

# Contents

## MAT 1005: Brief Introduction to Mathematics

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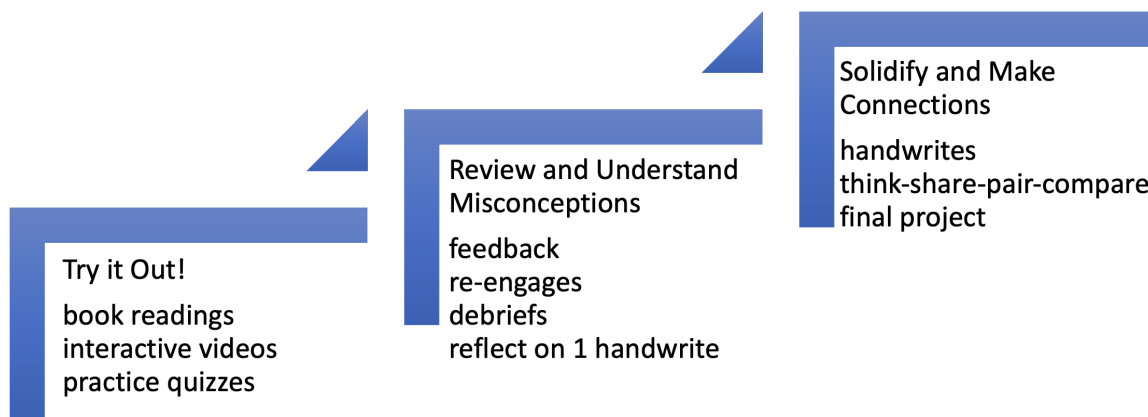
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### 1.1 Required Resources

- scientific calculator or calculator app which can do powers ( $y^x$  or  $x^y$  or  $\wedge$  symbol).
- scanning handwritten work: for handwrites, the course is designed so that you'll collate handwritten work into one full size multipage PDF. You can electronically annotate a PDF using an electronic stylus, or write on a printed copy or on notepaper to collate it like by using Adobe Scan or CamScanner from a phone. You can also use many printers or photo copiers to scan to PDFs—the school library lists that as an option and they can help: <https://library.appstate.edu/services-search/print-zone-tech-help>.
- reliable access to technology, software, and high speed connectivity

The work you're going to do for class you'll be accessing though your internet connection with a device, so it will be really important to have access to a dependable high-speed internet connection, a good computer that can run everything we'll need, and a camera to scan written work in. Software is free, including Microsoft Excel because any faculty, staff or student with a valid Appstate email address can download Excel on their own computer, work on campus computers, or work on office.com. We will use the Excel version that runs on a computer for some of the functions. For optional office hours, we'll use Zoom videoconference software and for the final project you'll be making a video project. If you don't already have one you'll also need access to a webcam, headphones or speakers and a microphone. Flexible browsers that will play common media formats from various sources such as from webpages, Google Drive, YouTube, and ASULearn, including interactive videos, are also something we'll use. You may need some flexibility in browsers so that if one browser is incompatible, you can try another. Online students are expected to have or acquire proficient computer skills and to resolve their own technology problems related to computers or internet access to turn things in before deadlines. Work early and leave yourself enough time before any strict deadlines to allow for technical issues that may arise. For example, ASULearn will typically be undergoing monthly system maintenance on the last Thursday of each month. <https://asulearn.appstate.edu/?redirect=0> announces downtime and <http://Support.appstate.edu> and <https://confluence.appstate.edu/display/ATKB/Appalachian+Technology+Knowledge+Base> can help.

### 1.2 Assignment Types, Grades, and Policies



- **Effective ASULearn Engagement 50%**

This includes every single item you see on the PDF calendar below, from marking as done that you read postings, feedback and grades, to viewing readings, completing quizzes, interactive videos, and handwrites so they are “Done” at a passing level, completing as “Done” re-engages and debriefs, and all the other items too. Generally, the percentage of completed activities determines the overall engagement grade. Evidence of deep and conscientious engagement in the activities is a part of the grade, which may be adjusted at the end of the semester to reflect it. ASULearn provides detailed reports. No lates allowed but to accommodate for emergencies, the lowest 1 is dropped\*.

Activities include

- book readings. To earn completion you will self-report completion on book readings from *How Do You Know?: Using Math to Make Decisions* by Holly Hirst and Jimmy Smith, which are linked within ASULearn. I recommend taking notes on concepts and examples.
- interactive video activities. You’ll watch the entire video and submit the correct answers for completion—you’ll use the check feature on interactive questions in order to help you so you can redo the responses until you get them all correct. Try to complete videos by the listed due date although they can be completed until the end of our course. The video activities are repeatable and you can slow down or speed up the videos and rewind them. I have video slides and more available from the “(optional) slides” page at the top of ASULearn. You can also watch these videos without the interactions from the YouTube link at the bottom right of the video as a review or introduction. I don’t monetize these videos but YouTube may put commercials in anyways. You can change watch?v= in the address to embed/ to get rid of those as the embedded copy that goes in ASULearn is always commercial free.
- practice quizzes. practice with instantaneous feedback check from me are repeatable until the deadline to obtain completion. The point is to practice and examine the feedback to make sure you understand rather than obtain a perfect score. A good faith effort makes use of the instantaneous feedback I’ve programmed in while you are taking the quiz so that you can use them to correct your responses. I only use the checks I see on my end, not the specific score. If you weren’t able to succeed by the first deadline then a second chance will stay open until the end of our course, but completion is easier to obtain when it is originally due (70% instead of 90%).
- handwrites. handwritten assignments apply course material in novel settings and approach problems from numerous points of view, including spreadsheets, tables, or calculators, to draw connections and think out of the box. You must submit your responses as one full size multipage PDF to the ASULearn assignment by the strict deadline. Completion is earned through a Jedi or Jedi Master grade. A Padawan grade does not earn completion but you can resubmit if it is before the deadline.
- re-engages and debriefs. Assignments where you compare with solutions and reflect earn their own completion credit. Try to complete these by the listed due date although they can be completed until the end of our course.
- additional completion activities include hand-ins, forums, surveys, glossaries, videos, web pages, PDFs... You self-report completion in some activities and in others completion is earned when you access them or submit responses. Some may have specific cut-off deadlines and others can be completed up until the end of our course.

Appalachian’s General Education Program prepares students to employ various modes of communication that can help communities reach consensus or respectful disagreement: successful communicators interact effectively with people of both similar and different experiences and values and in this class you will practice oral and written communication during class by interacting with your peers and me. Regardless of gender, political party, race, religion, sexuality, or more this class is to be a welcoming environment, and so I want you to be sensitive and respectful to each other in upcoming discussions. Part of the welcoming environment is to keep an open mind as you engage in our class activities and explore current mathematical/scientific consensus.

- **Handwrite Portfolio and Think-Share-Pair-Compare 30%**

Because of their importance to the course learning goals, the handwrites are collated as a portfolio and the think-share-pair-compare completion status is also collated, all into a separate numerical grade worth 30%. It is calculated as the percent complete out of these 4 items—the 3 handwrites and the think-share-pair-compare. The handwrites are Benjamin Franklin’s Financial Legacy, Lottery Decisions—Lump vs. Periodic, and Car Amortization. To accommodate for emergencies you can revise and reflect on one handwrite to replace its completion status, if you weren’t able to succeed before the final deadline when solutions open. Otherwise, no lates allowed\*.

- **Final Project 20%**

The final project earns a numerical grade as a separate part of the course grade than the completion items. In the final project you will look back at what you have done and make new connections in a video project that includes slides as well as your voice and face or an avatar representing you. You’ll also conduct peer review of each other’s projects and a self-evaluation as a part of the project. The final project video is ideally turned in by February 25th, with a final deadline of February 27th and the peer review and self-evaluation is ideally turned in by February 27th, with a final deadline of March 3rd. No lates allowed\*.

\* Accommodations in the determination of your final grade may be made for extenuating circumstances that are officially documented to prevent you from completing work early/on time. However, if you expect to miss more than 10% of class activities then I advise you to drop the course. There is no late work or make-ups allowed for strict deadline items. Your grade is based on what I was able to see by the same due date that everyone else had. I have a mechanism for an emergency, technical issue or misunderstanding for a handwrite in the form of optional corrections to replace its grade by the end of the semester. Plus there is flexibility built in and multiple pathways for success in the other items as practice quizzes have multiple chances to succeed, you can resubmit some other items if you allow enough time for that, and the lowest completion item is dropped. If the university cancels classes or changes them, we may adapt the above. The grading scale is:  $A \geq 93$ ;  $90 \leq A- < 93$ ;  $87 \leq B+ < 90$ ... and there is no rounding when converting the numeric weighted average to a letter grade.

### 1.3 Academic Affairs and University Policies

We adhere to the University-wide syllabus and policy statements:

<https://academicaffairs.appstate.edu/resources/syllabi-policy-and-statement-information>  
and University policies like on [https://policy.appstate.edu/Policy\\_Manual](https://policy.appstate.edu/Policy_Manual)

### 1.4 Course Communication and Related Policies

- Office Hours and ASULearn Forum: My office hours are on Zoom Sunday, Tuesday, and Thursday 7–7:45pm and Monday and Wednesday 10–10:30am and 11:30am–12:30pm via the link in the need help forum on ASULearn:

<https://asulearn.appstate.edu/course/view.php?id=183478>

I encourage you to talk to me often in help hours and on the ASULearn forum. Any changes, extra additions or cancellations are announced in class and/or online. Please use a salutation of Dr. Sarah, my preferred name, in communications with me. You do not need to make an appointment to use office hours—just drop by! I am happy to answer your questions, go over material you are not feeling comfortable with, or help you work on homework. If someone else is in my office hours, join us—we’ll take turns for questions. I strongly prefer that you use help hours, but if you can’t make them, message me on the ASULearn private forum, which I’ll try to answer at least once a day. The department has a policy that defines timely communication as generally within 3 working days, but I aim to respond to you and get items back to you sooner when possible.

- Check course web pages often for work.
- Inclement weather or class changes: If the university cancels classes or changes them, check the class web pages for updated info, if updates are needed. If courses are to be winterized then work is still due as listed.

- Use standards of professionalism and collegial communication as you focus your communication on course content and structure. Sarcasm, slang, and jokes can be misinterpreted in an online environment. Remember your audience and create messages that satisfy our course welcoming environment above and contain relevant details, including preferred first name. Offer details and examples which support your viewpoints. If you haven't heard back from me yet, only message again if you are addressing a new and separate issue or retracting a previous message.

## 1.5 Course Goals, Curricular Components, and Learning Outcomes

You'll receive 1-hour of general education quantitative literacy credit as we study:

- *Personal Finance and Beyond Algebra* How we apply algebra to interest formulas and decisions we make about our own lives.
- *Departmental course guide* This course is explored through the the lenses of numerous disciplines and interdisciplinary approaches, which we will compare, contrast and connect to mathematical thinking, including business, economics, ethics, history, mathematics, and philosophy. We examine course topics through a combination of theoretical derivations, problem solving and analyses, and real life connections. We also employ technology such as spreadsheets, calculators, and other mathematical software.
- *Catalog description:* This course is an introduction to mathematical problem solving. Emphasis is on the development of conceptual understanding rather than on computational drill. Using appropriate computational tools, including computers, is fundamental to the course. All sections cover personal finance. MAT 1005 is not open to students with 4 hours of QL credit. Prerequisite: 3 hours of QL credit.
- GEN ED Thinking Critically and Creatively
  - I can explore applications of algebra in everyday life, investigate real-world data and interpret key features.
  - I can understand the significance of variables for interest, lump sum, periodic payment and loan repayment formulas.
  - I can apply these formulas to compute and interpret savings, payments, and interest earned or owed on student, car, house, credit card and payday loans.
  - I can utilize technology to answer real-world questions and interpret results.
- GEN ED Communicating Effectively
  - I can communicate quantitative information using a variety of representations, including numerical, algebraic, and tables, in handwritten documents and a final project presentation.
- GENED Quantitative Literacy Learning Goals
  - The course will focus on how to recognize situations where quantitative methods can be used to model and solve problems, and employ appropriate tools (specifically technology) in formulating, analyzing, and solving those problems.  
Students will investigate real-world applications, employing spreadsheets and other technologies such as calculators, internet applets, etc., to visualize the situation and assist with non-trivial calculations. Problems are posed in context, and students must identify assumptions, build mathematical formulations, and choose appropriate symbolic and technological tools to solve the problems.
  - The course will examine ways to communicate quantitative ideas and concepts using a variety of representations, including numerical, graphical, and algebraic.  
Students will develop skill in recognizing patterns through investigating real-world applications and producing solutions using algebraic manipulations. Problems are posed in context, and students must identify assumptions and build and solve mathematical formulations, often using multiple representations to solve and/or present the solution to a problem.

- The course will investigate how to recognize and draw upon connections between the mathematical sciences and other disciplines, and between the mathematical sciences and life experiences. Students will explore mathematical concepts in context, examining how mathematics can be used to solve problems from personal finance.
- The course will encourage the development number sense and recognize quantitatively reasonable and unreasonable solutions to problems. Students will relate solutions to mathematical problems back to the real-world situation in which the problem arose. Problems are posed in context, and students identify assumptions, build mathematical formulations, solve the problems, and then explain in context what the solution means, including recognizing reasonable and unreasonable resulting courses of action.

1005 Learning Outcomes	Assessment
Thinking Critically and Creatively Students will develop skill in recognizing patterns in mathematical information, and become logical, flexible, critical thinkers and problem solvers who thoughtfully consider the reasonableness of their solutions	A variety of assessment methods will be used, including interactive videos, quizzes, handwrites, and think-share-pair-compares. All course sections will also include at least one non-trivial application assignment, in which students will be required to not only demonstrate the required quantitative skills, but also effectively reflect upon the reasonableness of their solutions in real-world context in order to receive credit.
Communicating Effectively Students will communicate quantitative information, including graphs, tables, and other mathematical structures in written documents or presentations	A variety of assessment methods will be used, including handwrites and a final project presentation. All course sections will also require at least one non-trivial write-up, in which students will be required to effectively demonstrate the required communication skills in writing or presentation in order to receive credit.

## 1.6 Tentative Calendar Spring 2025

There are 14 asynchronous days on the calendar, representing the 14 weeks of the semester. Since we are a first half semester class, as officially scheduled by the university, this means that we have two of them each week. Thus the 1-hour, first-half semester course essentially equates to a 2-hour course while it is active. Activities on the PDF calendar are meant to be started with a good faith effort and ideally completed by the end of the listed day (or earlier, as they are already open!). However, there is some flexibility built in—the final deadline is 10am on our next academic day. Details for the activities in the tentative calendar below are on ASULearn and <https://www.appstate.edu/~greenwaldsj/1005/s25.html>

	begin and good faith effort by Tuesday final deadline 10a.m. Thur	begin and good faith effort by Thursday final deadline 10a.m. Tues*
1/14– 1/16	read this week’s announcement posting** read percent, proportion and growth 1005 and percents in finance interactive video percent practice quiz add ASULearn profile pic	share your own intro video read syllabus re-engage percents
1/21– 1/23	read this week’s announcement posting** peer review your classmates videos read saving and investing lump sums lump sum interactive video	lump sum practice quiz research real-life rates and turn in
1/28– 1/30	read posting(s), assignment feedback, grades** re-engage lump sums handwrite intro interactive video <a href="#">Benjamin Franklin</a> <a href="#">handwrite</a> — <b>strict deadline</b> must be turned in to the ASULearn assignment	debrief handwrite read saving and investing periodic payments periodic payment interactive video periodic payment & lump practice quiz

2/4– 2/6	read posting(s), assignment feedback, grades** re-engage periodic payments <b>lottery decisions</b> <b>handwrite</b> — <b>strict deadline</b> must be turned in to the ASULearn assignment	debrief <b>handwrite</b> read loans and amortization loan interactive video loan, periodic & lump practice quiz
2/11– 2/13	read posting(s), assignment feedback, grades** re-engage loans <b>car amortization</b> <b>handwrite</b> — <b>strict deadline</b> must be turned in to the ASULearn assignment	debrief <b>handwrite</b> glossary think-share-pair-compare + final project video
2/18– 2/20	read posting(s), assignment feedback, grades** think-share-pair-compare	debrief think-share-pair-compare continue working on final project
2/25– 2/27	read posting(s), assignment feedback, grades** <b>turn in final project</b> — <b>strict deadline</b> must be turned in to the ASULearn assignment	<b>peer review final project</b> — <b>strict deadline</b> course survey course evaluations <b>last call on any open items</b> — <b>strict deadline</b> * (optional) revise and reflect on one <b>handwrite</b> to replace it— <b>strict deadline</b>
<b>Mon</b> 3/3	any still open items are due by 10am— <b>strict deadline</b>	

\*Last Thursday assignments are due by Monday 3/3 at 10am as the course ends.

\*\*I will post regularly in the Dr. Sarah’s announcement forum and possibly also in the need help forum. I recommend keeping up with my posts as they go out to you. I will also provide feedback regularly in assignments themselves, both instant feedback that I programmed in and personalized feedback on your handwrites.

## 1.7 Where to Get Help and Additional Policies

The CBMS published a statement titled “Active Learning in Post-Secondary Mathematics Education” about the importance of “classroom practices that engage students in activities, such as reading, writing, discussion, or problem solving, that promote higher-order thinking” and our activities are modeled after that. The purpose of engagement is to learn and practice computational strategies, concepts, and develop critical thinking and problem-solving skills, so you should first try problems on your own. This course focuses on mathematics in context. Real-life considerations can be ill-defined and have multifaceted aspects. Whether it is understanding why the Franklin funds never earns 5%, or many of the other concepts we will consider, many cases require the critical and creative analysis of a variety of interpretations in order to fully consider the implications. I understand that this can feel frustrating and uncomfortable and I am here to help you. In return, you are expected to contribute to discussions and activities in a meaningful way. Making mistakes is integral to the learning process—the key is to try to continue to engage rather than give up—and this course is to be an environment in which you ask questions and offer good guesses. It is on purpose that there are problems that don’t look exactly like what we did previously in order to provide you with rich settings to explore in order to learn deeply. Even if you achieved completion, you might still have some errors, so be sure to use my feedback to help solidify your understanding. Asking questions, and explaining things to others is one of the best ways to improve your understanding of the material and I am always happy to help.

I believe that each of you has the capability to succeed in this course. Yet, sometimes, in order to succeed, we must change certain behaviors, study habits, and/or emotional reactions. Everyone (including Dr. Sarah and other mathematicians) struggle with mathematics at times. Success in mathematics is not determined by whether it comes naturally or seems “clear”. Instead, success in mathematics is all about learning to use mistakes and material we are struggling with in order to grow.

You should expect to put in the necessary time outside of class in order to complete assignments on time. As per the University-wide Statement on Student Engagement with Courses you can expect to spend (on average) 2–3 hours outside of class for each hour we would have met in class.

You are responsible for all announcements and postings so check ASULearn often.

I also want you to be informed about your choices regarding what you tell me about certain types of sensitive information. In situations where students disclose experiencing an act of interpersonal violence to their instructor,

faculty are required to report what students tell us to the campus Title IX Coordinator, who then reaches out to the student by email offering support services. I care about you and want you to get the resources you need. I'm happy to talk with you if you decide you want that, but please be aware that if instead you'd like to explore options with someone who can keep your information totally confidential, I highly recommend the Counseling Center at 828-262-3180. They offer walk-in hours as well as after-hours coverage: <http://counseling.appstate.edu>

- Appalachian Cares is a place to find updates about matters of student health and safety. It also functions as the most up-to-date clearinghouse of information, resources and support available.  
<http://appcares.appstate.edu/>
- The library offers Research Advisory Program (RAP) sessions.  
<http://library.appstate.edu/gethelp/rap>
- Disco Student Learning Center offers academic resources that will complement and enhance classroom experiences by helping students become acquainted with their studies and learn how to learn effectively. For example, you can meet with a study skills specialist to discuss your goals and develop strategies and study plans to meet those goals or arrange for tutoring. "D.D.," or Dauphin Disco, was one of the three people who, in 1899, founded Watauga Academy – known as App State today. The word disco is Latin for learn.  
<https://studentlearningcenter.appstate.edu/>

Academic integrity is a fundamental part of the course, which includes meeting deadlines, attending classes, regular communication, and giving proper reference where it is due. These are essential to course integrity. Feel free to talk to me or each other if you are stuck, but when writing up work, be sure to give acknowledgment where it is due. Submitting someone else's work as your own (PLAGIARISM) is a serious violation of the University's Academic Integrity Code. Violations include, but are not limited to, borrowing, downloading, cutting and pasting, and paraphrasing without acknowledgement, including from online sources, giving unauthorized assistance or allowing an individual's academic work to be submitted as another's work. All course materials and activities are for your personal use only. Do not share or upload this content to any course repository, whether commercial or free, or to any coursework help site. Doing so violates Appalachian State University's Academic Integrity Code.

In this course, you will be challenged with problems that you have never seen before. I do not expect you to be able to solve all the issues immediately. Instead, I want to see what you can do on your own. Out in the real world, this is important, since no matter what job you have, you will be expected to seek out information and answers to new topics you have not seen before. This may feel uncomfortable and frustrating. I understand this and want to help you through the process. It helps to remember that there are no mathematical dead-ends! Each time we get stuck, it teaches us something about the problem we are working on, and leads us to a deeper understanding of the mathematics. In the real world though, you are not expected to face your work alone. You will be allowed to talk to other people and you may even be expected to work with other people. In this class, you are also not expected to face your work alone. I am always happy to help you and will try to give you hints and direction to help you understand the material. At times though, to encourage the exploration process, I may direct you to rethink a problem and to come back to discuss it with me again afterwards. This occurs when I believe that the struggle to understand is imperative for your deep understanding of the material.

## 1.8 Advice from Prior Students

- Be sure to complete all the assignments mentioned in Dr. Sarah's announcements. I initially had some difficulty because I was trying to use the App and notifications but some items didn't show there. I recommend a web browser where the layout of the assignments in ASULearn was self-explanatory and direct.
- The videos with constant knowledge checks, quizzes with instant feedback, and handwritten assignments with Dr. Sarah's personalized feedback helped me to better understand the concepts and apply them in the next activity, so I recommend you take the time to use these resources.
- My favorite part about this class was Dr. Sarah allowing us to go back and look at our mistakes, work through our mistakes and work with those same problems until we understood where we went wrong. This was on the quizzes and if I turned in a handwrite early enough, so be sure to take advantage of them. This was a tremendous part of my growth and understanding these concepts better.

- Dr. Sarah made sure to give us plenty of information and connections to real life when teaching the math topics and was available to ask questions on the ASULearn forum and in Zoom if I ever needed help.
- I recommend working on this class when you are not stressed and have free time. I liked being able to set my own schedule for the most part to meet the strict deadlines.
- I would say if you have the extra time and want to work ahead, work ahead. This course is really forgiving so if you know you have extra time one week and no time next week, just complete everything early. Then when you're busy all you have to worry about is the one or two things that have specific open dates/times. It is easy to not prioritize this class because it is online but it should be prioritized as any other class.

## 1.9 Instructor Bio

I am a full Professor of Mathematics, and I am also an affiliate of Gender, Women's and Sexuality Studies (GWS) and the Math and Science Education Center, investigating the connections between mathematics and society. My PhD is from the University of Pennsylvania. I am married to the bassist Joel Landsberg. In our spare time, we like to travel, hike, kayak and conduct genealogy research. In addition to my own personal genealogy, I like to give back to the broader community, and in this context, I am affiliated with ASU's Center for Judaic, Holocaust and Peace Studies. Some of what I like about mathematics is also what I enjoy about genealogy—the sense of exploration, discovery and aha moments that come with lots of patience and effort. For more information, see <http://cs.appstate.edu/sjg/>.