Math 12: Algebra for STEM Courses

California State University, Sacramento
Department of Mathematics and Statistics
Spring 2025

Instructor: Jose Alfredo Alanis
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Class Modality: In-Person
Class Meeting : MWF 10:00am-10:50am at Alpine 138 & Tu 10:30AM to 11:20AM at Eureka 109.
Office Hour: M 12:00pm-12:50 ; or by appointment
Office Hour Location: Brighton Hall 118 (Math Lab)
Final Exam Date/Time: Tuesday May 13 from 8:00 AM - 10AM

Catalog Description: Prepares students for Pre-calculus, Calculus, and other higher math courses requiring intermediate algebra. Topics include: linear equations and inequalities, absolute value equations and inequalities, systems of linear equations, quadratic equations, polynomial expressions and equations, rational expressions and equations, roots and radicals, and exponential & logarithmic properties and equations. 4 Units.

Prerequisites

You must be a STEM major (or have a major requiring Chem 1A or Chem 4) even if you do not have a qualifying ALEKS PPL score. Other majors are welcome to take Math 12 if you have a *proctored* ALEKS PPL score of at least 41.

Reasons to Take Math 12

This course is designed to prepare you for Math 24, 26A, 29, and Statistics 1. Note that while this is a graded class, it **does not** earn B4-Math Concepts credit for graduation. Passing this class with a C – or better **does** qualify you to take Math 24, 26A, 29, and Statistics 1.

Materials

1. Online homework will be completed using ALEKS (details below). You should already have access to ALEKS through Canvas and the cost was included in your student fees. There are content explanations and an e-textbook included within ALEKS. No other textbook is required but a loose leaf version is available.

2. A stapler. I will not accept unstapled mutli-page work.

Grade Breakdown

Your grade in the course will be a reflection of your understanding of the material, and not necessarily a reflection of how much effort you have put in. As with many things in life, some students will naturally need to put in more effort than others. Our shared goal is for each student to master the material.

Assignment	% of Grade
Group Work and Assignments	5%
Aleks Homework	10%
Quizzes	15%
Midterm Exams (3)	45%
Final Exam	25%

Grade scale

93– 100% A	77 – 79.99% C+
90 – 92.99% A –	73 – 76.99% C
87 – 89.99% B+	70 – 72.99% C –
83 – 86.99% B	60 – 69.99% D
80 – 82.99% B –	0 – 59.99% F

Expected Learning Outcomes

This course is all about mastery of the eight areas listed below. Mastery of these topics will not only be needed in your future math courses but also in your future physics, chemistry, biology, engineering, and science courses. Your instructors in those courses will expect you to have these ideas, and the ideas leading up to them, mastered and ready to use to solve new problems. Note that this is not an exhaustive list of the topics in this course and there will be material leading up to these eight culminating ideas. Along with each outcome are example problems to give you an idea of what is expected.

1. Solve linear equations and inequalities with applications.

   e.g. (a) $x + \frac{3}{5} = -\frac{1}{6}$ (b) $-13 < 4x - 1 < 15$

2. Solve absolute value equations and inequalities.

   e.g. (a) $|6x - 3| = 15$ (b) $|5x + 5| - 3 \geq 7$

3. Solve systems of linear equations in 2 variables with applications.

   e.g. (a) $\begin{cases} 9x - 8y = 2 \\ -2x + 5y = 6 \end{cases}$

4. Solve quadratic equations.

   e.g. (a) $2x^2 - 7x = 4$

5. Manipulate polynomial expressions and solve polynomial equations with applications.

   e.g. (a) $(x - 5)(3x - 1) - (x - 1)^2$ (b) $(12x^2 + 42x + 30) \div (2x + 5)$

6. Manipulate rational expressions and solve rational equations with applications.

   e.g. (a) $\frac{x - 5}{x + 3} - \frac{4}{x + 4}$ (b) $\frac{5}{x - 6} + \frac{x}{x - 2} = \frac{10}{x^2 - 8x + 12}$

7. Manipulate expressions involving radicals and solve equations involving radical expressions.

   e.g. (a) $32^{3/5}$ (b) $\sqrt{3x + 34} - \sqrt{x + 31} = 1$

8. Manipulate between equivalent exponential & logarithmic forms and solve exponential and logarithmic equations.

   e.g. (a) $27^{5-2x} = 3^{x^2-17x+45}$ (b) $\log_9(6) = \log_9(2) + \log_9(x + 8)$

Definition of Grade Symbols (For Math 12)
Your grade in this class is based on how well you understand the material, and not the amount of effort you put in. We all have different mathematical backgrounds which means some students may have to put in more effort than others, and that is perfectly okay! The following are the grade definitions from the academic policies as well as a course specific interpretation:

A - Exemplary achievement of the course objectives. In addition to being clearly and significantly above the requirements, work exhibited is of an independent, creative, contributory nature. (i.e. Near total mastery of all topics. I would expect A-students to be able to confidently explain and teach most topics themselves. The student is totally prepared to excel in the next course).

B - Superior achievement of the course objectives. The performance is clearly and significantly above the satisfactory fulfillment of course requirements. (i.e. Deep understanding of most topics. I would expect B-students to be able to discuss most topics but may lack some finer details or make common errors. The student is prepared to be successful in the next course).

C - Satisfactory achievement of the course objectives. The student is now prepared for advanced work or study. (i.e. Basic understanding of most topics and college level work. I would expect C-students to be able to complete and discuss basic problems but perhaps struggle with more advanced or in-depth topics. Errors in work are common but not egregious. The student is prepared for the next class, but may struggle to be successful).

D & F - Unsatisfactory achievement of course objectives to an extent that the student must repeat the course to receive credit. (i.e. The student does not have enough basic knowledge of core topics to be successful in the next class. D and F-students must retake the course to further strengthen their understanding before moving onto the next class).

Attendance and Tardiness
I will be dropping any student who fails to show up within the first 2 weeks of class. You are expected to attend and be on time for all class meetings. You are responsible for all material covered and work assigned and/or collected each day. This class will move extremely quickly, and we will cover new material, applications, and examples at every class meeting. I want you to be successful and that becomes very difficult if you are not in class to learn the material. No late work will be accepted for any reason if you are not in class. Instead, several low-scoring assignments will be dropped to account for emergencies and sickness. Details are provided in each assignment desciption below.

Cell Phones
Did you know research shows that the mere presence of your cell phone reduces available cognitive capacity? Learning math can be dense and difficult at times, so we usually need to give it our full attention. **Cell phone use is not allowed in class, and I ask that you put all devices in your bag before class begins.** This means you will not be able/allowed to take pictures or video of the board during lectures, so please make sure you are taking notes and asking questions. If I see your cell phone during class time, you will be asked to put it away. Repeat offenders may be asked to leave.

Group Work
Our class time will mostly be spent working in groups to understand and solve mathematical problems. Group work can often feel uncomfortable at first because you have to be vulnerable around strangers in a subject that you might struggle with. I promise you that every student is feeling this way! However, once students get to know their peers, they learn much better from each other and make deeper connections to the material. Your curiosity, insights, ideas, and ability to listen and discuss the ideas of your classmates is essential to everyone's learning. For this reason your attendance and participation is of the utmost importance.

The class problems are designed to help you explore and discuss mathematics that are foundational

to what you will need in your future math/STEM courses and careers. We will need to learn math computation skills to make sense of these ideas and we will discuss them in class as they are needed. Practicing these skills will happen in the homework. At times you may want to see more examples than we had time to do in class, or you may have questions from a topic on the homework. There are a ton of resources discussed later in this syllabus, but I am always happy to help so please don't ever hesitate to contact me after class, during office hours, or by email.

Group work assignments are worth 10 points towards your Group Work grade and cannot be made up for any reason. The two (2) lowest group work assignment scores will be automatically dropped to account for emergencies and sickness.

Homework
Most of the homework will be completed online via ALEKS. ALEKS Modules function a bit differently than traditional online homework systems and works towards mastery of the material. Instead of every student working on exactly the same set of questions, ALEKS uses AI to send every student down their own path of topics to help them master the course material. ALEKS will ask topics you are ready to learn and avoid topics you already know or aren't ready for yet.

Module Homework (M): This is where the bulk of the homework is and where you will practice the ideas that we establish during class meetings. The specific skills and exercises you are expected to learn and complete are called *Topics*. Examples of *topics* are "Solving an absolute value inequality" or "Exponent power rules with negative exponents" or "Expanding a logarithmic expression". Each Module Homework will contain 7-12 *topics* that you need to learn (sometimes more, sometimes less). Depending on your initial assessment, some of these topics may already be "learned" in each module. To "learn" a new topic, you need to answer 3-5 questions correctly on that topic. Getting several questions correct in a row are counted double. Missing questions loses a point. This means for topics you are comfortable with you just need to get 2-3 questions right in a row. For topics you are still working on learning you may need to complete a few extra problems until you can get a few right in a row. The idea is to master each topic. Each module is due before it closes and is worth 25 points to your homework grade. You may ask for one (1) module's due date to be extended before each exam. Otherwise, no late work is accepted for any reason.

The point of the online homework is to help you master the "mechanical" part of working through algebra problems, as well as some deeper application type problems. **Please use the online homework as intended to practice mastering these topics.** Use of technology or outside resources to quickly complete ALEKS modules is considered academic dishonesty and will lead you to being woefully unprepared for exams and quizzes.

Initial Assessment: Before you can begin working on the homework modules, you will need to complete an initial assessment so ALEKS can assess what you do and do not already know. **DO NOT use any outside resources or calculators when you take your initial assessment.** This assessment is ungraded and you will want an honest assessment of what topics you already know in this course. "Cheating" on the initial assessment will cause you headaches later on when you are asked questions you aren't ready for. You will want the opportunity to practice essential topics that will show up on exams and quizzes. Giving the initial assessment an honest go will give you the best chance to be successful in this course and later courses.

A Final Note on ALEKS: Please note there will be material in the homework that is not addressed directly in class. *There will be times when you will be asked to learn small topics on your own.* There is a lot of material to be covered and college students are expected to be able to research and learn independently. For any problems you are stuck on, there are a ton of resources including the "Explanation" button/videos/ebook on ALEKS, coming to ask questions during office hours, visiting

the Math Lab tutors, and a ton of online resources including YouTube, Khan Academy, etc. I am always happy to help so please don't ever hesitate to contact me.

Quizzes
There will be two quizzes every week. Each Friday's class session will begin with a basic knowledge quiz. These quizzes will focus on material from the two most recent ALEKS Module Homeworks. The purpose of these quizzes are to ensure you have the basic skills needed to be successful on thee exams and in future courses. Calculators are not allowed on any quiz. Quizzes are worth 10 points to your quiz grade and can never be made up for any reason so make sure you are on time to class. The lowest quiz score will be dropped to account for unexpected events. Each Sunday's, there will be a reading quiz due. Although this isn't technically a quiz, it will count toward your quiz grade. **The readings will be done on Perusall, and no reading quizzes will be dropped. No late reading quizzes will be accept either.**

Midterm Exams
We will have three (3) midterm exams at the end of weeks 4, 8, and 12. These exams will be taken by hand during class time. Calculators are not allowed on any exam. Please mark these exams on your calendar now. Exams cannot be made up for any reason. If you think you may miss an exam, please communicate with me early to look into options.

Final Exam
Our final exam will be on **Monday May 13th from 8:00am - 10:00am.** Note that this is different from our usual meeting time. Please mark this in your calendar now. If you miss this final exam it will be too late to make arrangements. The final exam cannot be made up for any reason.

Testing Accommodations and DAC
Sacramento State is committed to ensuring an accessible learning environment where course or instructional content are usable by all students and faculty. If you believe that you require disability-related academic adjustments for this class, please immediately contact Disability Access Center (DAC) to discuss eligibility. A current accommodation letter from DAC is required before any modifications, above and beyond what is otherwise available for all other students in this class will be provided. More information can be found here: https://www.csus.edu/student-affairs/centers-programs/disability-access-center/

Office Hours
The purpose of office hours are to give you a chance to ask questions outside of class time. During office hours I can give you one-on-one attention to best help you learn the material. This is also the time to discuss any personal matters you may have relating to the class. This is time set aside for YOU. Please use office hours. In-Person (F2F) office hours are preferred but if my listed times don't work for you, please don't hesitate to contact me about meeting at another time or over Zoom.

E-mail Policy
If you need to contact me outside of class or office hours, you may e-mail me at kyleolson@csus.edu. *If you send message me on Canvas or any other platform as I will likely not see it in a timely manner.* Please allow one to two working days for a response. I do not check my e-mail on weekends, holidays, or outside business hours so please plan appropriately if you need a response by a certain time.

Extra Credit
I will add up to 2% extra credit to the final course grade of every student who completes a PAL section (described later). If your schedule does not allow for you to add a PAL section, you may instead spend a minimum of two (2) hours per week in the Math Lab on Math 12 material. Please check-in and out of the Math Lab properly for your hours to be counted. This will be the only extra

credit offered during this course, so please take advantage of it.

Cheating, AI, and Academic Honesty
Cheating and use of AI has become a major concern in recent semesters and is harming student's success in this course, later courses, and in the work field. As a class, we form a community of scholars and we must be committed to a culture of honesty. While you are encouraged to work together on homework, all work must be your own. If I find that you have cheated on an assessment or used AI to write any part of your work, you will receive a zero on the assignment, an automatic F in the course, and be reported to Student Conduct.

Grade Rounding
By dropping several low scoring assignments across many grade categories, as well as the 2% extra credit described later, I am helping your grade as much as I can in a way that affects all students equally and fairly. Please do not ask for any grades to be arbitrarily rounded further. By asking for points which you have not earned, you are putting us both in an uncomfortable position. Any requests for rounding will be refered to this statement.

Final Notes on this Course
There will be times in this class where you will be frustrated and this is 100% expected in any learning environment where growth is happening. Please be patient with yourself and with the material and trust that hard work pays off.

Extra Math Resources
Peer-Assisted Learning (PAL): PAL is a curricular structure that encourages cross-year support among students in science and math gateway courses. PAL encourages students to learn cooperatively under the guidance of trained students, called PAL Facilitators, who have been very successful in the same course they facilitate, and have been highly trained in group facilitation and pedagogy. Their recent statistical analysis indicates that students opting into PAL earn a 23% "bump" in their course grade.

Math 12 PAL Sections (**NSM 12R**)

Course	Class #	Facilitator	Days	Time	Location
NSM 12R	34092	Jan Oropesa	MW	1:00P-1:50P	Solano Hall 4008
NSM 12R	34120	Destiney Housley (Lead)	MW	11:00A-11:50A	Mendocino Hall 3007
NSM 12R	36649	Madaline Padilla	MW	3:00P-3:50P	Alpine Hall 205

More information on PAL can be found here: https://www.csus.edu/pal

Math Lab (BRH 118; M-Th 9am-5pm; F 9am-1pm): The Math Lab is our peer staffed, walk-in tutoring center. The tutors are graduate and undergraduate math and STEM majors who are able to help you think through ideas if you are stuck, or help you get started. No appointment is necessary. You are encouraged to work on your homework in the Math Lab in case a question arises, or just stop in with a question.

Note: I will add up to 2% extra credit to the final course grade of every student who completes a PAL section *or* spends a minimum of two (2) hours per week in the Math Lab on Math 12 material.

Student Resources

Commit to Study The Commit to Study (C2S) program provides students with a safe, non-judgmental environment where they can work on their study skills with their own personal peer mentor. Peer mentors are undergraduate students, just like you, who know what it's like to be a stressed student and who are trained to help all students reach their full potential. You can schedule an appointment at the C2S website: https://tinyurl.com/sacstatec2s

First Year Experience First Year Seminar is a cohort of 25 first-time college students, allowing a direct connection with professors and other students. Each First Year Seminar has a Peer Mentor to provide academic advising and assist with college transition. Students who participate in these programs feel more connected with their courses and faculty. More information on FYE can be found here: https://www.csus.edu/undergraduate-studies/first-year-experience

Other Services

Student Health and Counseling Services

Your physical and mental health are important to your success as a college student. Student Health and Counseling Services (SHCS) in The WELL offers medical, counseling, and wellness services to help you get and stay healthy during your time at Sac State. SHCS offers: Primary Care medical services, including sexual and reproductive healthcare, transgender care, and immunizations; urgent care for acute illness, injuries, and urgent counseling needs; pharmacy for prescriptions and over-the-counter products; mental health counseling, including individual sessions, group counseling, support groups, mindfulness training, and peer counseling; athletic training for sports injury rehabilitation; wellness services, including nutrition counseling, peer led health education and wellness workshops, and free safer sex supplies; violence and sexual assault support services. Most services are covered by the Health Services fee and available at no additional cost. More information can be found here: https://www.csus.edu/student-life/health-counseling/

A Note on Illness

To increase safety on campus, you are required to report a positive COVID-19 test. You will find a confidential reporting form on the Student Affairs COVID-19 web page.

If you need to isolate, please notify me immediately.

- If you are isolating and not ill, I expect you to stay up to date with your academic work remotely as best you can. Checking in with me for assignments will be your responsibility.
- If you are ill, please contact me as soon as you are well so we can work together to catch you up with the rest of the class.
- You will find the latest updates to academic continuity during COVID-19 here.

Communicating with me in a clear and timely manner will help you stay on track academically and help all of us stay healthy.

This syllabus is subject to change at any time.