

*Good Advice:*

*Words from one 280 class to the next*

At the end of the Spring 2009 semester I asked the students in my MATH 280 course from that term to write down whatever advice they would like to give to future classes of MATH 280 students. Below I've collected their thoughts, unexpurgated.

- The main thing that a 280 newcomer needs to know, is that this is *NOT* an average, run of the mill, “if I procrastinate I will do fine,” type of class. The concepts and ideas discussed are not the type of thing that I had ever seen in any math class before, and these concepts are of the type that will make you go “What the hell?” Therefore the only way to really get a grasp on the concepts is to actually work at it. Each week I would have to consider my schedule in which I would do my homework, and would usually rack up about 8 hours a week on the 280 homework. It takes a dedication to the class in order to do well. Fortunately, it becomes an easy practice if you start out that way, and I would have never gotten as much out of the class without doing so. Though it is a lot of work, it is a really fun class, and you really get to see a lot of really cool ideas and how they work. In this class you truly do reap what you sow.
- To me a very helpful thing to keep in mind in 280 was to start all homework sets and test knowing your first draft is not your last. It is more helpful to get everything you know on paper than to worry about legibility. It's also good to stay somewhat organized because the handouts help so much in forming proofs. But really most important is to be able to enjoy this math so you will want to put the necessary time into it to get the most out of it.
- To whom it may concern,  
It turns out that you are taking 280. So, take this advice: First of all, when you start to understand the material the first few class meetings, don't fret, it gets harder. On the serious side of things, it's not impossible. This class will stretch your mind and you will learn crazy things that you've never imagined before. Take your time! Spend a lot of time! Don't rush through things. Spend a generous amount of time on it and if things don't make sense immediately, give it time to seep in!
- My suggestion to incoming Math 280 students is to start each assignment early. Look at the assignments and develop some ideas and potential solutions the day you get it and it will make the assignment easier.
- So, you're taking 280 in the fall? Good for you, it's an interesting and challenging class! If I could impart any piece of advice to you before you start on this adventure, it would be to emphasize the importance of using your available resources.

Keep up with the worksheets you are given, and keep them in order! This will help you so much on Wednesday, since you should absolutely have started your homework by then, when you are trying to find specific examples to help you.

Always study or work on your homework with a study buddy. While you might not share the same viewpoint, it ALWAYS helps to bounce your ideas off another person. The math lab is always good for putting together 280 homework parties. I promise, head up there

with a classmate or two, let the math lab's positive ju-ju seep into your being, and magic will happen! You may even find one of the 280 veterans there, feel free to pick our brains, we love nothing more than to be distracted from our own work!

If you can't find the definition of something, and Professor Bahls is not in his office, don't be afraid to look it up on the internet. While not always accurate, Wikipedia is your friend. There are thousands of examples of problems worked out online so that you can follow them if you need more practice than what can be fit into the few moments of the class time you get.

Last, but not least, if you are really lucky, Professor Bahls does an amazing job with this class. You may not always understand him, and he may run off on random tangents or poke fun at you for liking the word supercalifragilisticexpialidocious, but he is always willing to sit down with you and help you muddle through a problem. Don't be shy, if you really don't understand something, go talk to him, he will explain it to you twenty times if that is what it takes for you to understand the concept. Also, for your own personal amusement, I recommend keeping a running total of how many times Professor Bahls yells, throws a chair, drops a table, draws on the classroom walls, chunks chalk across the room, or does anything else that startles or amuses you. In half a semester, my running total was 83 interesting Patrick moments, good luck beating that!

- Math 280 requires a different kind of attention compared to previous math classes. The best advice I can offer is to start working on everything early and often! Foundations is trying to teach the student how to do math on their own: learn how to explore and play mathematically while writing complete proofs. Don't wait until the last minute. Don't be afraid to make mistakes. Don't be afraid to ask questions. The ideas you learn from in this class will train you to think mathematically. So enjoy this new skill and have fun.

Seriously, *don't* wait until the last minute to do your homework. Start early and work often!

- Read everything you are given in class as many times as you can, until is engrained in your head. Read problems over and over until you know exactly what components are needed to complete that problem. With these two things, your engrained knowledge and your thorough understanding of the problems at hand, every solution will contain more meaning and come more easily. Just read, re-read, and re-re-read!
- My personal advice for a student is to get ready for a class that will change their whole way of thinking about math. I also tell them to stay focused and never fall behind because everything build on each other. Lastly I would tell them that they should enjoy the beginning because it is the easiest part of this course. The first part of the course is used just to open our minds and get ready for the rest. But also don't be scared and just try to have fun.
- My advice to future 280 students:
  - Start working on the homework the day it gets assigned to you. There is a good reason why you have a week or more on these assignments.
  - Don't be afraid of the Math Lab, familiarize yourself with it, set up a temporary residence there. If your friends and family are convinced you live in the Math Lab, you might be spending enough time there.
  - This is not an easy math class, it will take a lot of effort, these is a lot to learn in this class that isn't necessarily obvious right off the bat. Even if every math class before this

one seemed simple, you are no longer showing specific examples, but instead proving general cases, this is a very different animal.

- Write out what you know, then what you need, then take the smallest steps possible. The saying goes “you have to walk before you can run.” By the end of your semester you will understand that running might get you where you need to go, but shuffling is where it’s at.
- Finally, don’t think you are on your own, you should work closely with your classmates and ask your teacher LOTS of questions.

- Four things I wish I knew at the start of the semester:

- (1) Do NOT miss class, even if you can’t walk, have someone carry you.
- (2) Go to the Math Lab.
- (3) Make friends in the class – they’re your biggest help, aside from
- (4) Patrick Bahls – go see him about *everything* you have questions on.

- **Advice for the young at heart (soon we will be older)!**

When I sat down to think about what advice I’d give incoming 280 students, many thoughts flooded into my mind. Run while you can and don’t look back, was one. But then I remembered what a great learning experience this has been so, I settled down and came up with less extreme ideas. I feel like very general advice about being successful is the best route to take. So here it is:

- (1) Don’t panic about what your teacher is saying to you. These foreign ideas and terms will make so much more sense at the end of the semester that it will feel like old hat.
- (2) Ask questions, and even when you think that Patrick is frustrated with you because you’re not grasping the ideas (and he might be) do not worry because he wants you to know them and he is a willing teacher.
- (3) When you get your homework, do NOT wait until the last day to start working on it. Trust me on this one; the sooner you read over the questions and try to start processing them, the better.
- (4) Do not worry if what you are reading in that homework does not make sense the first time; read and read and read and read until things that you are seeing on the homework sheet start to look like the handouts, and they will because Patrick sets them out to be that way. They just won’t look exactly like the handouts because he is challenging you to use your brain (I personally didn’t like this aspect as I am inherently lazy.)
- (5) This one is a corollary to #’s 3 & 4. His tests are tough, and he does not divulge too much about them when you ask him questions about them, but the answers will reveal themselves if you have been paying attention in class, taking good notes, and doing your homework to the best of your ability.
- (6) This is kind of my last piece of advice. Do NOT freak out if you are used to being an A student and you get a B on your assignments. They are tough and will try your patience. You will stress out and think that you have NO idea what is being asked of you, but again referring to #’s 3 & 4, the sooner you start working on your assignments, the better you will do. The people who do the best in this class read their work multiple times, write their ideas down until they get it right, darken Patrick’s door all the time and ask questions. I found that the best work I did was when I gave this stuff multiple hours a week.

At the end of the semester, if you've stuck it out, you find that it was a great learning experience. Good luck! (you're going to need it)

- My advice for someone taking 280 next semester is to find someone you work well with and work with them on the homework. Being able to bounce ideas off someone else is a big help, and they can also look at your ideas after you have talked yourself in a circle and are just confused. Also working on the homework a little bit throughout the week works better than trying to do all of it at the end, even if it is just thinking about the problem.
- For all future 280 students I would give just a few tips on how to get a good grade.
  - Try to at least have *started* the homework/exam by the day after it is given. I more than anyone know what it's like to be overloaded, but if you started the homework your stress level on Friday will be much lower.
  - Never hesitate to ask Patrick questions. He honestly does not mind, but what he *does* mind is waiting until Thursday or Friday to ask.
  - As you are working on your assignment keep a log of your questions so you don't forget them.
  - Go to every class and get all the notes

With these tips and some hard work I am convinced you will make an A in the course.

- Don't try to overcomplicate or overthink the problems. Write what you know and what you need. Build shelter on Math Lab/Patrick's office.
- My advice for this class is the general stuff that professors/students will always tell someone if they are looking to perform better in a class. Things like showing up to class and asking the professor to help you if you don't fully understand; but in this class, they really can make the difference. Also try to find a group to work with on homeworks. Don't go into the group without trying but think about your own ideas first then gather different approaches and ideas from the group.
- Dear 280 student, don't be afraid! Although this is a rigorous course and takes a lot of work, it is definitely doable. If you truly care about the material, the work will come naturally. Of course all of the normal advice applies like do your homework, pay attention, go to the math lab, and so on. But this class is a little different and that can trip people up. Do not be intimidated by the notation and jargon, it's just symbols and words for concepts you probably already understand. Take it slow and take the time to really understand what you're doing. Write your answers out a lot of times before you submit them. Use  $\text{\LaTeX}$ ! It really does come in handy and Bahls did not pay me to say so. Ask questions in class if you don't get it. And you probably won't get it always because some things just take time to sink in. Also, start your homeworks early. Like, read them over the day you get them. That way, the ideas will be in your head while you're doing other things and when you come back to work on the problems you'll have an idea of how to get started. If I only had one word of advice to give you about this class it would be to WRITE. Just write everything you know and a tiny answer is sure to appear somewhere in there. Good luck!
- One of the things I wish I had really known before coming into 280 is how different it would be compared to the math classes I had already taken. A lot of people walked into this class thinking "I really like integrals and I really like math," without really realizing that math is a whole lot more than computations. I feel like this class either made people recognize either that they didn't like math as much as they thought they did, or that they

appreciated math more than ever. Don't walk into 280 thinking that it'll be kind of like Calculus or your other math classes or it'll catch you off guard.

- To future Math 280 students: If you have never spent more than 3 hours on a homework assignment before, get used to it, and get used to it quickly! Start getting into the habit of looking over your homework as soon as you receive it. The material in this class is tough, much tougher than any calculus formula you've learned. If you need help, ASK! The professors know this is a hard course and are more than willing to help. Also, make friends with the people in your class, I waited until the last few weeks to talk to some people and I wish I hadn't! Study groups are a real help and can be very fun at times. Try and enjoy 280 as much possible!
- Advice for a student going into Math 280 can be one of the most important things ever. There are many things that students should know.
  - First take notes. The more examples and work that you have the easier it will be when you go back to look over them.
  - Next, start your work well in advance. This is hard work and will take a good deal of time. Also this will leave time to get help.
  - Third, ask for help. This will be important, and this may be the first class you ask for help but it is needed.
  - Fourth, work with others. It is really good to get other minds to work on an idea. Some people see things differently and they will be able to help.
  - Finally, just try your best and don't give up. It is a hard class but you will get through it.
- The day you are given your homework or test, start working on it. Ask Patrick for help.
- Beware of 280! Ha, just kidding. Hopefully if you're taking this course, you care about math enough to put a good bit of time and effort (and pencil lead) into it. The course is tough, and is all about writing structured sentences to reason through scenarios. My main advice to you is to not procrastinate on the homework or exams, because even if you understand the work, it takes a while to actually form your thoughts and transcribe them to paper. Good luck and have fun!!
- The first place to start is in the classroom. Who would have ever thought going to class would be a key to being successful in a class full of dense material. Yet that dense material is too much just to be understood in one go-through. So use outside of class time wisely. Discuss the logic behind proofs with your friends. You would never have guessed that math problems could be peer bonding experiences. If you do not have access to the smartest kids in the class, the place to go is our lovely professor. Do not be scared of wounding your pride by going to the professor. He does know his stuff, and out of all people can explain it at a level which us intro students can understand. Using resources wisely is a key to doing well in this class. Also the mindset you have in this class is very important. This class will be frustrating to you if in past math classes it came to you intuitively, because this material won't. It makes sense once you tackle it from the right perspective. Getting frustrated will only get you down and won't help you with the material. By coming to class, using your vast array of resources, and keep an open mind, you should be able to succeed in the exciting adventure that is 280.
- For those taking 280 I would suggest studying, a lot. The sooner you start to study your notes the better, in fact getting into the habit of studying the notes the night after the

lecture is a great start; that way you can understand the material before the exam and the homework. Also, working in groups on the homework is a great way to get different ideas and perspectives on the many problems you will get stuck on. In addition, Math 280 is a difficult class but with hard work, time and patience it will be a worthwhile class.

- When given a sheet of notes make sure you look at it before the class in which you will go over it. Also, do your homework early whenever possible so that you can ask questions, because you will need to ask questions. You should also go over the vocabulary every few weeks so you don't have to look everything up while doing the homework. And last but not least GO TO CLASS!!! or you will be lost.
- Take clear concise notes of the in class proofs and even writing in side notes along the way, nothing will help you out more. Think of the notes as formulas for the rest of your proofs where you can just mix and match to get what you need. I also found that meditation helps out a lot. If I could not get a problem, I would do some tai chi and let my subconscious mind mull it over. Afterwards I would usually find the answer just by glancing at it.
- The biggest problem you can have in this class is to look a problem and feel intimidated. DO NOT FEAR!

Write out everything you can think of on a piece of math lab paper for a problem. Have it to refer to. Very useful.

Don't hesitate to inquire with your professor. You need him and he needs you. To quote (loosely) *Jerry Maguire*, "Let him, help you."

280 will grow on you the quicker you understand it. Over time it will interest you more and more. So try to like it right off. To quote (loosely) that girl in *Jerry Maguire*: "You had me at binary operations."

And don't forget it will help you in your math career. This is a very important milestone. This information is very vital. To quote (loosely) that other guy in *Jerry Maguire*: "Show me the mathematical proof!"

But seriously folks, you will like it if you try to like it. Don't fight, work with it.

Good luck!

- To all future math 280 students,  
Take it from me, you want to start out the semester with a bang. It gets a lot harder as the semester goes on. Use the first few weeks to get your grade up. Also, make sure to start the homework early because you don't want to be stuck in the math lab on Friday trying to get the homework done, fighting all the other students for Patrick's time to ask the questions that you have on the test. Patrick will gladly work with you and will greatly appreciate you coming in during the week to ask questions on the homework. Don't be afraid to ask for help.