

Instructor:

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“Students must learn mathematics with understanding, actively building new knowledge from experience and prior knowledge...Learning with understanding is essential to enable students to solve new kinds of problems they will inevitably face in the future.” (Principles and Standards for School Mathematics, National Council of Teachers of Mathematics (NCTM), pages 20 – 21)

Course Description

Math 13600 combines the first and third courses of a three-course sequence titled “Mathematics for Elementary Teachers.”

Our course goals, in these sequences of classes, are to prepare you to:

- Be a poised and self-confident mathematics teacher in the elementary classroom
- Have deep understanding of the reasoning behind various mathematical processes
- Be knowledgeable and able to clearly articulate mathematical ideas using correct vocabulary

Multiple ways of teaching concepts will be explored in this class. Our goal is for you to move beyond the traditional way you have learned mathematics and to examine the topics in this course in a different **conceptual** way.

Prerequisite

You should have earned a grade of C- or better in Math 11000 or equivalent. If you do not have solid abilities with arithmetic and basic algebra, you will find this course very difficult.

Email

All email should be sent via Canvas or to the email address shown above. For privacy reasons, please use your university-provided email when corresponding with your instructor outside of Canvas. *Please include Math 13600 in the subject line.*

Textbooks and Materials

- Textbook: *A Problem Solving Approach to Mathematics for Elementary School Teachers*, 13th edition, Billstein, Boschmans, Libeskind, Lott; Pearson. Students are required to purchase access to online homework and supplements. This includes access to the electronic form of the textbook. A paper copy may be purchased if students wish.
- Colored pencils or crayons, highlighters, straightedges, etc.
- Calculator: Students may use only the TI-30XA calculator for in-class quizzes and exams. class. All other electronic devices must be stowed, including but not limited to **cell phones**, smart watches, computers, and graphing calculators.

Course Objectives

This course focuses on why techniques for finding solutions work and on the thinking that one does in approaching a mathematics problem. We will consider the history and development of mathematics. Assignments will emphasize investigation, critical thinking, and analysis rather than rote computation. *As a teacher, you should not only be able to solve mathematics problems, but also to explain why your solution method makes sense. Hence, this course emphasizes giving explanations, not just getting final answers. The process is as important as the product.*

Upon completing this course, students will be able to:

1. Name and describe (through examples) the various number systems.
2. Describe mathematical properties of operations.
3. Convert between base ten numerals and numerals written with different bases.
4. Perform basic mathematical operations using different bases and multiple methods.
5. Determine the union and intersection of two or more sets of elements.
6. Define a set's complement and the meaning of empty set.
7. Apply divisibility rules and identify prime numbers.
8. Determine the factors and multiples of a given number.
9. Derive the greatest common factor and least common multiple when given two or more numbers.
10. Model fractions using multiple representations.
11. Convert between fractions and decimals.
12. Perform and model basic mathematical operations using fractions and mixed numerals.
13. Solve proportions and model problems with proportions.
14. Apply a problem-solving process to standard and non-standard problems.
15. Recognize and write a good definition.
16. Differentiate various polygons, number of sides, and measures of angles.
17. Find the sum of the measures of the interior angles of polygons.
18. Describe the various types of (regular) polyhedra.
19. Determine the number of lines of symmetry and rotational symmetries for plane figures.
20. Describe shapes that will tessellate for plane and solid figures.
21. Determine area, surface area and volume of two-dimensional and three-dimensional figures.
22. Recognize and draw motions of shapes illustrating translations, reflections, and rotations.
23. Use the Pythagorean Theorem to determine diagonals of two-dimensional figures.

IUPUI Principles of Undergraduate Learning (PUL's):

Core Communication and Quantitative Skills – addressed in oral communication, both one-on-one and in groups, and through writing assignments.

Critical Thinking – addressed in exploring problem solving strategies.

Integration and Application of Knowledge – addressed as students look at elementary math applications and the State Standards.

Intellectual Depth, Breadth, and Adaptiveness – addressed in problem solving strategies and readings.

Understanding Society and Culture – addressed in readings about math in different cultures and settings.

Values and Ethics – addressed in group activities and classroom dynamics of the college classroom and an elementary classroom.

University Course Policies

Students are expected to read carefully the IUPUI policies concerning attendance, academics, and conduct **within the first few days of classes** as some policies have early deadlines. Information on campus-wide policies related to attendance (administrative withdrawal, disabilities, emergency withdrawal, military service, religious holidays), academic policies (auditing a class, final exam scheduling, grade replacement, grade forgiveness, pass/fail option), conduct (academic integrity, academic misconduct, code of conduct), and related policies can be accessed in Canvas under the "Syllabus Supplement," "Campus Course Policies," and "IUPUI Academic Student Support Services" links.

Course Coordinator

Any inquiries about this course or student/instructor issues should be directed to Dr. Barbara Johnson (bj37@iu.edu)

Course Expectations

Because much of the learning in the class takes place in the classroom, all students must work together to help create a positive classroom environment. This includes but is not limited to the following policies:

1. Take responsibility for your own learning through attendance, participation, and effort.
2. Attend class regularly, since much of the class time is tied to group and class activities. **Please discuss with the instructor, ahead of time, if you must miss a class for any reason.**
3. Conduct yourself using basic classroom etiquette:
 - Do not arrive late or leave early, as much learning and assessment takes place throughout the hour.
 - Do not have private conversations during class; even whispering can be distracting. Unnecessary or disrespectful talking is not acceptable.
 - Do not work on assignments for other classes, read other textbooks, or other books.
 - Turn your cell phones **OFF** or to silent mode. Any and all other electrical devices will be turned off during the class unless they are required for class. If you have an emergency to take care of, please leave the room.
 - **DO NOT TEXT MESSAGE or HAVE YOUR PHONE VISIBLE.**
 - Laptops/tablets may be used during class only for note-taking and other class-related activities.
4. Read all sections in the textbook prior to the class in which the material will be discussed. Come to class prepared for active learning of the relevant topics covered in those readings.
5. Submit assignments on the due date indicated on the class calendar.
6. Participate fully by staying on task and contributing significantly to the discussion topics. Show respect for the instructor and classmates and their points of view.
7. Demonstrate your best effort in completing assignments, presenting ideas orally, or in written work.
8. Make an appointment the instructor if you wish to discuss a problem or an issue associated with the class or if you wish to discuss the grading of an assignment.

Attendance

Attendance is EXTREMELY important for the Elementary Education Mathematics content courses. Discussions and group activities designed to form conceptual understandings of mathematics are done in class. Points earned for in-class assignments cannot be made up. If your grade is borderline at the end of the semester, good attendance will be a valid reason to round up to the higher grade. This is the beginning of your professional career preparation. As a professional, let the instructor know as early as possible if you cannot meet with the class.

Attendance is a GOOD indication of what type teacher you will be.

Administrative Withdrawal

A basic requirement of this course is that you will participate in all class meetings and conscientiously complete all required course activities and/or assignments. If you miss more than half of the required activities within the first 25% of the course without providing the instructor with supporting documentation, you may be **administratively withdrawn** from this course. This course meets two times per week; thus, if you miss more than four classes in the first four weeks, you may be withdrawn. Administrative withdrawal may have academic, financial, and financial aid implications. Administrative withdrawal will take place after the full refund period, and if you are administratively withdrawn from the course you will not be eligible for a tuition refund. If you have questions about the administrative withdrawal policy at any point during the semester, please contact your instructor.

Withdraw Dates

Last Withdrawal Date varies by semester - Last day to withdraw with automatic grade of W requires advisor approval via the Late drop/add classes link at one.iu.edu. **NOTE: UCOL students or Engineering/Technology first-year students must see advisor in person by 5:00 pm on the prior Friday.** After this date, drops will be approved only in serious, extenuating circumstances and require the approval of the student's advisor, instructor, Chair or Associate Chair in Mathematics, and the School of Science Dean's office.

you find it necessary to withdraw from the course, we encourage you to first talk to your instructor and/or your advisor so that they can assist you in deciding what alternative options best fit our need. Read carefully the withdraw information found on the Registrar's website (www.registrar.iupui.edu) under the Academic Calendar.'

Cell Phones During Tests/Quizzes: Cell phone usage during a test is strictly prohibited. Use of a cell phone (or any other electronic devices other than a TI-30xA calculator) during a test will result in a 0 for the test and possible additional disciplinary action (including, but not limited to a failing grade for the course). If there is a situation where you must be able to answer a phone call (i.e. work or family related) during the test, contact/discuss the situation with your instructor prior to the start of class.

Grading Policies

Grades will be determined using weighted scores from the following activities:

Final Exam	20%
Exams	40%
Quizzes	10%
Homework	15%
Projects and Writing Assignments	10%
Class Participation	5%

100-97	A+	72-70	C-
96-93	A	69-67	D+
92-90	A-	66-63	D
89-87	B+	62-60	D-
86-83	B	59-0	F
82-80	B-		
79-77	C+		
76-73	C		

Note: Per the policy of the Education Department, you must have a minimum grade of C to pass the course. That means you need at least 73% of the total points to pass. The School of Education will NOT accept a grade of C-.

Incomplete

Grades of Incomplete (I) will only be given in accordance with the Department of Mathematical Sciences Grade of Incomplete Policy. Specifically, students must have a passing grade at the ¾ mark of the semester to qualify for assigning an incomplete. The instructor must agree that an incomplete is appropriate and it must be approved by the Associate Chair of the Department of Mathematical Sciences. *Note: An Incomplete grade is very rarely granted.*

Final Exam

The Final Exam is comprehensive and will cover material from all sections covered throughout the semester. It will be held in LD 229. Be sure that you do not have any conflicts (work or personal) with the time and date of the final exam. If you find that you have a conflict with this final exam and that of another class, contact your instructor immediately so that the conflict may be resolved. **All students are required to take the final exam. In addition to accounting for 20% of the course grade, the final exam score can also be used to replace a missed test or your lowest test score (if better).**

[Final Exam Date](#) [See Final Exam Schedule](#)

Tests

There will be four tests during the semester. **You must take the test on the day that it is given.** If you miss an exam, your final exam score will be used as a replacement.

Tentative Test Dates

- Varies by semester

Take-Home Quizzes

Several take-home quizzes will be assigned and collected. As much, if not more, emphasis will be placed on your work and explanations as the answer, so pay close attention to detail when answering questions on the quizzes. These quizzes will be related to the textbook reading, class discussions and homework assignments.

You are **strongly encouraged** to work with the mentors/tutors/other students on these quizzes. You may also use your book, class notes and discussions with other students. However, the actual writing of the quiz **must be done independently**.

Quizzes must be turned in on the indicated date; late work will not be graded. At the end of the semester, some low scores will be excluded from the final grade calculation to account for unexpected absences or circumstances that prevent you from turning a quiz.

Homework

Online homework will be assigned for each section discussed from the online textbook. **You should work on the homework as it is assigned.** Make sure you have read the assigned pages that accompany the homework before you begin. Complete assignments before the ending dates as shown on the course calendar. Occasionally, additional homework may be assigned during class.

Class Participation Points

Throughout the semester, points will be awarded for class participation. These points may come from a brief quiz (1 or 2 questions) taken at the end of class. Or, points may be awarded for participation in a classroom-based activity. You must be in class to earn any points associated with the quiz or activity—make-ups and late submissions are not permitted.

IUPUI Policy on Academic Integrity The IU Code of Student Rights, Responsibilities, and Conduct states that students must uphold and maintain academic and professional honesty and integrity; the code defines academic misconduct as any activity that tends to undermine the academic integrity of the institution. Students engaging in academic misconduct may therefore receive penalties from their course instructor and disciplinary action from the university. Policies against academic misconduct apply to all course-, department-, school-, and university-related activities. Academic misconduct may involve human, hard-copy, or electronic resources and includes but is not limited to the following: cheating, fabrication, plagiarism, interference, violation of course rules, and facilitating academic dishonesty. For definitions of these activities, visit studentcode.iu.edu/responsibilities/academic-misconduct.html. Additional information about the rights and responsibilities of IU students is available at studentcode.iu.edu/.

IUPUI Policy on Disability Accommodations Students needing accommodations because of disability will need to register with Adaptive Educational Services (AES) and complete the appropriate forms issued by AES before accommodations will be given. The AES office is located in Taylor Hall, UC 100. You can also reach the office by calling 317-274-3241.

IUPUI Policy on Religious Holidays IUPUI respects the right of all students to observe their religious holidays and will make reasonable accommodation, upon request, for such observances. Students seeking accommodation for religious observances **MUST** submit a request in writing to the course instructor by the end of the second week of the semester and should use the Request for Course Accommodation Due to Religious Observance Form. More information on the IUPUI Policy on Religious Holidays is available here: registrar.iupui.edu/religious.html. Failure to comply with the university policy will result in no accommodations given later in the semester.

Student Engagement Roster This semester your instructor will be using the Student Engagement Roster (SER) to provide real-time feedback on your performance in this course. Periodically throughout the semester the instructor will be entering data on factors such as your class attendance, participation, and success with coursework, among other things. This information will provide feedback on how you are faring in the course and offer you suggestions on how you might be able to improve your performance. Students can view their submitted SER data through the One.IU tile, Student Engagement Roster (Student).

Counseling and Psychological Services (CAPS) During the semester, if you find that life stressors are interfering with your academic or personal success, consider contacting Counseling and Psychological Services (CAPS). All IUPUI students are eligible for individual counseling services at minimal fees. Group counseling services are free of charge. CAPS is located in Walker Plaza, Suite 220 and can be contacted by phone (317-274-2548). For more information, see the CAPS website at <http://caps.iupui.edu>

Tentative Calendar

Week	Topic/Exam
1	Orientation / 3.1. Numeration Systems
	Numeration Systems
	3.2 Addition of Whole Numbers
2	Labor Day
	Problem Solving
	3.3 Subtraction of Whole Numbers
3	3.4 Multiplication of Whole Numbers
	3.5 Division of Whole Numbers
	4.1 Divisibility Rules
4	4.2 Prime and Composite Numbers
	4.3 GCF and LCM
	Exam Review
5	Exam 1
	5.1 Addition and Subtraction of Integers
	5.2 Multiplication and Division of Integers
6	6.1 Models of Fractions
	6.2 Mixed Numerals
	6.2 Addition and Subtraction of Fractions
7	6.3 Multiplication and Division of Fractions
	Fractions and Problem Solving
	7.1 Introduction to Decimals
8	6.4 Proportions
	Exam Review
	Exam 2
9	Fall Break
	2.1 Logic – Good definitions
	11.1 Basic Notations
10	11.2 Curves, Polygons, and Symmetry
	11.3 Sum of Angle Measures
	Applications
11	11.4 Regular Polyhedra, Cylinders, and Cones
	12.1 Congruence Through Construction
	12.2 Proving Congruence
12	12.4 Similar Triangles and Other Similar Figures
	Exam Review
	Exam 3
13	13.1 Linear Measure and Conversions
	13.2 Areas of Polygons and Circles
	13.3 Pythagorean Theorem
14	13.4 Surface Area
	13.5 Volume
	Thanksgiving Break
15	14.1 Translations, Rotations, and Tessellations
	14.2 Reflections
	14.3 Dilations
16	Exam Review
	Exam 4
	Final Exam Review
17	Final Exam Review
	Final Exam Date