Welcome to MATH 1315: College Algebra

New to the course?

- Be sure to familiarize yourself with the Syllabus (https://canvas.txstate.edu/courses/1366984/assignments/syllabus) and review the information carefully.
- Be sure to fill out the Course Pacing Guide (https://canvas.txstate.edu/courses/1366984/files/134151087/download?wrap=1). You must submit it as your first assignment before you will be able to proceed with this course.
- Click Get Started (https://canvas.txstate.edu/courses/1366984/modules/4435206) to begin your course.

Returning to the course? Click Modules to the left and resume where you left off.

Important reminders:

- This is a 6-month, online, correspondence self-paced course.
- All submissions, including exams, must be completed by the course expiration date. When you registered for the course, an email was sent to your Texas State account indicating your registration and expiration dates.
- Up to two "Real-World" and Extension assignments can be submitted within a seven-day period and the assignments must be submitted in sequence.
- An exam can only be taken when all submitted assignments have been graded and returned.
At the end of the course, you will be asked to complete a brief course evaluation. Your input will help improve the course.
Meet Your Instructor

I am Shane Lowe and I have been teaching Math at Texas State University since the spring semester of 2011. During my time at Texas State University, I have taught developmental math, college algebra, survey of contemporary mathematics, business mathematics I, business mathematics II (business calculus), calculus for life sciences I, informal geometry, and pre-calculus.

I am originally from Denver, Colorado, where I spent my first 12 years growing up near the Rocky Mountains. When I was 12, my family moved to Dayton, Ohio, where I graduated high school and started my college career at Sinclair Community College. Once I had enough credits to transfer, I moved to Austin, Texas and earned a B.S. in mathematics from The University of Texas at Austin.

After graduating with a B.S. degree, many friends and coworkers encouraged me to pursue a teaching career. With their encouragement and support, I enrolled at Texas State University and earned a masters of education degree in secondary education with a minor in mathematics.

When I am not teaching, I enjoy reading with my favorite genres being historical fiction and horror. A few of my favorite books are "Pillars of the Earth" by Ken Follett, "The Stand", and "It" by Stephen King. I have also enjoyed many recommendations from past students, so feel free to recommend your favorite book!

Another pastime of mine is going to the movies. I enjoy watching all types of movies and particularly like to compare movie versions to their books. I will normally watch all new releases at least twice, so it is possible that you may bump into me at the theater here in San Marcos.

If you visit my office, you will discover that I also enjoy following the Denver area (my hometown) sports teams. I especially like to follow the Colorado Rockies (baseball) and Denver Broncos (football).

An interesting fact about me is that I am the second of seven children in a teaching family. Three of my siblings are teachers and another has an education degree. If a student travels throughout their education, it is possible to have one of my siblings as a teacher in elementary school, middle school, and high school, with me teaching at the college level. In my extended family, I have two aunts that are teachers and my dad has been a teacher in the past. So, it can be said that teaching is in my blood.
I have enjoyed my time teaching at Texas State University and look forward to continue teaching and learning from the students in future semesters!

Click Next to proceed to Meet Your Fellow Students.
The "Lowe" Down on Real and Complex Numbers

A solid mathematics foundation starts by identifying and operating with numbers, which is where this course will start.

The numbers used in College Algebra are generally real numbers. However, there are sections, definitions, and equations that specify certain numbers as integers, whole numbers, natural numbers, and even imaginary numbers.

Since different types of numbers are encountered in this course, this lesson starts by defining the different sets of real and complex numbers and describes how they are related to each other. After which, the lesson explains how to perform operations like addition and multiplication with these numbers (in particular, operating with complex numbers).

- Watch the "Lowe" Down on Numbers video discussing the real number systems.

Watch the "Lowe" Down on Numbers video discussing the real number systems.
• Watch the "Lowe" Down on Complex Numbers video discussing the complex number system.

(https://canvas.txstate.edu/courses/1366984/external_tools/retrieve?display=borderless&url=https%3A%2F%2Fmediaflo.txstate.edu%2Fsettings%2Flti%2Fvideo%2Flaunch%2F8699f0a1-45ec-4ee0-934b-66f739e0af02%3FautoPlay%3Dfalse%26displayTitle%3Dtrue%26displaySharing%3Dfalse%26displayAnnotations%3Dtrue%26displayCaptionSearch%3Dtrue%26displayAttachments%3Dtrue%26audioPreviewImage%3Dtrue%26displayLinks%3Dtrue%26displayMetaData%3Dtrue%26displayEmbedCode%3Dfalse%26displayDownloadIcon%3Dfalse%26displayViewersReport%3Dtrue%26embedAsThumbnail%3Dfalse%26startTime%3D0%26displayCredits%3Dtrue%26showCaptions%3Dfalse%26hideControls%3Dtrue%26width%3D848%26height%3D516)

**Objectives**

Upon completion of this lesson, you will be able to:

1. Classify a given number as natural, whole, integer, rational, irrational, real, and/or complex.
2. Simplify a complex number
3. Add, subtract, multiply, and divide with complex numbers
4. Simplify $i$ raised to an integer exponent

Click Next to proceed to Key Terms for Real and Complex Numbers
Key Terms for Real and Complex Numbers

- **Set**
  A set is a collection of objects

- **Element of a Set**
  An element of a set is an object that is included in a given set

- **Natural Numbers**
  The set of natural numbers (also known as the counting numbers) is defined as \( \{1, 2, 3, \ldots \} \)

- **Whole Numbers**
  The set of whole numbers is defined as \( \{0, 1, 2, 3, \ldots \} \)

- **Integers**
  The set of integers is defined as \( \{ ..., -2, -1, 0, 1, 2, \ldots \} \)

- **Rational Numbers**
  The set of rational numbers is the set of all fractions where the numerator and the denominator are integers and the denominator does not equal 0.
  (The set of all fractions that are ratios of integers)

- **Irrational Numbers**
  The set of irrational numbers is the set of all numbers that can be represented as a non-repeating, non-terminating decimal.
  (An irrational number *cannot* be written as a ratio of integers.)

- **Real Numbers**
  The set of real numbers is the set of all rational and irrational numbers.

- **Complex Numbers**
  The set of complex numbers is the set of all numbers that can be written in the form \( (a + bi) \), where \( a \) and \( b \) are real numbers and \( i \) is the square root of -1.
  \( a \) is referred to as the real part and \( b \) is referred to as the imaginary part

- **Complex Conjugates**
Consider the complex number \((a + bi)\), the complex conjugate of \((a + bi)\) is the complex number \((a - bi)\)

Click Next to proceed to Classifying Numbers Quiz