MAT 033 : Pre-Algebra
Course Information

1 Why Learn Algebra?

Algebra is important for what it helps you do directly, for the skills you learn along the way, and for the big ideas it makes possible.

Directly, algebra teaches you a set of methods that are enormously powerful for understanding and thinking critically about the world around you. The techniques of algebra will be important as you continue your studies, work at a job, and participate in society.

Indirectly, you will learn an approach to solving problems by looking at them abstractly. How can you take limited information about a situation and make good decisions with it? How can you understand a process by making some basic assumptions and seeing what they imply? When someone makes an argument involving numbers and statistics, how do you know whether it's right and how far it extends? Sometimes you will use the specific methods of algebra to answer these questions, but even more often you will use the approach to numbers, analysis, and reasoning that are essential to algebra and beyond.

Philosophically, algebra is the mathematical foundation of all of modern science. In order to have a deep understanding of the beauty and insight of science, it is essential to know algebra and to be comfortable with its special style of abstract thinking.

2 Course Logistics

MAT 033, Pre-Algebra, is a review of many of the techniques of manipulating numbers: fractions, factoring, exponents, decimals and percents, a review of basic geometry, and an introduction to the abstract thinking in algebra, and will prepare you for the college algebra courses.

This is a college class. Nobody is forcing you to be here. You are here because you are making a decision to learn math, and it is up to you to make this class work for you and towards that goal.

Your instructors are all volunteers who come here because we truly believe in the value of math and the importance of teaching it to you. We deeply want you to succeed, and we are counting on you to take responsibility for making that happen. Part of being a college student is doing the extra work and taking the extra steps you need to learn the material, even if it isn't assigned or graded and even if nobody is looking over your shoulder to make sure you're doing it. We will do everything we can to make it possible for you to learn as much as you can in this class, but that learning has to be driven by you.

Each part of the course is designed to help you in the process of learning new techniques, finding out what you know and what you need to work on, and developing into a confident user of math. You will get out of these what you put in. Learning is an active process, and if you work hard you will be rewarded not only with a good grade, but (more important!) a strong understanding of math that will stay with you into the future.

2.1 Lectures

The backbone of the class will be the lectures. Each lecture will introduce new concepts and techniques. We will distribute a copy of each lecture to help you with taking notes and studying outside of class. We strongly recommend that you read through the lecture notes again on your own after the lecture in order to review the material, and write down any questions you still have so that they can be answered at the next worksheet session.

2.2 Worksheet Sessions

Associated with every lecture will be a worksheet session. (See the class syllabus for the day-to-day schedule; sometimes sessions are doubled up to fit into the time available for the course.) In general, the problems on the worksheets will be more challenging than what you will find in the homework, exams or textbooks. They often require you to put together multiple techniques and skills to solve the problems correctly. This is your opportunity to practice solving problems with your peers and to get specific feedback from your instructors. We will sometimes try to solve problems individually, sometimes as a small group, and sometimes as a whole class. Although worksheet problems are not graded, practicing these problems will prepare you for the exams and will help you on your homework as well. We will distribute solutions at the end of the session so that you can try any problems you didn't get to during the session on your own and check your answers.

The worksheet sessions also provide a good opportunity to learn and practice how to present your work clearly and neatly. Carefully laid out work, with the steps shown, and neatly written, is much easier to read, grade, and study from. This will be a useful skill to learn for many aspects of your activities.

2.3 Homeworks

Homework assignments are the most important part of the course. We only have a limited amount of time together in the classroom, so we depend on everyone doing as much as possible outside of class to learn the material and be prepared for future lessons. It is thus essential that you attempt to solve every problem in the assignment, and keep trying on the ones you don't understand. Homework forms a small part of your grade, but it is most important as a chance for you to spend the time you need practicing with the ideas and methods.

We will pass out solutions along with your homeworks when they are graded. You should carefully check and make sure you understand each problem you got wrong, and write down any questions for the next worksheet session.

It can be helpful to work with fellow students or tutors if you have the opportunity to do so, but this is much more helpful if you have tried the problems on your own first. You will learn the material best if you think about it on your own before discussing it with others. When it comes time to write up your homework, we want to see just your writing. You should write out the final copy of your homework on your own and without copying from any notes you may have made while discussing problems with a classmate or tutor. *Copying answers is completely unacceptable, will not help you learn the material, and may result in your removal from the course.* Please also write at the end of your homework the names of the other students and tutors you studied with. When submitting homeworks, it is important to write *your name, the date, and the assignment number* on every page. Please also number your pages so we can make sure no pages are lost. Please write the homeworks carefully and neatly; they will be hard to grade and hard to study from if they're

not neat and well laid out. And show your work: this isn't just about the right answer, but the process of getting there.

2.4 Exams

Much of your grade for this course will be determined by your performance on exams. We will distribute practice exams in advance of each exam so that you can try solving problems on your own. First try solving as much as you can within a time limit, but then go back and make sure you know how to solve each kind of problem on the practice exam. These will be the basis of review sessions before each exam.

If you work hard to understand your homework and worksheet problems, the exams should be well within your abilities. The final exam covers material from the entire course.

3 How to Succeed In This Class

Algebra is a skill that takes time and work to master. Just as when you learn other skills, you start with a lot of rules and ideas that seem difficult, hard to remember, and disconnected. Over time, as you practice, you will be able to remember and apply rules easily, and this will make it easier to learn new things as well. Think of some skill you are good at. How long did it take you to get to this point? How much work did you put in? How did it feel when you were first starting to learn it?

The most successful students in algebra take every possible opportunity to practice what they have learned. This means carefully doing every homework and worksheet problem, and also reading lecture notes. If there are areas you find difficult, you should find extra problems to practice with, even though they won't be graded. The result will be a better understanding of the material and a better peformance on future assignments.

3.1 If you miss a session...

We expect you to attend every class meeting, but we understand that sometimes there are unavoidable situations that prevent you from doing so. You are still responsible for all the material—including homeworks, lectures, and worksheets—that you miss when you cannot make it to a class. Speak with an instructor as soon as possible after missing a session and obtain a copy of the relevant lecture notes and worksheets to study on your own, and hand in any homework assignments that are due as soon as you are able. You should make every effort to catch up to the rest of the class as soon as possible, because it is much more effective to learn alongside the whole group than to be constantly trying to figure things out on your own.

3.2 If you need more practice...

As you do homework assignments and worksheets, you may find that some material—either background to the course or covered in the course itself—requires more practice for you to feel comfortable with it. This is a normal part of learning a new skill, and you should stick with problems even if they don't completely make sense. Most material comes up again and again, and the repeated practice will help you improve your understanding and ability to work with that material.

Because material comes up repeatedly, however, it is important to recognize when you need extra practice with a method or concept before moving on. If it is something in your textbook, go to the relevant sections and practice with the exercises from the book. If it is a skill like working with

numbers or fractions, write yourself a page of examples to try and practice with them until you feel comfortable. If you spend time with your classmates outside of class, give each other problems to practice and check each other's answers. Your instructors can help you come up with specific ways to practice with concepts or methods as they come up in the course.

3.3 Cooperation

This is a cooperative learning enterprise. Work together, and support your fellow students and your teachers. If you have a question during the lecture, ask it. If you want to see another example of how to use a mathematical technique, ask for it. But this should always be done to help with the learning, not to disrupt the class. Disruptive behavior is very destructive to your fellow students, to your teacher, and to yourself, and will not be tolerated. Our time together is precious and very difficult to arrange, and we are not going to waste a second of it.