

Arcadia University
Fall 2021
Math 117, Mathematical Concepts I
Tues/Thurs – 8:30-10:10(OL1), 10:20-12:00(OL2), 2:10-3:50(OL3)

Instructors: Taylor Marsh; Molly Pooler(around November**))

Email: MarshT@arcadia.edu; PoolerM@arcadia.edu

Office Hours: I will be available most Tuesdays & Thursdays from 12:30-2 or 4-5, please just let me know ahead of time that you would like to meet. Send me an invite through google calendar.
Office hours for Professor Pooler will be virtual by appointment.

Prerequisite: MA095 or placement exam

Credits : 4 credits

Arcadia Requirement: Satisfies AUC QRM.

Course Materials:

TEXT: Burger, Edward & Starbird, Michael - *The Heart of Mathematics*, 4th edition, Wiley Publishing.

CALCULATOR: basic operations capabilities (fractions, and exponents)

Course Overview:

Hello! Welcome to Mathematical Concepts I! This is the first semester of a two-semester sequence of courses (but it's OK if you only take this semester's course). We will explore some of the greatest ideas of humankind within the scope of mathematics and various problem-solving techniques. The main mathematical ideas we will cover include logic, number theory, and the concept of infinity. This will be very different than a traditional math course and in fact very little mathematical background is expected. I ask you must come into this course with an open mind and a willingness to make mistakes and learn from them.

Class time will be spent introducing new mathematical concepts, going over assignments, working in groups, and investigating unsolved problems (not all of which will have a clear and definitive answer). We will follow the first half of the book very closely, but not every single topic is covered in class. Students should have their textbook every day. Please do not work ahead on HW problems unless you know you will be absent. Often, we start these in groups in class.**

**This semester we will start as a synchronous online course and will transition to an asynchronous course on or around the first week of November once I go on maternity leave. At that point, Professor Pooler will take over for the remainder of the semester.

Learning Outcomes:

Upon successful completing this course, students will be able to:

1. Develop a deeper understanding and appreciation for rich mathematics ideas
2. Build sharper skills for analyzing problems
3. Develop a new perspective and outlook at the way you view the world by connecting these ideas and applying these mathematical concepts to everyday life

These *general* outcomes will be accomplished through the exploration of the following *specific* topics:

1. Logic puzzles
2. Counting/pigeonhole principle
3. Fibonacci numbers
4. Prime numbers
5. Modular arithmetic
6. Irrational numbers
7. Real numbers
8. 1-1 correspondences
9. Cantor's Diagonalization
10. Sets, power sets
11. Infinity within geometry

Quizzes/Exams

There will be 3 quizzes and 1 cumulative final exam. If you miss a quiz/exam or are caught cheating a 0 is automatically assigned. Don't cheat it's not worth it!

*Details to follow how we will complete this online

Homework/Assignments

Homework will primarily be in the form of problems from the textbook called "mindscapes" at the end of each section. **All** homework is expected to be completed, however only a few mindscapes will be collected and graded. HW grades will be based on *thorough completion and effort*. I need to see a well thought out process and effort not just random scribbled down answers. You are allowed and encouraged to work together on HW assignments (no copying answers). We review HW in class so you must be prepared to ask questions.

It is expected you read the sections after we have completed it in class.

There will also be 2 short written assignments throughout the semester and some graded discussions on canvas.

Attendance Policy

I will take attendance for all our live classes. You are permitted up to 2 absences for any reason, 3 or more will adversely affect your grade (unless excused).

- If absent, you are expected to get any missed notes from a classmate, and to have all assignments completed upon return. A missed quiz will result in a 0.

Grading breakdown

- Class attendance, participation, webcam on	8%
- Written responses (x2)	12%
- Checked Mindscapes and other canvas assignments	20%
- Quizzes (x3)	30%
- Final	30%

Total

100%

This break-down of grades is tentative and subject to change with ample notice. I follow a standard letter grade assignment. I generally DO NOT round (79.8 = C+).

MA117 – Course Overview

Section	Topic	Tentative Related Mindscapes (in class/HW)
Ch 1	Logic puzzles/games	1.1 – Story 1,2,3,5,7,8,9,10, worksheet 1.4 – 1,2,3,4,5,10,20
Ch 2 - Number Theory	2.1 - Counting/pigeonhole principle 2.2 - Fibonacci Numbers 2.3 - Prime numbers 2.4 - Modular Arithmetic 2.6 - Irrational Numbers 2.7 - Real number line	2.1 – 1,2,3,4,5,6,8,14,20 2.2 – 1,2,3,6,7,8,10,14,16,34 2.3 - 1,2,3,5,7,8,9,11,12,14,22,24,37,38 2.4 – 1,2,6,7,8,10,13,22,26,32, Written assignment #2 2.6 - 1,2,3,5,6,7,8,9,10,30 2.7 – 1,4,5,6,8,9,10,12,14,17,20,23,25,29
Ch3 - Infinity	3.1 - Intro to 1-1 correspondence 3.2 - Examples of 1-1 correspondence 3.3 - Cantor's diagonalization proof (naturals vs reals) 3.4 - Sets, power sets, power set theorem 3.5 - Geometrical Correspondences	3.1 - 1,2,4,8,9,10,14,15 3.2 - 3,4,6,8,9,11,14,15,16,18 3.3 - 4,5,9,10,11,12,14,16,17,18 3.4 – 1,2,3,4,5,6,10,12,13,14,15 3.5 - 1,2,3,4,5,9,10,11

Tentative Schedule & Due Dates

<i>Class Date</i>	<i>Sections Covered</i>	<i>Graded Assignment Due</i>
<i>Tuesday, Aug 31</i>	<i>Intro</i>	
<i>Thursday, Sept 2</i>	<i>Ch1</i>	
<i>Tuesday, Sept 7</i>	<i>Ch1</i>	<i>Written assignment #1 by midnight</i>
<i>Thursday, Sept 9</i>	<i>Ch1</i>	
<i>Tuesday, Sept 14</i>	<i>2.1</i>	
<i>Thursday, Sept 16</i>	<i>2.1/2.2</i>	
<i>Tuesday, Sept 21</i>	<i>2.2</i>	<i>2.2 Mindscapes Due 9/22 by midnight</i>
<i>Thursday, Sept 23</i>	<i>2.2/Review Day</i>	
<i>Tuesday, Sept 28</i>	<i>2.3</i>	
<i>Thursday, Sept 30</i>	<i>Quiz #1(Ch1-2.2)</i>	

<i>Tuesday, Oct 5</i>	<i>2.3/2.4</i>	<i>2.3 Mindscapes Due 10/4 by midnight</i>
<i>Thursday, Oct 7</i>	<i>2.4</i>	
<i>Tuesday, Oct 12</i>	<i>2.6</i>	
<i>Thursday, Oct 14</i>	<i>2.6/2.7</i>	
<i>Tuesday, Oct 19</i>	<i>2.7</i>	
<i>Thursday, Oct 21</i>	<i>Review Day</i>	<i>Written Assignment #2 Due by midnight</i>
<i>Tuesday, Oct 26 – NO CLASS</i>		
<i>Thursday, Oct 28</i>	<i>Flex</i>	
<i>Tuesday, Nov 2</i>	<i>Quiz#2(2.3,2.4,2.6,2.7)</i>	
<i>Thursday, Nov 4</i>	<i>Watch 3.1 & Do 3.1 mindscapes</i>	
<i>Tuesday, Nov 9</i>	<i>Watch 3.2</i>	
<i>Thursday, Nov 11</i>	<i>Do 3.2 mindscapes</i>	
<i>Tuesday, Nov 16</i>	<i>Watch 3.3</i>	
<i>Thursday, Nov 18</i>	<i>Do 3.3 mindscapes</i>	<i>Turn in mindscapes on canvas by midnight</i>
<i>Tuesday, Nov 23</i>	<i>Watch 3.4 & Do mindscapes 3.4</i>	
<i>Thursday, Nov 25 – NO CLASS</i>		<i>Turn in mindscapes on canvas by 11/29 midnight</i>
<i>Tuesday, Nov 30</i>	<i>Watch 3.5</i>	
<i>Thursday, Dec 2</i>	<i>Do 3.5 mindscapes</i>	
<i>Tuesday, Dec 7</i>	<i>Quiz #3(3.1-3.5)</i>	
<i>Thursday, Dec 9</i>	<i>Study for final</i>	
<i>TBD</i>	<i>Cumulative Final exam</i>	

Code of Academic Responsibility:

This code may be found here:

<https://www.arcadia.edu/faculty-handbook/6000-course-policies-procedures-and-resources/6004-code-academic-responsibility>

Violations of this code are handled as described here:

<https://www.arcadia.edu/faculty-handbook/6000-course-policies-procedures-and-resources/6005-violations-code-academic>

Academic Support:

Tutoring is available from the [Learning Resource Network](#). Their web page explains the process for joining the Virtual LRN and scheduling appointments. **In-person** tutoring takes place in the Learning Resource Network Lab in Knight Hall, Room 142. Please stop by the LRN to schedule an appointment. Appointments are recommended, but drop-in may be available.

Disability statement:

Arcadia University provides reasonable accommodations for students with documented disabilities. If you require accommodations or other academic supports due to a physical, psychological, psychiatric or learning disability, you should contact Disability Support Services at (215) 572-4033.

Title IX Statement:

“Arcadia University is committed to providing a learning, living, and working environment that is free from discrimination. The University has a [Policy Prohibiting Sexual Misconduct, Relationship Violence, and Stalking](#) detailing our commitment to preventing and addressing such behavior. I understand the impact that sexual harassment and sexual misconduct can have and am committed to doing my part to foster an environment that is safe and equitable.

Please know that all faculty on campus are mandatory reporters. This means that if you disclose an experience of sexual harassment or sexual misconduct to me outside of a classroom discussion, a writing assignment, or a University-approved research project, I must share what you reported to me with Arcadia’s Title IX Coordinator. This does not mean that you will have to pursue an investigation or go through a grievance process. Even if you do not choose these options, the Title IX Office can provide supportive measures and other resources to you.

If you or someone you know has experienced sexual harassment or sexual misconduct, please know that you are not alone. If you would like to speak to someone confidentially, confidential resources are provided on the [Office of Equity and Civil Rights](#) website.”