of a tank in the shape of a trapezoidal prism. Although the problem statement doesn't reflect this, the primary challenge comes when dealing with the geometry of the tank; students who are already comfortable with work computations may still struggle to set up this problem correctly. A better formulation of this problem would lead the students through the computation in several steps, with each step building on the previous. This would serve as a review of the computational method involved in the problem, would ease the difficulty of handling the geometry, and would help the student build confidence in their understanding of the method. After solving the guided problem, the problem set could present a similar problem with less guidance to help solidify the student's understanding.

Restructuring the problem sets to have more guided questions like this would turn the problem sessions into more of a learning experience for the students, rather than merely an opportunity for them to recall and apply the lecture material. I could also use this format to introduce related topics to the students via the problem sets, using a combination of explanations of new ideas and prompts to apply the ideas to familiar concepts.

Video Lesson Quality and Format

My first attempt at video lectures received positive feedback from students, but there is still ample room for improvement. Most notably, none of the videos I produced were scripted: my choice of words and pace while recording the vidoes was almost entirely improvised. As a result, I occassionally appear unsure of what to say, which distracts from the mathematics I am presenting. Scripting my lectures, while time consuming, would lead to a more polished video that is easier to watch and understand. I plan on doing this time I have the opportunity to use video lessons in a class.

Additionally, I would like to explore the use of interactive platforms for video lecture presentation. My current setup (hosting videos on YouTube) does not provide any tools to the students watching the video, such as the ability to find specific topics within a video. There are more specialized video hosting platforms (such as *Panopto*) that I am interested in trying out.

Appendices

In the following sections I provide some supporting evidence for this portfolio.

Additional material (e.g. complete evaluations or more problem session handouts) is available upon request.

Appendix A Example Recitation Handout

ONE-PAGE REVIEW
11.3 (Positive Series), 11.4 (Cond. Conv.)

MATH 1910 Recitation
Fall 2012

- A series $\sum a_n$ is called **positive** if $a_n > 0$ for all n.
- The **Integral Test**: If $f(x)$ is a positive, decreasing, continuous function for $x > M$, then

  [(1)] if and only if [(2)].

- **p-Series**: $\sum_{n=1}^{\infty} \frac{1}{n^p}$ converges [(3)] and diverges if [(4)].
- The **Direct Comparison Test**: If there is an $M > 0$ for which $0 \le a_n \le b_n$ for all $n \ge M$, then
  - if $\sum b_n$ [(5)], then $\sum a_n$ [(6)], and
  - if $\sum a_n$ [(7)], then $\sum b_n$ [(8)].
- The **Limit Comparison Test**: If $\{a_n\}$ and $\{b_n\}$ are positive and the limit

  $$L = \lim_{n\to\infty} \frac{a_n}{b_n}$$

  exists and $L > 0$, then [(9)],
- The series $\sum a_n$ **converges absolutely** if [(10)] and **converges conditionally** if [(11)].
- The **Alternating Series Test**: if $\{a_n\}$ is positive, decreasing, and $\lim a_n = 0$, then [(12)].
  Also, $|S - S_N| < a_{N+1}$, where S is the sum of the series.

PROBLEM SET

MATH 1910 Recitation
11.3 (Positive Series), 11.4 (Cond. Conv.) Fall 2012

1. Determine if the following series converge or diverge.
   (a) $\sum_{n=2}^{\infty} \frac{1}{\ln n}$
   (b) $\sum_{n=25}^{\infty} \frac{n^2}{(n^3+9)^{5/2}}$
   (c) $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$
   (d) $\sum_{n=1}^{\infty} \frac{1}{2^{\ln n}}$
   (e) $\sum_{n=1}^{\infty} \sin \frac{1}{n}$
   (f) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}+2^n}$
   (g) $\sum_{n=1}^{\infty} \ln\left(1+\frac{1}{n}\right)$
2. Determine if the following series converge absolutely, conditionally, or not at all.
   (a) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{n}{n^2+1}$.
   (b) $\sum_{n=1}^{\infty} \frac{\cos \pi n}{n}$
   (c) $\sum_{n=1}^{\infty} \frac{(-1)^n n^4}{n^3+1}$.
   (d) $\sum_{n=1}^{\infty} \frac{\sin n}{n^2}$.
3. Show that $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{(\ln n)^a}{n}$ converges for all exponents a.
   (*Hint*: show that $f(x) = (\ln x)^a / x$ is eventually decreasing.)

Appendix B Example Syllabus

MATH 1910
CALCULUS II FOR ENGINEERS
Summer 2017

Instructor: Drew Zemke (drew.zemke@gmail.com)
Lecture: Every Weekday 10:00-11:15am in 203 Malott Hall
Office Hours: Fri. 12:00-2:00pm in 256 Malott Hall

TA: TA's Name (email)
Office Hours: Mon. 3:00-4:00pm in 256 Malott Hall

About This Course

Description

This is a second course in calculus which focuses on integral calculus and infinite series. Together with *Multvariable Calculus for Engineers* (MATH 1920), this class aims to provide you with the fundamental skills required to engage with the mathematics that arise in physics and enginneering.

Throughout the course, you will develop the ability to solve conceptual and application-based calculus problems via regular practice, both in an out of class. In particular, by the end of the course, you will be able to:

- evaluate integrals using a variety of techniques (substitution, integration by parts, partial fraction decomposition, etc),
- use integrals to compute geometric quantities (such as area, volume, and arclength),
- use integrals to solve application-based problems arising physics and engineering (such as computing work and volumetric flow rate),
- determine the convergence or divergence of infinite sequences and series, and
- compute and analyze power series and Taylor series.

Course Website

Announcements, assignments, and general information will be available on the course Blackboard page at http://blackboard.cornell.edu. If you are enrolled in the course, you should already be setup with Blackboard. Please **check Blackboard regularly** for new content and updates about the course.

Prerequisites

You are expected to have taken the equivalent of three years of high school mathematics, including geometry and trigonometry, and at least one course in differential calculus. If you have any concerns about how your background might affect your performance in the course, please contact me during the first week of class.

Textbook

J. Rogawski and C. Adams, *Calculus*, Third Edition. (W.H. Freeman & Company, NY, 2015. ISBN: 978-1-4641-7501-5)

The textbook is required for homework assignments. If you plan to take Multivariable Calculus for Engineers (MATH 1920) in the future, you may consider buying the full textbook, which contains both single variable and multivariable calculus.

Assessment

Your performance in this class will be evaluated via in-class assignments, written homework assignments, and three written exams.

Prelims :	25% each
Final Exam :	30%
Homework :	10%
Class Participation :	10%

The two prelim (midterm) exams will take place during class on the dates listed below, and there will be a cumulative final exam at the end of the course.

Prelim I :	Wednesday, July 12, 10:00-11:15am
Prelim II :	Wednesday, July 26, 10:00-11:15am
Final Exam :	Tuesday, August 08, 8:30-11:00am

There will be **no make-up exams!**

Class Structure

Video Lessons and Problem Sessions

- This class will differ from the day-to-day pattern of most college match courses, where you see a lecture in class and then do homework problems outside of class. Instead, twice each week we will have a "flipped" class, where you watch a recorded lecture at home the night before and solve homework-style problems in class.
- The "video lessons" will be 20 to 30 minutes long, but you will be given opportunites to pause and solve some problems on your own before seeing the solutions. Each video lesson and the accompanying exercises should take no more than an hour to complete. (To compensate for the extra work outside of class, there's only one short written homework assignment per week.)
- It is *extremely* important that you watch the video lessons when they are assigned. Not watching one is the same as skipping class!
- During the "problem sessions" you will work on problem sets relating to the previous day's video lesson. We may work in groups, as individuals, or as an entire class depending on the nature and difficulty of the material. Problems that we work on during problem sessions will not be collected for a grade, but you are expected to attend and participate. Failure to do so will be reflected in the "Participation" part of your course grade.

Homework

- Homework assignments will be due on Tuesdays at the start of class. The problems for each assignment will be posted on Blackboard at least a week before they are due.
- You may work alone or in groups, but the solutions you submit must be your own.
- Two or three of the problems from each homework assignment will be graded carefully for **correctness** (as if it were an exam problem), and the rest will be graded for **completeness** (full credit will awarded if you made a reasonable attempt at the problem).
- No late homework will be accepted.

Additional Information

Extra Help

See Blackboard for a list of tutoring resources available this summer.

Students With Disabilities

Your access to this course is important. Please give me your Student Disability Services (SDS) accommodation letter early in the semester so that we have adequate time to arrange your approved academic accommodations. If you need an immediate accommodation for equal access, please speak with me after class or send an email message to me and/or SDS at sds_cu@cornell.edu. If the need arises for additional accommodations during the semester, please contact SDS.

(SDS is located on level 5 of Cornell Health, 110 Ho Plaza. Call at 607-254-4545 or visit sds.cornell.edu.)

Academic Integrity

Each student is expected to abide by the Cornell University Code of Academic Integrity. In this course, as stated above, you may work in groups on the homework, but the solutions you hand in should be your own write-up. If there is clear evidence that a student has committed fraud (e.g. cheating on an exam or quiz), your instructor will be obliged to deal with the matter in accordance with the Code. For more information, visit:

http://cuinfo.cornell.edu/Academic/AIC.html

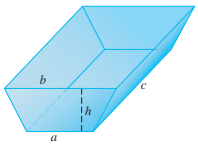
Appendix C Example Problem Session Handout

PROBLEM SET

MATH 1910
July 07, 2017

1. Use the shell method to find the volume of a sphere of radius R as a volume of revolution.

2. Suppose a water tank is trapezoidal prism with bottom lengths a and c and top lengths b and c (all in meters) as in the figure below. If the tank is completely filled with water, compute the work done in pumping the water out of the tank.



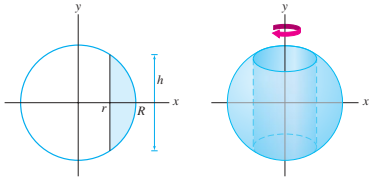
3. Use any method to find the volumes of the following solids of revolution.

   (a) The solid obtained by revolving the region between $y = -x^2 + 2x + 3$ and the x-axis about the line $y = -1$.

   (b) The solid obtained by revolving the region between $y = -x^2 + 2x + 3$ and the x-axis about the line $x = 4$.

4. Calculate the work required to lift a 3-meter chain over the side of a building if the chain has variable density $\lambda(x) = x^2 - 3x + 10$ kg/m for $0 \leq x \leq 3$. Assume that the chain is hanging off the edge of the building, with the bottom of the chain at $x = 0$ and the top at $x = 3$.

5. Use the shell method to find the volume of the bead obtained by removing a cylinder of radius r from the center of a sphere of radius R.



6. The Great Pyramid of Giza in Egypt (shown below) is 146 meters high and has a square base of side length 230 meters. Find the work (against gravity) required to build the pyramid if the density of the stone used is 2000 kg/m^3.

7. Let $a > 0$. Show that the volume obtained when the region between $y = a\sqrt{x - ax^2}$ and the x-axis is rotated about the x-axis is independent of the constant a.

Appendix D Example Mid-Semester Feedback Form

CLASS FEEDBACK SURVEY

MATH 1910
Summer 2017

1. What do you think of the pace of the *in-class lectures*?

   too slow a bit slow just right a bit fast too fast

2. If you could change one thing about the *in-class lectures*, what would it be?

3. How many of the *video lessons* have you watched? (Please be honest!)

   none a few of them most of them all of them

4. To what extent do you feel that the *video lessons* are helpful?

   not helpful moderately helpful very helpful

5. If you could change one thing about the *video lessons*, what would it be?

6. What do you think of the difficulty of the *problem sessions*?

   too easy kind of easy just right kind of hard too hard

7. If you could change one thing about the *problem sessions*, what would it be?

8. Currently we spend about a half of our class time doing regular lectures and about a half doing problem sessions (accompanied by video lessons). What do you think of this balance? (Please check one.)

   _____ I would prefer more video lessons and problem sessions
   _____ the current balance is good
   _____ I would prefer more in-class lectures

9. Please list any further comments / suggestions / questions that you have.

Appendix E Teaching Evaluations

This section contains student-written course evaluations from the two summer courses for which I was an instructor and four of the fall/spring courses for which I was a teaching assistant (TA).

All of the "quantitative" questions allow responses on a 1-to-5 scale, where 1 is the most negative response and 5 is the most positive. Since my summer classes were relatively small, I have provided all of the written responses to the open-ended questions for those classes. On the other hand, each of my recitations had about sixty students total; for the sake of brevity, I have only included a few written responses for each of those classes.

Calculus II for Engineers, Summer 2017

Enrolled: 14

Quantitative Questions

Question	Num	Avg	Min	Max
How well did the instructor organize the presentation of the material?	10	4.8	4	5
How willing was the instructor to give help to students requesting it?	10	4.9	4	5
How well did the class meet its stated objectives	10	3.9	3	5
How did the amount of work compare with other classes carrying equal credit hours	10	3.5	2	5
How did the teaching skills of the instructor in this class compare with other Cornell instructors you have had	10	4.4	3	5
The value of this class as a part of my general education, compared with other classes, has been:	10	4.6	3	5
My overall opinion of this class is:	10	4.5	3	5

Qualitative Questions

The aspects of this class I valued most were:

Very good course the content is nearly the same with AP caculus BC, but problems are more interesting and challenging

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A further study of calculus than AP calculus.

The problem sessions were of great help to our understanding of the course. Also, I love the small-class environment which can give all of us enough time to ask questions that we are not sure about.

Problem session solving some tough problem Video lesson

This was extremely well done. The Instructor, Drew Zemke, did an incredible job, and you could tell he devoted an insurmountable amount of effort, time, and dedication to teaching this class. He made 13 video lessons, each 20-40minutes long, and these looked like they were very time consuming with editing. Furthermore, they gave more insight than the textbook. He did a far better job than my other class, which had an experienced professor. He was approachable, and Although the class required rigorous studying, inside the class room was very relaxed and interesting.

Drew made lots of efforts for this class. The youtube videos he made and review questions he made helped me a lot. I like the way he explained logically in class to make me understand some of the questions.

The collaboration between students on various occasions

The problem sets we did in class as they allowed us to use what we in the lectures while our instructor walked around and helped those that needed help.

Improvements to this class (if any) should include:

I think it's good

I wish the solution of test problems can be given to us after tests.

Well..as I have said, maybe more interactions? But I know it is math..

Inform the students that the textbook is optional before they come to Cornell

---

Some topics could be more in depth

The problems we do in class or for problem sets should be as hard as the problems that will show up on the tests.

Slower pace and a little bit less challenging materials

Calculus II for Engineers, Summer 2015

Enrolled: 19

Quantitative Questions

Question	Num	Avg	Min	Max
How well did the instructor organize the presentation of the material	9	4.56	4	5
How willing was the instructor to give help to students requesting it	9	4.67	3	5
How well did the class meet its stated objectives	9	4.11	3	5
How did the amount of work compare with other classes carrying equal credit hours	9	4.11	3	5
How did the teaching skills of the instructor in this class compare with other Cornell instructors you have had	9	4.33	4	5
The value of this class as a part of my general education, compared with other classes, has been...	9	3.89	3	5
My overall opinion of this class is	9	3.78	3	5

Qualitative Questions (selected responses)

The aspects of this class I valued most were:

How well and in depth the material was taught, and how it was presented in the most logical order, not necessarily what the textbook had. Also the material was consistently taught extremely well and even the hardest concepts were made easy to understand.

Learning all of the BC topics.

Very helpful but difficult

We went over the material well, despite the fast pace.

The knowledge gained.

Improvements to this class (if any) should include:

Better time management for each section

It is an extremely tough class and I'm not sure any other high school students could be prepared for it even after having taken its equivalent AP classes like I did, maybe give them a heads up this one will probably kick their ass.

More quizzes to help our grade and a later start time.

The progress can be slower. Air conditioners should be turned on.

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6 weeks seemed like too short of a time for this class.

N/A

Multivariable Calculus for Engineers Recitation, Spring 2015

Enrolled: 65 (two sections)

Quantitative Questions

Question	Num	Avg	Min	Max
Was the recitation organized and clear	30	4.83	4	5
Was the teaching assistant willing and available to help you overcome difficulties	30	4.67	3	5
How would you rate your teaching assistant's command of the course material	30	4.90	3	5
What was the overall quality of your interaction with the teaching assistant	30	4.50	3	5

Qualitative Questions (selected responses)

Please comment on any aspect of this recitation.

My TA went above and beyond. A great teacher and mentor. I believe being in his section enhanced my understanding of the material immensely.

Drew puts a lot of effort into making a recitation that aims to help the students.

These recitations were helpful in providing a succinct summary of the material for that week while also giving an opportunity to practice and ask questions. The quizzes were helpful reinforcements of the homework and they were most valuable when the TA would review them afterwards. The workshops were tedious and annoying because they made Wednesday recitations very hectic and less organized. They provided insight into how the course material was actually used in engineering but I think they were overvalued aspects of the course and should be used less frequently.

Would you recommend this TA to someone considering taking a course assisted by him or her?

He never wasted any time during the recitation and always encouraged the students to work and ask him questions.

Absolutely, I had Drew first semester as well and intentionally signed up for his class again

Calculus II for Engineers Recitation, Fall 2014

Enrolled: 54 (two sections)

Quantitative Questions

Question	Num	Avg	Min	Max
Was the recitation organized and clear	37	4.89	3	5
Was the teaching assistant willing and available to help you overcome difficulties	37	4.81	3	5
How would you rate your teaching assistant's command of the course material	37	4.89	3	5
What was the overall quality of your interaction with the teaching assistant	37	4.86	3	5

Qualitative Questions (selected responses)

Please comment on any aspect of this recitation.

Andrew Zemke is an exceptional TA. Incredibly organized, very knowledgeable, patient, very good at explaining concepts.

At our first recitation he explained how the discussions would be outlined, he made everything crystal clear. He presented his office hours, and brought to class review sheets that both reviewed the material and brought new problems to class (besides the ones in the course book).

Little did we know he is the only TA to actually do this, put his review material on a website, and upload solutions weekly. I must say I appreciated them immensely. Drew soon realized some of his office hours dont work well with the class, so he adjusted his schedule for us, and I was able to attend, as a consequence (I otherwise wouldnt have been able to go).

He is very approachable, often staying after class to explain concepts. At some point during the semester, I got sick and had to skip lectures. I relied only on him and the book for explanations, and he proved to be a very good instructor, not only reviewer. He answers e-mails fast and provides you with all the information you need.

Moreover, he is an extraordinary fair grader, I have never felt that I deserved a higher or lower grade than the one I received. He is prompt with his grading as well.

Drew is very well known among the 1910 students as the best TA. His office hours are packed with thirty plus people, and he still manages to get information across to

everyone, and make sure everyone understands the material, and gets full answer to their questions.

I will try to adjust my next semester schedule to fit in Drews Recitation, once I find out which one he teaches. This TA is a very responsible, knowledgeable, patient, oriented and genuinely interested in developing a better teaching method and in reviewing/instructing his students. He proved to be a moral support before prelims (the Math prelim was the first prelim for a lot of people) and a great TA. If there is anyone deserving an award, this is definitely him.

Would you recommend this TA to someone considering taking a course assisted by him or her?

Yes I would definitely recommend him to others taking the course. He is very helpful and knows his stuff very well. He also provides a lot of problems that are useful for studying.

Under no circumstances. If I do his classes will fill up and I will not be able to get in anymore. I am planning to adjust my whole next semester schedule just to have him as my TA. It's worth it.

Multivariable Calculus for Engineers Recitation, Spring 2013

Enrolled: 63 (two sections)

Quantitative Questions

Question	Num	Avg	Min	Max
Was the recitation organized and clear	43	4.88	3	5
Was the teaching assistant willing and available to help you overcome difficulties	43	4.84	4	5
How would you rate your teaching assistant's command of the course material	43	4.88	4	5
What was the overall quality of your interaction with the teaching assistant	43	4.79	3	5

Qualitative Questions (selected responses)

Please comment on any aspect of this recitation.

Helpful and amazing, the one page review made the material really clear and understandable.

Problems worked out step-by-step in class and One-Page-Reviews were both incredibly useful, as was the website Drew put up for his recitation... Workshops were basically not useful at all, but they were fun :) Only complaint: Drew Zemke is a bloody traitor for leaving and not continuing to teach Engineers. His abandonment of me is appalling and will likely never be forgiven.

The recitations were excellent and helpful. Workshops only detracted from the experience because we missed valuable instruction time with the TA

Would you recommend this TA to someone considering taking a course assisted by him or her?

The only reason I'd ever say "NO" is in the hopes I could somehow keep a pocket-sized version of Drew in my pocket for the rest of my Undergraduate Career. His future students better know how lucky they are. Actually I hope they treat him like crap so he comes back to the College of Engineering. Seriously.

Yes. This is my second semester having him as my TA (not by chance)

Yes, he has a nice structure to his sections, and has a knack for explaining things.

Calculus II for Engineers Recitation, Fall 2012

Enrolled: 54 (two sections)

Quantitative Questions

Question	Num	Avg	Min	Max
Was the recitation organized and clear?	36	4.83	3	5
Was the teaching assistant willing and available to help you overcome difficulties?	36	4.83	3	5
How would you rate your teaching assistant's command of the course material?	35	4.86	3	5
What was the overall quality of your interaction with the teaching assistant?	36	4.61	3	5

Qualitative Questions (selected responses)

Please comment on any aspect of this recitation.

Drew clearly put a lot of his time into preparing for the recitation classes, and it really helped the students in the section. The review sheets were an excellent help for getting a deeper understanding of material, and the review of each lesson reinforced the important ideas that were sometimes confused or missed in a lecture that might have run out of time.

The material covered in recitation was always extremely well organized. The TA was prepared for every recitation section with review sheets and review problems for us to complete, as well as with homework assignments and homework quizzes graded and ready to hand back. He also had flexible office hours so that he would be available to help anyone who would need it.

Would you recommend this TA to someone considering taking a course assisted by him or her?

Absolutely, he has an excellent grasp of the knowledge and is more than willing to help students master the material. His quizzes and sample questions may be challenging, but in the long run this only makes the section even better prepared than if they had done simpler practice problems leading up to a prelim.

Drew is an excellent TA. He is friendly, helpful, and approachable, I would be doing much worse in math 1910 without him. His help has been invaluable.

F*** Yeah!