

Foundations: Patterns, Reasoning and Algebra

Math 250

Spring 2018

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Welcome!

Welcome to Math 250! This is our second introductory course in the foundations of mathematics. Topics will include: finding, analyzing, and describing patterns; inductive and deductive reasoning; advanced problem solving and logic; linear, quadratic and exponential functions; common factors, common multiples and prime numbers. Students will develop a conceptual understanding of the course material through activities that model the pedagogical foundations of the common core standards of mathematical practice. We will work with different representations and have mathematical classroom discussions to make sense of the mathematics and model doing mathematics in an elementary classroom.

Mathematics can be fun and challenging at the same time. Westfield State defines a credit hour as "One hour of classroom or direct faculty instruction and a minimum of two additional hours of student work each week for approximately fifteen weeks for one semester." Since this class is 3-credit hours, that means you are expected to spend at least 6 hours per week working on mathematical homework, reading our book and other literature, writing reflections outside of class or meeting with me.

Recommended Book:

We will read and reflect parts of the book "Mathematical Mindsets: Unleashing Students' Potential through Creative Math, Inspiring Messages and Innovative Teaching" by Jo Boaler. I highly recommend buying the book but will make copies available of particular chapters.

Attendance

Exploration, collaboration, and communication are essential for this class, therefore, attendance is mandatory and active participation contributes to your grade. No make-ups will be given for missed classes, quizzes or exams, except in the event of a true, documented emergency where the instructor is notified in advance--if possible. In such a circumstance, it is the student's responsibility to contact the instructor to make alternate arrangements.

PLATO

We will use our PLATO site to collect the homework, record grades and for additional resources.

Homework Stories

There will be homework, so called homework stories, on a regular basis. If you are absent, you are expected to find out the assignment and complete it prior to the due date. Please see the separate writing rubric for requirements and expectations of homework stories. Late work will only be accepted if you check in with me about it and we agree on a new due date. If there is still time in the semester, homework stories that were not mastered yet, can be redone. You should expect to spend at least 2-3 hours of homework every week.

Reading Assignments

There will be three reading assignments during the semester. Please see the separate rubric for requirements and expectations.

Journals

There will be three journals during the semester in which you will reflect on your current beliefs and attitudes toward mathematics. Detailed rubrics will be handed out in class.

Notebook

I suggest writing all your thinking work during class and outside of class in a notebook or to collect them in a binder. This will allow you (and me) to see how you progress in your thinking and how much effort you put into your work. This notebook/binder is not meant to contain “perfect work” but instead all you attempt, thinking and mistakes. Work that you hand in has to be written up separately.

Academic Honesty

Anyone detected cheating in an exam, the final examination, or the collected exercises, whether aiding or being aided, will receive a zero for that exam or exercise. I encourage you to seek assistance on homework assignments whenever there is a need: in my office, at the tutoring center, or with fellow students. However, one should not simply copy somebody else's work. What you write on your paper should always reflect your understanding of the material. If you were helped in a substantial way, note your helper's name next to the assignment. (Ideas for this syllabus, for instance, are owed to my colleagues Volker Ecke, Phil Hotchkiss and Stan Yoshinobu)

“Help!” You are warmly invited to come and see me whenever you are faced with questions, confusion or concerns -- or to share an exciting discovery. Office hours are times when I'm available *specifically for you*. Please do take advantage of this opportunity. In addition, if my office door is open throughout the week: you are welcome to check in for help on those occasions, as well. If our schedules don't match, email or skype/facetime is a good way to get in touch: feel free to suggest a few times that would work for your schedule and we can make special arrangements.

Preparation

You are expected to come prepared to every class. I will start every class by walking around to check if, indeed, you put in effort outside of class. You should expect to spend at 1-2 hours of preparation every week.

Class Participation

We will work on investigations in class, in groups, and on the blackboards. You are expected to prepare for class, contribute and discuss meaningfully, communicate with your group, and present your group's material to the rest of the class. The following list contains 9 elements of successful participation:

Stay focused on doing mathematics during class.
Be prepared for class. This means you do all assigned problems/tasks and email me if you get stuck.
Work constantly at your learning edge . This includes that if you are behind many other students you will come to office hours to catch up and if you are ahead of the class you are ready to work on extension questions.
Give your best effort in solving the mathematical investigations. This includes being persistent even if you feel frustrated at times. It also includes making mistakes, and learning from them.
Ask all your questions (to students and/or instructor).
Actively and respectfully listen to students and instructor.
Communicate about mathematics positively and meaningfully in your group. This means that your comments are relevant and reflect understanding of the material and previous remarks from students. Communicate at appropriate times -- not too little and not too much.
Communicate about mathematics positively and meaningfully in whole class discussions .
Be reflective about yourself as a learner. Change your perception of doing mathematics if applicable.

You can always ask me what your current participation grade is. I will post participations grades about half-way through the semester. You can check in with at this time about what you could do to improve your grade.

Exams:

There will be a midterm exam and a final exam. The date for the midterm exam will be announced during the semester, the final exam will take place during the time and place assigned by the university during finals week.

Grading:

For an A you need to do **all** of the following:

- Participate at A level (9 elements of successful participation are present)
- Pass 9 homework stories.
- Pass 3 reading assignments.
- Pass 3 journal entries.
- Present one productive mistake to the class.
- Pass the exams at 85% each.

For a B you need to do **all** of the following:

- Participate at B level (8 elements of successful participation are present)
- Pass 8 homework stories.
- Pass 3 reading assignments.
- Pass 3 journal entries.
- Present one productive mistake to the class.
- Pass the exams at 80% each.

For a C you need to do **all** of the following:

- Participate at C level (7 elements of successful participation are present)
- Pass 7 homework stories.
- Pass 3 reading assignments.
- Pass 3 journal entries.
- Present one productive mistake to the class.
- Pass the exams at 75% each.

For a D you need to do **all** of the following:

- Participate at D level (6 elements of successful participation are present)
- Pass 6 homework stories.
- Pass 3 reading assignments.
- Pass 3 journal entries.
- Present one productive mistake to the class.
- Pass the exams at 65% each.

If you do not pass all of the D-requirements, you will receive an F.

Meta Objectives:

Upon successful completion of this course students will:

1. Recognize and challenge their own beliefs and feelings about mathematics.
2. Work well with other students.
3. Find work partners that have similar speed, curiosity and learning edge.
4. Gain social competence in negotiating different ways of thinking.
5. Persevere when it gets difficult and frustrating.
6. Be ok making mistakes and learning from them.
7. Be more confident in doing mathematics.
8. Admit not knowing and ask questions to learn.
9. Be prepared and ready to try/learn when coming to class.
10. Realize that mathematics is more about creating and deep thinking than memorizing procedures.
11. Be curious about mathematics.
12. Recognize how they learn best and put a plan into action.
13. Enjoy the challenge of reasoning.
14. Only accept mathematics that makes sense to them.
15. Communicate mathematical ideals in writing and orally.

Content Objectives:

After successful completion of the course the students will be able to:

1. Recognize and describe linear, quadratic and exponential functions in different representations.
2. Find, analyze and describe patterns in number sequences and more general situations (e.g. the star polygons).
3. Explain and use the logic of implication and negation in mathematical statements.
4. Describe and use inductive and deductive reasoning in various situations.
5. Recall how inductive and deductive reasoning are taught across the elementary grades.
6. Recall and prove key properties of common multiples, common factors and prime numbers.
7. Connect activities and strategies with corresponding big mathematical ideas.
8. Use algebraic reasoning to solve problems.
9. Recall how algebraic thinking is taught across the elementary grades.
10. Explain advantages of inquiry-based learning in mathematics.
11. Reflect on your own experiences as a learner of mathematics.
12. Describe connections of reasoning and algebra to other areas of mathematics.

Best wishes for a successful semester!

Other Support on Campus:

Reading and Writing Center (RWC), Parenzo Hall 218

The RWC is dedicated to supporting and encouraging all students as they write to communicate their ideas and to discover new ones. Acting as an engaged audience, the RWC staff assists writers on any type of project, in any major, at any stage of the writing process. To make a FREE appointment and to learn more about the RWC's services, including drop-in hours at Ely Library and workshops on a variety of topics, visit the website: www.westfield.ma.edu/reading, stop by Parenzo Hall 218, or call 413-572-5569.

Here are three tips to ensure you get the most out of your RWC session: 1. Make an appointment sufficiently in advance of the due date in order to give yourself adequate time; 2. Bring with you anything associated with the assignment: a copy of the assignment, the course syllabus, previous writing, and relevant research and reading material; 3. Prior to your session, reread your assignment or your draft and identify a particular question or concern for the session. Notice that you will most likely not get feedback about the mathematical ideas during these sessions.

The Counseling Center, Lammers Hall, Annex A

Life at college can get very complicated. Students sometimes feel overwhelmed, and experience a variety of challenges, such as anxiety, depression, relationship difficulties, and/or diminished self-esteem, to give a few examples. However, many of these issues can be effectively addressed with a little help. The Counseling Center helps students cope with difficult emotions and life stressors. The Counseling Center is staffed by experienced, professional counselors, who are attuned to the needs of college students. The services are FREE and completely confidential. Find out more at <http://www.westfield.ma.edu/student-life/counseling-center>, or by stopping by Lammers Hall, Annex A. Please talk to me if you are distressed and you are not sure what to do about it.

Support for Students with Disabilities Requesting Reasonable Accommodations

It is the policy of Westfield State University to provide reasonable accommodations to students with documented disabilities. Students, however, are responsible for registering with the Banacos Academic Center. If you require reasonable accommodations in this class, please make your request with a Banacos advisor in the Banacos Academic Center. Please stop by or write to banacos@westfield.ma.edu to set up an appointment. Additionally, I strongly recommend that you make an appointment with me as soon as possible to discuss how we can work best together.

Exceptions to Class Rules, Restrictions or Requirements

Any student may request an exception to the class rules, restrictions or requirements. Please set a time to meet with me during my office hours or send to me an email so that we can discuss your reasons.

Academic Skills Program

The Banacos Academic Center offers FREE Academic Skills workshops and individual sessions open to all students on topics including understanding a syllabus, organizing time productively, making note-taking effective, reviewing grammar, preparing for exams, tackling an assignment, recognizing key concepts in reading, reviewing grammar, preparing for exams and tests, and giving oral presentations. Go online to www.westfield.ma.edu/banacos/scheduler to register, find the schedule, and sign up for the workshops or sessions. For questions, email to academicskills@westfield.ma.edu or stop by the Banacos Academic Center in Parenzo Hall.

Common Goods is a food pantry serving Westfield State University students, faculty, and staff who may be experiencing hunger and are struggling to purchase food. It is a safe, discreet, nonjudgmental, and welcoming space in which to distribute a variety of non-perishable foods and personal care items at no cost. Visitors to the pantry do not need to provide any financial documentation to use this service. Common Goods is housed in the Second Congregational Church on Western Avenue, adjacent to the entrance to the Commuter Parking Lot. For more information and hours, please visit www.westfield.ma.edu/commongoods or email commongoods@westfield.ma.edu.