

University of Alabama at Birmingham
MA 513 3B *Patterns, Functions, and Algebraic Reasoning*
Fall 2020 M/W 5:30-6:45pm
Teaching Time Zone: Central Time [U.S. Official Time Zone Site](https://www.time.gov/)

Instructor: Tami Puchta, Ed.S.

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Virtual Office Hours: TBA on Canvas **Zoom Contact:** 5447109945

Remote: This class will be conducted virtually using a combination of live and recorded content through Canvas, Zoom, and other tools using the Canvas Learning Management system. Students should reserve the days and hours listed in the Class Schedule for live course elements, determined by the instructor. Students will not attend class on-campus.

Preferred Methods of Contact:

Email is the preferred method of contact if you have questions. Please expect a response within 24 hours on weekdays and a slower response on weekends. Include the course number and section in the subject line of your email for a faster response. I am available to meet with you virtually via Zoom by appointment.

Text & Supplies: There is no official textbook for this course. You will need graph paper, a ruler, colored pencils or pens, and a way to organize handouts from class.

Course Description

The focus of this course will be to help enhance your mathematics background so that you may teach a rich K-8 grade curriculum as specified by the National Council of Teachers of Mathematics' *Principles and Standards for School Mathematics* and the *Alabama State Course of Study: Mathematics*. **This course will be taught differently from perhaps any mathematics course you have ever taken.** It is guided by UAB's participation and collaboration in the Greater Birmingham Mathematics Partnership. This is a joint venture between UAB (Schools of Education, Engineering, and Dept. of Mathematics), Birmingham Southern College, the Mathematics Education Collaborative (MEC), and several local school systems. The project has its foundations in the work of Dr. Ruth Parker of MEC and the constructivist view of learning. Constructivism is a theory of teaching and learning based on the work of Jean Piaget. It emphasizes the learner taking an active role in constructing her/his own learning as the learner interacts within an environment.

The goal of this course is that you become mathematically powerful students and that you become *competent* and *confident* problem solvers. The content and experiences in this course will lead you toward this goal. My role as the instructor will be to provide guidance and support as *you* make sense of mathematics. True understanding will only come when *you* make sense of a situation. My role is not to tell you everything about the subject, nor is it to answer all of the questions that will arise as you engage in problem solving. You will at times experience confusion and perhaps frustration. This is a natural part of the learning process. I will try to help *you* reflect and work your way out of confusion before your frustration becomes debilitating to your learning. Don't be afraid of wrong answers. Sometimes learning occurs by multiple attempts down wrong paths until you find a correct path.

You will learn while working in teams, in pairs, and as an individual as you solve problems. Listening to others as you engage in collaborative problem solving will help you see a variety of points of view

and several ways of solving a problem. In groups, you are not to 'teach' someone how to solve a problem and you are not to direct others to think in a certain way. Each person must think for her/himself and make sense of the situation. For many problems, I will insist that you not be satisfied with simply finding one way to solve a problem. Instead, I will push you solve problems in multiple ways. **While getting the right answer is a goal in solving a problem, understanding how you got to the answer is also important, as is being able to communicate your understanding to others.** While collaborative learning is desired, you are at the same time individually accountable for learning the material.

The content of the course will include problem solving experiences, inductive and deductive reasoning, patterns and functions, and some concepts and applications of geometry. The patterns and functions examined will include linear and quadratic relations, as well as some functions of a higher order such as cubic or exponential functions. This is not a course in the usual formal methods of algebra as you may know it. You won't be doing extensive polynomial manipulations. Instead, you will be developing algebraic thinking and reasoning.

Learning Outcomes

1. Apply inductive and deductive reasoning to problems.
2. Identify and solve problems involving patterns that form linear and quadratic functions.
3. Create and thoroughly explain expressions for patterns involving summations and/or figurate numbers.
4. Apply a variety of problem-solving strategies in order to solve both geometric and word problems involving patterns.
5. Identify patterns on Pascal's Triangle. Write an expression that works for multiple patterns identified.
6. Identify properties of geometric figures and apply these in problems.
7. Demonstrate knowledge of concepts of number and number relationships, number systems, number theory, estimation, and computation in the context of problem solving.
8. Communicate mathematical ideas orally and in writing including making mathematically convincing arguments.
9. Demonstrate a positive disposition toward persistence and reflection in doing mathematics.
10. Demonstrate the ability to interact within groups, and with the class as a whole, while demonstrating cognizance of working with students at different levels.

Course Requirements

1. **Attendance and active participation in all sessions. Because active group participation is an essential component of this course, missing 33% or more group discussions for unexcused reasons will result in a grade of F for this course.**
2. You may collaborate on solving Menu 1 and 2 tasks. However, it is imperative that you are able to solve problems independently on the exam. Graduate students are required to complete four additional and more complex problems for Menu 1 and 2. These will be distributed in class.
3. Complete individual menus of problems, group tasks, and homework problems. If you must miss class, you are expected to complete any missed group work or tasks from the missed class.
4. Complete article reviews and other readings. Full directions and expectations for these assignments are on Canvas.
5. Participate in assigned group discussions on Canvas.

6. Complete an in-class Midterm Performance Assessment near the middle of the semester and a Final Performance Assessment at the end of the semester.
7. Develop a Final Mathematics Portfolio. Directions will be provided on Canvas.
8. Complete a final mathematics task to be included in your Portfolio. This task will be distributed in class and is in addition to the Portfolio tasks described on Canvas.
9. Have a positive and productive disposition toward yourself, your classmates, and mathematics. Be respectful of fellow classmates and the instructor as you share ideas.

Course Policies

Grading

Students earn their grade in the course as shown in the table below. Points accumulated will be recorded in CANVAS. Important due dates will be listed in CANVAS calendar.

Assignments	Percent of Final Grade
Math Menus (2)	20
Article Reviews	10
Discussion Groups	12.5
Midterm	20
Mathematics Portfolio	10
Participation/Attendance*	5
Final	22.5

Percent Earned	Final Grade
92-100	A
82-91	B
72-81	C
<71	F
Please note there is no grade of D for graduate students.	

* The participation score is intended to recognize those who put forth a maximum effort and demonstrate persistence in problem solving. The instructor will use her best professional judgment in awarding the 5% for this item based on a student's full participation in class activities, attempts at completion of challenging tasks, and may be influenced by a student's attempts or non-attempts at dessert items from the menu problems. Five percent will be awarded to students who: have few or no absences (and make up the work for any absences), actively participate in all group and independent tasks, demonstrate persistence in pursuing challenging problems and tasks, show craftsmanship in solving problems and seek to extend their thinking on problems, stay on task without reminders during class activities, show the ability to work independently on tasks, demonstrate the ability to work with others on tasks without providing too much assistance, complete all required tasks on the menus and give good faith attempts at some of the desserts on the menus. The instructor's decision here is based on his/her professional experience and is the final judgment on this item.

Exams

An online midterm and a final are scheduled for this class. The midterm will occur during a regular class time and the final will take place during the scheduled final time for this section. See the [Final Schedule](#) here. Make-up exams will be scheduled only when requested within the first week of the term for a valid and verifiable reason or in case of an extreme emergency.

Attendance and Tardiness/Early Departure Policy

Attendance every day is expected and essential to success. Please be on time to class and let me know as soon as possible if it is necessary to miss class. **Class roll will** recorded for each class. It is your responsibility to talk with your peers regarding what you missed, ask classmates to turn in your assignments, etc. You are responsible for content missed during your absence. Tardiness to class and early departures are disrespectful to the instructor and your classmates.

Late Assignments/Revisions

All assignments are due on the indicated day and time in Canvas unless otherwise instructed. In the event the instructor will accept a late assignment, ten percent of the assignment grade will be deducted per day late. Once an assignment has closed on Canvas, no late assignments will be accepted except in extreme circumstances. No revisions will be possible unless requested by the instructor. If the instructor requests a revision of an assignment, the grade you receive will be an average of the first and second attempts.

Discussions:

You will be assigned to at least one discussion group each week where you will discuss given patterns or tasks to discuss. There are two parts to the discussion – your initial post and your responses.

- Your initial post should show your current thinking about the assigned task. You may submit an incomplete solution but do show what you have figured out so far.
- You are also expected to respond to at least two posts by other students. Your initial and response posts must be of substance. Posts *only* saying “I agree with your point” or “I did it the same way” are not substantive and will not be counted. Here are some tips on how you can make your post substantive:
 - State how your solution is the same or different than others and how/why.
 - If you are truly stuck, be specific about what you do know (what the problem is asking, what do you know so far) and what kind of help you think you need. NOTE: Simply “getting an answer” that you do not understand will not help you very much in this class.
 - Ask a specific question about someone’s solution.
 - Expand on at least one idea shared in the conversation.
 - Connect your solution or someone else’s to a previous pattern or task.
 - Ask follow-up questions
 - Answer questions that your peers or instructor ask about your post

At the end of some task/projects, you will be required to fill out a group self-evaluation form to evaluate other team members’ contributions to the project.

Time Commitment:

This class meets twice per week for 1.5 hours each. In addition to our virtual class time, you should spend about 6 hours per week reading, studying, preparing for class discussions, and completing assessments.

UAB Policies

Add/Drop and Course Withdrawal

- **Drop/Add:** Deadlines for adding, dropping, or withdrawing from a course and for paying tuition are published in the [Academic Calendar](#) available online. Review the [Institutional Refund Policy](#) for information on refunds for dropped courses.
- **Withdrawal:** To avoid academic penalty, a student must withdraw from a course by the withdrawal deadline shown in the academic calendar and receive a grade of W (withdrawn). Failure to attend class does not constitute a formal drop or withdrawal.

Academic Misconduct

The University of Alabama at Birmingham expects all members of its academic community to function according to the highest ethical and professional standards. Students, faculty, and the administration of the institution must be involved to ensure this quality of academic conduct. Review the Academic Honor Code and Non-Academic Student Code of Conduct located in the Course Information Module on Canvas.

Academic dishonesty and misconduct includes, but is not limited to, acts of abetting, cheating, plagiarism, copying homework, fabrication, and misrepresentation. Candidates are expected to honor the UAB Academic Code of Conduct.

Non-harassment, hostile work/class environment:

The UAB College of Arts and Sciences expects students to treat fellow students, their Course Instructors, other UAB faculty, and staff as adults and with respect. No form of hostile environment or harassment will be tolerated by any student or employee. In this class, we will only use constructive criticism and will work to build a community of life-long learners.

Title IX Statement

UAB is committed to providing an environment that is free from sexual misconduct, which includes gender-based assault, harassment, exploitation, dating and domestic violence, stalking, as well as discrimination based on sex, sexual orientation, gender identity, and gender expression. If you have experienced any of the aforementioned conduct we encourage you to report the incident. For more information about Title IX, policy, reporting, protections, resources and supports, please visit <http://www.uab.edu/titleix> for UAB's Title IX Policy, UAB's Equal Opportunity, AntiHarassment Policy and Duty to Report and Non-Retaliation Policy.

Course Netiquette:

There are course expectations concerning etiquette on how we should treat each other online. It is very important that we consider the following values during online discussions and email.

- **Respect:** Each student's opinion is valued as an opinion. When responding to a person during the online discussions, be sure to state an opposing opinion in a diplomatic way. Do not insult the person or their idea. Do not use negative or inappropriate language.
- **Confidentiality:** When discussing topics be sure to be discreet on how you discuss children, teachers, and colleagues. Do not use names of people or names of facilities.
- **Format:** When posting use proper grammar, spelling, and complete sentences. Avoid using ALL CAPITALS. This signifies that you are yelling. Avoid using shortcuts/text abbreviations such as 'cu l8r' for 'See you later.'
- **Relevance:** Think before you type. Keep posts relevant to the discussion board topic

For classes in which you are on campus:

UAB United: Safe Entry to Campus

Please go to the [UAB United website](#) for guidance and resources related to our safe entry to campus in Fall 2020, including information on:

- [Testing](#)
- [Academic resources and in-depth information](#)
- [Student Affairs resources](#) to support all students (housing, dining, extracurricular activities, parking, etc.)
- [Health and safety resources and recommendations](#) for on and off-campus

- Information for [graduate students](#)

All students should use the [Student COVID-19 Entry Checklist](#) to see what they have to do in order to enter the campus safely. **Non-compliance with the required items will result in students not being able to remain on campus or participate in any in-person classes, meetings, jobs, extracurricular activities, and events.**

Mandatory Masks and Social Distancing Requirements:

- In accordance with CDC guidelines and for the health and wellbeing of all faculty, staff and students, students, faculty and staff are required to wear cloth face coverings or face masks at all times and maintain social distancing (6 feet between individuals in traditional classrooms, or, in instructional laboratories and similar settings) while on the UAB campus. Instructors have the right to ask those who are not complying with these requirements to leave class in the interest of everyone's health and safety. In the event that a student refuses to comply with these requirements, the instructor has the right to cancel class.
- Additionally, following other simple practices will promote good health in and out of the classroom, such as frequent and thorough hand washing, wiping down desks and seats with disinfectant wipes whenever possible, not sharing personal items such as pens and cell phones, and avoiding crowded areas and other enclosed spaces.
- The UAB Blazer community views the adoption of these mandatory guidelines as a mark of good citizenship and respectful care of fellow classmates, faculty, and staff. Please visit the [UAB United website](#) for further information.

Food may not be consumed during class times in classrooms, but bottled water is permissible.

GuideSafe Event Passport Class Requirement

Faculty are required to verify all students who are present for in-person instruction have a current Event Passport.

The COVID-19 pandemic is an extraordinary situation requiring significant measures to create a safe educational community. UAB is using GuideSafe™ Event Passport to facilitate access to classrooms, meetings, events, or facilities having ten or more people. Attendees, including faculty, staff, and students, will complete [UAB Healthcheck](#), a COVID-19 assessment tool, prior to entering their event. An Event Passport is issued based factors from your daily risk level as assigned by the UAB Healthcheck. After you have completed Healthcheck, press the “Passport” button to get your passport. This passport is good for 24 hours. Remember your passport number to access your passport later in the day. Each user is assigned a unique passport number indicating their status for the upcoming event that will show a “Clear” (Green) screen or “Not Clear” (Red) screen. After the 24-hour passport has expired, you will need to complete Healthcheck again. Each passport will have a time and date to ensure validity. Learn more at [UAB GuideSafe Event Passport](#).

Syllabus: This syllabus is subject to changes announced in class.