

Math 303: Intro. to Concepts of Mathematics, Fall 2026

Instructor: Kevin Milans (milans@math.wvu.edu)

Class Meetings: MWF 9:30am-10:20am in Hodges Hall 401

Office Hours: M 10:30am-11:20am, W 3:00pm-3:50pm, Thurs 2:30pm-3:20pm, and by appointment, in Armstrong Hall 408H

Class Journal: <https://milans.us/teaching/fa26/math303/>

Prerequisite: Math 156

Welcome: Welcome to Math 303: Introduction to Concepts of Mathematics. This class will probably be unlike any other math class you have ever taken. Learning mathematics is analogous to learning a language. Many lower level mathematics classes (especially those geared toward general audiences and not math majors) teach a few important phrases that are useful in answering certain types of problems. This class is different: we wish to be able to respond creatively and correctly to all kinds of problems, even those with which we are not already familiar.

This is an ambitious goal, and one that is never fully achieved. Indeed, a professional mathematician spends a lifetime honing these skills. Mathematics is not a sport for the easily discouraged; it takes a lot of effort and determination to make progress. The reward for success is a deeper command of mathematics and, more generally, a stronger mind. Let's get started.

Learning Outcomes and Course Goals: Students will become familiar with the language of mathematics, including definitions, theorems, conjectures, and proofs. Students will read, critique, and write mathematical proofs, requiring the use of elementary logic, sets, relations, and functions.

Textbook: Required: *Book of Proof*, by Richard Hammack. Optional: *Mathematical Reasoning*, by Ted Sundstrom. Both texts available online for free under a Creative Commons License.

Homework: Homework is assigned roughly once a week. In mathematics classes, most of your learning occurs while doing homework exercises. You are strongly encouraged to work on the homework with other students in the class, but your written work must be your own. In particular, *you must fully understand everything written down on your paper under your own name*. You may not obtain answers to homework exercises by using search engines, AI, other textbooks, scholarly research articles, or other resources. Claiming the work of others as your own is a serious violation of academic integrity known as plagiarism. It also robs you of your chance to learn and defeats the purpose of the homework.

Homework will generally be assigned on Wednesdays and due the following Wednesday. Homework is evaluated on *completeness*, and, depending on availability of resources, *correctness* on selected problems. Your homework is expected to be neat and conform to accepted standards for professional work-products. Handwriting must be clearly legible, and margins must be respected. Except for excused absences, late homework is not accepted. Your lowest two homework scores are dropped.

Homework Workshops: Homework workshops will be held weekly. The sessions are dedicated to working on the current homework assignment in small groups (at most 3 students per group). Students are encouraged to make serious attempts to solve some problems before the weekly sessions. Students will discuss the problems, brainstorm ideas, and find solutions together. The instructor will be available for assistance and to offer hints. Attendance is optional but recommended.

Workshops are an excellent venue to practice and develop both oral and written communication skills.

Homework Time Impact: Please plan to spend an average of about 10 hours per homework assignment. Part of learning involves trying approaches that do not work. This takes time and can be frustrating, but take heart! Everyone who studies mathematics seriously goes through the same struggle, so you are not alone. Just make sure you allot enough time.

Presentation: During the week of Nov 16 through Nov 20, we will have group presentations. Each presentation will be 20 minutes in length with about 5 minutes for questions. Groups will be assigned at random after the university add deadline. The presentations will focus on theorems, proofs, and definitions in a subfield of pure mathematics, such as calculus, probability theory, number theory, linear algebra, combinatorics, abstract algebra, analysis, etc. Grading is out of 30 points, as follows. Each presentation must include at least one theorem and proof and at least one definition. All group members must speak during the presentation.

10 points: Presentation Proposal. The presentation proposal is a written document. It must describe the content area as well as which theorems, proofs, and definitions will be presented. The initial proposal is due Fri Oct 2.

5 points: Proposal Revisions. Based on feedback from the instructor, revisions to the proposal may be necessary. Groups whose initial proposals are accepted need not submit revisions and automatically earn the full 10 points. The instructor may adjust the proposal if revisions are still necessary. Revisions are due Fri Oct 30.

15 points: Oral Presentation. The presentation will be assessed in 5 key areas, each equally weighted and worth 3 points each.

1. Accuracy: are the theorems, proofs, and definitions mathematically correct?
2. Clarity: is the presentation well-organized, with neat boardwork/slides, and communicated in an effective way?
3. Proposal Adherence: does the presentation agree with the final proposal?
4. Group Contribution: are all members participating in a balanced way?
5. Question and Answer: does the group understand and respond appropriately to questions?

It is expected that all group members will contribute equally and earn the same grade. In the event that a group member fails to contribute equally, please see the instructor and appropriate arrangements will be made on a case by case basis. If a group member is absent on the day of the presentation, then the absent student earns a score of zero for the oral presentation.

Quizzes: We will have short quizzes in class on most Fridays. Quizzes cover material on the corresponding homework. No calculators or other aids are permitted. No make-up quizzes are offered. Your lowest two quiz scores are dropped.

Tests: There will be 3 tests, each covering between $1/4$ and $1/3$ of the course material. No aids are permitted. The tests are scheduled for **Fri. Sep. 18, Fri. Oct. 16, and Fri. Nov. 13**. In accordance with the make-up policy, your lowest test score will be replaced by your score on the final exam if doing so will help your grade.

Final Exam: The final exam is **Tues. Dec 8, 2:00pm-4:00pm**. All students must take the final exam during the scheduled exam period, unless specifically exempted by university rules. No aids are permitted. The final exam is cumulative.

Expected Classroom Behavior: Talking with your neighbors, reading material unrelated to the course, listening to audio entertainment on your headphones, texting, and using a cell phone are not permitted in class.

Grading Rubric: Each homework, quiz, and test is converted to an decimal percentage and weighted equally with other like assessments. The tables below show how course averages are computed and converted to letter grades. The instructor reserves the right to lower these thresholds.

Homework	12%
Presentation	8%
Quizzes	20%
Tests	$13\% \cdot 3 = 39\%$
Final Exam	21%
Total	100%

A: 90-100	B: 80-89.9
C: 70-79.9	D: 60-69.9
F: 0-59.9	

Make-up Policy: Students who miss quizzes or tests due to a University Sanctioned Absence must present documentation to the instructor at least a week before the missed quiz or test. An alternative time to take the quiz or test will be scheduled, typically before the ordinary quiz or test date.

Excused absences that result in a missed work are, to the extent possible, accommodated by dropping the assessment (homeworks/quizzes) or by final exam score replacement (tests). Excused absences have the highest priority for dropping/replacing an assessment. In the event that a student's excused absences exhaust the provisions for dropping/replacing, make-up work may be required. Students must notify the instructor of excusable absences as soon as possible.

Regrade Policy: Regrades may be requested by submitting the original work with a written explanation of your request up to 1 week after the work is returned. Regrade requests are to be used to correct errors in grading. Regrade requests that challenge the amount of a deduction are usually not considered, since deductions for common mistakes are applied uniformly to all students. When regrading, the entire problem(s) in question will be reviewed, and all discovered errors in grading (including any that previously favored the student) will be corrected. The resulting grade may be higher than, equal to, or lower than the original.

Academic Integrity: You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will, at a minimum, result in an academic penalty of a score of zero on the assignment or test in question. Additional disciplinary measures are possible. For more information, see the university's Student Conduct Code.

SpeakWrite: Math 303 has been designated as a SpeakWrite course by the Eberly College of Arts and Sciences. This class is committed to helping you communicate your knowledge effectively as you keep four key components in mind: purpose, audience, conventions, and trouble spots (or PACT for short). You can find resources at SpeakWrite.wvu.edu.