

MATH 308: Mathematics for K – 8 Teachers: Rational Numbers

Western Kentucky University – Spring 2023

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Classroom: TBA
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Classroom: ZOOM
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Course Description: 3 Credit Hours - Conceptual development of rational number system, including operations with and relationships among fractions, decimals, and percents.

Learning Objectives: Upon Successful Completion of MATH 308, students will be able to:

1. Demonstrate a conceptual understanding of the relationships and interconnectedness among fractions, decimals, percent, and ratios.
2. Recognize and develop multiple representations of equivalent terms, simplest form, rational number properties, denseness property, and ordering of fractions and decimals.
3. Complete computations with fractions and decimals using models and manipulatives.
4. Solve rational number problems in multiple ways.

Prerequisites: Completion of MATH 205 with a grade of C or better; for students in Elementary Education, Middle Grades Mathematics Education, or Special Education Teacher Certification programs only.

Textbook: You are required to purchase a MATH 308 Course Packet from the WKU Bookstore.

Classroom Materials: You should bring a variety of pencils, pens, colored pencils, markers, and/or highlighters to class with you every day. In addition, you need to bring a three-ring binder containing your course packet and some extra paper. The binder will help you keep all of your work organized throughout the semester, and you will need the course packet and writing utensils to complete the daily classwork assignments.

Calculator: You *will not* be allowed to use a calculator in this course. A successful elementary teacher must be proficient with numbers and completely confident when solving problems mentally and on paper without the use of the calculator. You should be able to verify that your work is correct by evaluating the process that you used to solve a particular problem or by working backwards from the answer.

Internet Access: You must have regular and reliable access to your WKU email account and Blackboard. Lack of internet access or failure to login to these systems may not be used as an excuse for failing to obtain materials or turn in homework assignments. You should check your WKU email account daily, as all announcements for the class will be sent there.

Attendance and Absences: Attendance and participation in class is crucial to your success in this course. If you miss a class for any reason, you will be responsible for obtaining any materials and/or information from your fellow classmates and from Blackboard, *not from the instructor*.

Because this class is taught in a cooperative inquiry-based format, small group and whole class participation is an essential part of the experience for both you and your classmates. Consequently, absence or tardiness by an individual student hurts not only that student, but also the rest of the class. Furthermore, as a future educator, you must get in the habit of showing up on time every day ready for work! Excessive absences from class will likely hinder your mastery of the course content and decrease your likelihood of success.

WKU Syllabus Statement on COVID-19: All students are strongly encouraged to [get the COVID-19 vaccine](#). In accordance with WKU policy, all students must call the WKU COVID-19 Assistance Line at 270-745-2019 within 4 hours of testing positive for COVID-19 or being identified as a close contact to someone who has tested positive. The COVID Assistance Line is available to answer questions regarding any COVID-19 related issue. This guidance is subject to change based on requirements set forth by federal, state, and local public health entities. Please refer to the Healthy on the Hill website for the most current information www.wku.edu/healthyonthehill.

Cell Phones and Portable Electronic Devices: Cell phones, smart watches, and other electronic devices provide a distraction to the learning environment for both the users and those around them. In order to provide the best environment for learning that we can, we will be attempting to make our classroom a cell phone free zone. We will provide a place to store cell phones during class. It is expected that all cell phones & smart watches be silenced (no vibration) and stored out of sight during class. If you feel that you have an extenuating circumstance that requires a one-time exception to this policy, please discuss it with your instructor before class.

Course Content & Instruction: MATH 308 may be different than any course you've had before – unless you have also taken MATH 205 with us! It is listed as a math course, and you certainly will study a lot of mathematics, but not necessarily the kind of mathematics you've studied before. In this course you will learn the mathematics needed to become an effective teacher.

What kind of mathematics do teachers need to know? It is mathematics that helps teachers understand how their students are thinking about mathematics and how they can help their students deepen their understanding. It is mathematics that helps teachers see how the different topics in elementary and middle school mathematics fit together and how they can help their students move from easier topics to more challenging topics. It is mathematics that helps teachers re-examine what they have learned before so they can understand the underlying concepts, and so they can effectively support their students' learning.

This may be a new kind of mathematical knowledge for you. Learning this mathematics requires that you start fresh. It requires that you become genuinely curious about how and why all those rules in mathematics work like they do, about how children think about mathematics, about the methods children are likely to use to solve mathematical problems and why some of these methods are useful for them and some are not, and about what kinds of mathematical understandings are essential for children to acquire.

Because you will be learning a new kind of mathematics, you will notice very soon that you are not doing the usual kinds of things. You will not be shown how to do sample problems and then asked to practice more on your own. Instead, you will:

- View videotapes of students doing mathematics and be asked about what they do and do not understand.
- Work problems posed to students in grades K-8 and predict how students might solve them.
- Solve new kinds of problems designed to provide insight into several mathematical topics and promote your mathematical reasoning skills. In doing so, you will understand familiar problems more deeply.
- Examine patterns and structure; formulate generalizations and conjectures; investigate and test your conjectures using concrete materials and other tools; and construct and evaluate mathematical arguments. You will learn to ask yourself: Is there a pattern? What might happen next? Can I make a generalization or conjecture? Do I think my conjecture is true for all cases, true for some cases, true for no cases (that is, false for all cases), and why? Under what circumstances is it not true? Can I give an example? Why does it work? How might I convince my group members that my conjecture is correct?
- Be asked to explain your reasoning – how you were thinking while you were solving a problem, why you think students will solve problems in a particular way, and why you think some methods for solving problems work better than others. ***Developing good explanations that are convincing to others is one of the best ways to verify that you truly understand.***

This course will be one of the more challenging courses you take as you prepare to become a teacher. This is because most of what you will learn will be new. You won't always be able to rely on what you've learned before. But, if you commit yourself to becoming an effective mathematics teacher and apply yourself, what you learn in this course will be invaluable.

Assessment and Grading: Your grade in the course will be based on the following:

Exams: There will be four exams to measure your understanding of the course material. The exams are worth the following point values:

Exam 1	Exam 2	Exam 3	Final Exam
55 points	85 points	115 points	120 points

The exams will be taken outside of the normal class times on the dates listed in the course calendar. More information about the exams, including times and locations, will be distributed in class and on Blackboard.

Homework: Homework will be assigned following each lesson in the course packet. Each assignment must be submitted through Blackboard before the start of the next class meeting. Homework assignments are designed primarily as learning tools rather than assessments, so they will be evaluated for a combination of completeness and correctness. You will earn 1 point for each on-time satisfactory homework assignment you submit.

Note: All missed exams will be given a grade of zero. Late homework assignments will not be accepted. The only exceptions to this policy will be those absences that are caused by University approved activities, religious observances for which documentation has been provided to the instructor in advance. The instructor will evaluate unexpected illness or unforeseen catastrophic circumstances on a case-by-case basis and determine whether a make-up is appropriate. Every effort must be made by the student to notify the instructor as soon as possible in these cases.

Determination of Final Course Grade: Final course grades will be determined using the following scale, based on the percentage of available points earned:

Percentage	0% – 59%	60% – 69%	70% – 79%	80% – 89%	90% – 100%
Letter Grade	F	D	C	B	A

Understanding Course Grades:

- A** Pre-service teacher consistently demonstrates competencies that signal that s/he is proficient in the mathematical topics covered in the course. This qualification includes a deeper level of understanding than that expected of the students s/he is preparing to teach. Pre-service teacher demonstrates this level of understanding by consistently going beyond the information explicitly presented by the course instructor to completing new kinds of tasks. This ability to apply one's knowledge to new contexts and to put together various ideas is *essential* for effective classroom teaching because good teachers are able to respond to children's questions, to support and assess children's mathematical proficiency, and to interpret new curricula.
- B** Pre-service teacher occasionally demonstrates the competencies and the knowledge transfer abilities that characterize the mathematical proficiency of A-level students, but at times is limited to learning well just the information explicitly presented by the course instructor. Pre-service teacher shows evidence of better-than-acceptable level of mathematical proficiency in the topics studied and a deeper level of understanding than that expected of the students s/he is preparing to teach.
- C** Pre-service teacher consistently demonstrates good levels of performance on tasks measuring straightforward learning of course content, but rarely completes knowledge transfer tasks successfully. Shows evidence of an acceptable level of mathematical proficiency of the topics studied and shows evidence, although inconsistent, of a deeper level of understanding than that expected of the students s/he is preparing to teach.
- D** Pre-service teacher does not consistently show acceptable levels of performance, even on tasks measuring content explicitly presented by the course instructor. Although the pre-service teacher may have mastered some of the course content, and s/he shows signs of considerable effort, serious questions persist about her/his mathematical proficiency and whether s/he has developed a deeper level of understanding than that expected of the students s/he is preparing to teach.
- F** Pre-service teacher shows a profile similar to that of the D student but, in addition, appears to be unprepared to teach others at this time. Pre-service teacher consistently exhibits lack of effort, profound and persistent misconceptions, and/or the failure to master some of the course topics.

Academic Dishonesty: Students who commit any act of academic dishonesty will receive from the instructor a failing grade in the course without possibility of withdrawal. The instructor will also present the case to the Office of Student Conduct for disciplinary sanctions. More information can be found here: <https://www.wku.edu/handbook/academic-dishonesty.php/>

ADA Accommodation: In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, Room 1074. The SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at sarc.connect@wku.edu. Please do not request accommodations directly from the professor or instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

Title IX / Discrimination/Harassment: Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's [Sex and Gender-Based Discrimination, Harassment, and Retaliation](#) (#0.070) and [Discrimination and Harassment Policy](#) (#0.2040). Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Executive Director, Office of Institutional Equity/Title IX Coordinator, Ena Demir, 270-745-6867 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121. Please note that while you may report an incident of sex/gender-based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's [Counseling and Testing Center](#) at 270-745-3159. Further, sexual assault resources can be found here: <https://www.wku.edu/titleix/>

Withdrawal Dates: The last day to drop this course without a grade, without paying a fee, and to change from audit to credit is Tuesday, January 24, 2023. The last day to withdraw from this course with a W or change from credit to audit is Thursday, March 30, 2023.

Math Help Lab: The department of mathematics provides a free help lab located in COHH 2124. Hours for the lab and specific tutor schedules are posted and will be posted on Blackboard.

WKU START Center: The START Center is available to assist all WKU students, particularly those enrolled at regional campuses, with their courses. Hours and math tutor schedules will be posted on Blackboard.

The Learning Center: The Learning Center (DSU 2141) provides free one-on-one tutoring and study areas available to all WKU students. For more information, or to schedule a tutoring appointment, please call TLC at (270) 745 - 6254 or visit their website: www.wku.edu/tlc

Disclaimer: The instructors reserve the right to change, alter, modify, or tweak anything in this document at any time for any reason.