Central Washington University
Instructor: Dr. Steve Stein
Black Hall 225-35, 509.963.2296, Steinst@cwu.edu cell (509) 929-2019

Math 164.004 Fall 2011

Office Hours: M-T 1:30-2:30 and by arrangement

Special Points of Interest:

- Homework is assigned but not collected
- Homework quizzes will be announced, worth 20 points, and cover assigned homework problems. Daily homework and notes may be used during these quizzes. Quizzes may not be made up. There will be about 5 homework quizzes during the quarter.
- We will have 2 100-point in-class exams. You may use a handwritten 3x5 note card on these exams. These exams may be retaken outside of class time by arrangement.
- As many as 20 group activities or presentations will be assigned and worth 5-10 points each.
- 2 writing assessments plus a math autobiography will be worth a total of about 100 points.
- 2 take home quizzes will be worth 20 points each.
- The final take home exam will be worth 200 points.
- You will be required to keep a binder which will be worth 50 points.
- Grades are based on total point percentages, calculated to the nearest whole number.

A=93%, B=83%, C=73%, D=63%

A minus grade would be (-3%) and a plus grade would be (+4%)

Course Summary

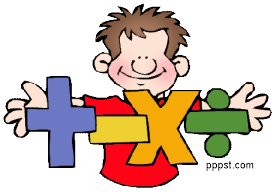
Mathematics for Elementary Teachers is the course designed to meet the needs of prospective elementary teachers. The course not only emphasizes math concepts and skills, but also stresses learning by activity and collaboration.

This course focuses heavily on the standards of the National Council of Teachers of Mathematics and also the curriculum focal points for each grade level.

Topics covered in this course include: Structure of the real number system. Properties of and operations on integers, rationals, decimal representation, percentages and elementary problem solving.

At CWU, we recognize that there are differences in not only the math content taught in first grade versus 6th grade, but also in the abilities of students in the classroom. While Math 164 is not a teaching methods course, it is important for Math 164 students to understand not only the mathematics they will be teaching, but also the difficulties their students will face and know how to teach a wide variety of math content. Basic course goals include:

- To use problem solving as an integral part of mathematics.
- To approach mathematics in a sequence that instills confidence and challenges students at the same time.
- To provide communication problems to develop writing skills and allow students to practice explanation.



- To provide core mathematics for prospective teachers in a way that they are challenged to determine why mathematics is done as it is.

Necessities

1. Come to class. You need the interaction. You need the information. You need to contribute to your groups. You need to show your commitment.
2. The required text is A Problem Solving Approach to Mathematics for Elementary School Teachers, 10th Edition, by Billstein, Lebeskind and Lott. You will also need Mathematics Activities for Elementary School Teachers by Dolan, Williamson, and Muri.
3. You will need plenty of lined paper and sharp pencils, a calculator, a ruler, a few protective covers, and a 3 ring binder with 7 dividers
4. Get yourself the help you need. I am more than happy to help you as much as possible. Beyond that, form study groups.

This course is designed to address these changes in mathematics education and to prepare pre-service elementary teachers to teach important mathematical content to elementary students. This course will use the following reform ideas.

Content:	*Toward*: A variety of mathematical topics and problem situations
	Away from: Only arithmetic topics
Learning:	*Toward*: Investigating problems and exploring concepts
	Away from: Memorization and rote learning (although, in certain cases these are necessary)
Teaching:	*Toward*: Questioning and listening
	Away from: Teaching by telling
Evaluation:	*Toward*: A variety of sources evaluated by the instructor
	Away from: Evaluation by tests only
Expectations:	*Toward*: Using understanding of concepts and procedures to solve problems
	Away from: Only the mastery of isolated concepts and procedures

Attendance and Professionalism

If you are to fully benefit from this class, you must attend class. As you prepare to become a teacher, you need to become accustomed to setting a good example for students. Attendance demonstrates professionalism and dedication. High quality work and organization demonstrate professionalism, as well.

Academic Honesty

There are times when it is proper to get help from others and times when it is not. Feel free to ask others for help on homework, take-home quizzes, and activities. You can only learn how to do something new by doing it correctly. During in–class quizzes and tests, you must do your own work. Academic dishonesty will not be tolerated during testing situations.

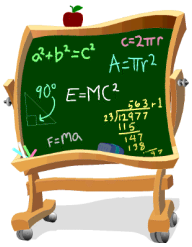
Success

To be successful, you must work hard and **be organized**. I encourage you to form study groups. You must also study regularly, take notes, do your homework, and read the textbook (Read each lesson before you come to class. Most material will be presented in class from a different perspective than the textbook.) You must seek help before you are in trouble and/or too far behind. Never hesitate to ask for help from me, your classmates, or anyone else who can help. I am here to serve you and help you be successful. If you need help, decide what you need help with and write it down. If you are working on a problem unsuccessfully, write down the approaches you have tried. Then seek help with your paper in hand. Write down the helpful hints you receive.

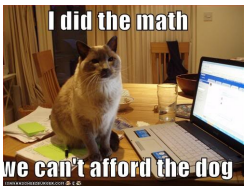
Additional Note

Students with disabilities who wish to set up academic adjustments in this class should give me a copy of their "Confirmation of Eligibility for Academic Adjustments" from the Disability Support Services Office as soon as possible so we can discuss how the approved adjustments will be implemented in this class. Students without this form should contact the Disability Support Services Office, Bouillon 205, or dssrecept@cwu.edu or 963–2171.

Assigned Problems



Section	Exercises
1.1	A:1-3,6-12,17; B:1,3-5,7,9,12,13, C: 2,3,5,7,10
1.2	A: 1-14; B:1-3,11-13,16; C: 1-3,8,11,12,16
2.1	A: 3,5-13; B: 10-12; C: 1,3,5
2.2	A: 2,5-9,11,13; B: 6,9,10; C: 2,3,11a,12
2.3	A: 1,3-5,9,10,17,19; B: 3,9,16,20; C: 1,7,12
3.1	A: 2,56.,9,14,15,17,18; B: 2,5-8,11,13-15; C: 2,5,6,16
3.2	A:3-12,17; B: 3-7,9-11,19; C: 1-3,6
3.3	A: 3-9,11-13,17; B: 3,6,10,14; C: 1-6,13
3.4	A: 1-7,11,18-21; C: 5,9-11
3.5	A: 1-12,15,17,18; B: 1-7; C: 1,9
4.1	A: 1-10; B:8; C: 1,6
4.2	A: 1-10; B: 1,2,4,8; C: 3,5,6,8
4.3	A: 1,4,8,9,11,13,15,18; B: 10a, b,12; C: 8.9.14,16
5.3	A: 1-13; B: 1-4,7,8; C: 1,3,4,11
5.4	A: 1-13; 1,2,512,15,18; C: 1,2,4,6
5.5	A: 1-19; B: 4,17; C: 4,7,11
6.1	A: 1-22; B: 5,8,14,16,17; C: 3,6,17,23
6.2	A:1-6, 12; C: 2, 5, 16, 17
6.3	A: 1-6, 8, 13, 15, 17; C: 3,6,8,16,18
8.2	A:5,6,8,9,12,15; B: 16

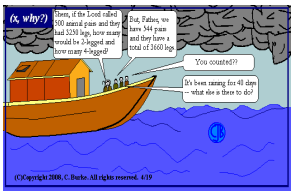


Course Objectives By Chapter

After completing the given chapter, you should be able to:

Here are three of my general goals for this course:

1. That everyday I look forward to coming to class and that I enjoy being here.
2. That you (students) enjoy this class.
3. That you (students) connect their own success and satisfaction with your (their) effort (self efficacy).

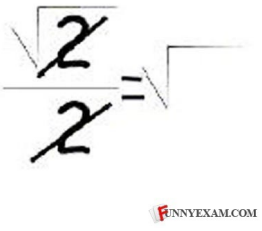


Chapter 1

- Determine what is being asked when presented with a problem-solving situation;
- Apply an appropriate strategy to solve a problem;
- Explain or state the name of a strategy you use;
- Write the answer to a problem in a sentence and explain the method you used to solve the problem;
- State whether a sequence is arithmetic, geometric, or neither;
- Given an arithmetic or geometric sequence, write a formula for it using the appropriate form (either $a + (n-1)d$ or $a \cdot r^{(n-1)}$);
- If a sequence is neither, describe the pattern using words;
- Given a formula for a sequence and a term number, find a specific term;
- Use sequences and formulas to solve problems;
- Identify/describe/complete the Fibonacci sequence

Chapter 2

- Given a number system like Roman, Egyptian, Babylonian, Mayan, or ours, discuss its features. Include how numerals are formed, whether it has a base, whether it has lots of symbols, whether it has a placeholder and if the placeholder is efficient, and compare it to our system;
- Write a numeral in any base from 2 through 9 for a given base 10 numeral, and vice versa;
- Count in any base from 2 through 9;
- Add and subtract in any base from 2 through 9.
- Identify and use these terms: set, member, equal sets, equivalent sets, on-to-one correspondence, finite, infinite, empty or null set, universal set, subset, intersection, union, complement;
- Identify and use these symbols: $\{\}, \cap, \varnothing, \cup, \subseteq, \in$;
- Give one reason why the ideas of sets are important in elementary school;
- Use a Venn diagram to solve a problem;
- Know the difference between whole numbers and natural numbers.



Chapter 3

- Draw a picture and describe at least two models of addition, subtraction, multiplication, and division;
- Identify and apply the properties of addition and multiplication;
- Explain why some properties do not work for subtraction and/or division
- Translate into English the Division Algorithm;
- Explain the three special cases that involve division and 0;
- Apply the order of operations;
- Demonstrate and explain algorithms for addition, subtraction, multiplication, and division that are not traditional;
- Demonstrate and explain method of mental math and a method of estimation.

Chapter 4

- Explain what algebra is;
- Explain the differnece between and expression and an equation and apply that knowledge
- Explain why the word "variable" gives students trouble;
- Write expressions for problems;
- Write equations for problems;
- Substitute a number into a formula and state the result;
- Solve and equation, using either traditional algebra properties or other methods used in class;
- Discuss how students progress from using very concrete models for solving equations to formal steps for solving equations;
- Identify and use these terms: ordered pair, relation, function, domain, range, input, output;
- Represent a given function in four ways and name the four ways;
- Take a function represented in one form and translate that function to the three other forms;
- Answer a question or solve a problem using a function.

Chapter 5

- Write the definition of a prime and a composite number;
- Explain why "1" is neither prime nor composite;
- Explain and/or apply the divisibility rules for numbers given in class;
- Factor a composite number and write it as a product of primes;
- Given a number, list the factors to check to determine whether it is a prime number;
- Find the GCD,GCF, LCM of two numbers;
- Apply the rule about the number of divisors of any number;
- Explain why GCF and LCM can be confusing for students;
- Describe and use the Neat Trick for GCF and LCM
- Solve application problems related to the GCF and LCM.

Chapter 6

- Know the meaning of all terms introduced in the chapter, not limited to numerator, denominator, simplest form, fraction, rational number, etc.;
- Know how sets of numbers relate;
- Know all the information on Fractions: Fact or Fiction. Explain why the statements are fact or fiction;
- Model equivalent fraction; mixed numbers and their improper fraction equivalents; and addition, subtraction, multiplication, and division of rational numbers;
- Add, subtract, multiply, and divide (using a paper and pencil algorithm) any given rational numbers and/or mixed numbers and express the answer in a required form;
- Change improper fractions to mixed numbers and vice versa;
- Find a rational number that is between tow given rational numbers. (apply the Density Property);
- Arrange a list of rational numbers in order by magnitude;
- Solve word problems containing rational numbers;
- Know what the Fundamental Law of Fractions says and what it is good for.

Chapter 8

- Solve an is/of percentage problem
- Solve percent increase/decrease problems
- Convert between percents, decimals, and fractions

Although instructions are provided in multiple formats with adequate time for you to be sure you understand them, you may still need further clarification of an assignment. Also, there may be extenuating circumstances that complicate your plans to complete tasks on time. It is reasonable to expect you to contact me with any questions well in advance of the target date.

However, it is unreasonable to assume I know what you are thinking. Therefore, let's use some communication strategies that will also serve you well in the future. Follow these three steps:

Email the instructor at steinst@cwu.edu. Please use your CWU email and this format:

Subject line: Your **section**, the **assignment**, and your focus of **concern** [e.g. [*EFC 315: Midterm clarification; July 10 Absence follow-up*]. Succinctly summarize what action you want me to take. With this, your message becomes a priority.

A **greeting** by name, [e.g. *Dear Dr. Stein*].

Include **background**: what you know from having reviewed the assignment, quoting from the instructions or rubric, or recalling what was mentioned in class. ***Make it clear that you have carefully read the instructions before you ask for help by mentioning the page numbers.*** It is not wise to use hearsay or other people's comments as a support for your query, which would suggest you have not tried to comprehend the reading available to you.

Include the **specific** details you want addressed ['*this particular score is recorded for this particular assignment'*] and the outcome you hope for. If you are concerned about a grade, it is important to recognize the inherent danger of mis-keying when so many students' scores are being entered so quickly.

The **tone** should be professional, without defensiveness or blame: a polite request to double-check the accuracy of the entry based on a specific concern ['*after examining the instructions and rubric, I was expecting this particular score because].'* Acknowledge any misunderstanding or unintentional mistakes.

A **signature**. This means the name you like to be called. And it never hurts to be gracious.

Then wait for a response. I try to respond immediately, even if only to say, "I will look into the matter." If none is forthcoming before our next class meeting, please re-send your email and/or politely bring it to my attention after class.

***Teaching is a highly interactive profession*.** This class is your opportunity to demonstrate a collegial disposition toward your colleagues. There will be many opportunities to develop and demonstrate your professional disposition, beginning with class sessions which will include many invitations to use 'your teacher voice' that can be heard by everyone in the room.

Teaching is a very subjective profession. Grades will be based on a **cumulative impression** of actively participating in all opportunities for classroom interaction with a professional demeanor. Feedback is given informally during class sessions and more directly during the midterm interview and other private conversations. This is admittedly a subjective assessment based on perception of behavior and interpretation of motive over the course. Final assessment will reflect absenteeism and other incivilities.

in this class includes all of the following expected behaviors:

Read assigned texts and be ready to discuss;

Respond with patience, encouragement, and intelligence to written and oral prompts;

Share your understanding with colleagues via class discussions, class activities, online discussions, and examinations;

Arrive promptly with assigned textbook,

Make eye contact with the speaker;

Look for what you have in common with others more than what makes you different,

Function cooperatively, not competitively;

Greet people by name, in person and online, and close all written communication with your name

In contrast to the above, examples of incivility include these unwelcome behaviors:

absenteeism, wearing hats and otherwise indicating a preference to be outside,

eating in front of others without sharing, coming late, leaving early,

leaving the room during class (whether for urgent needs to attend to bodily functions, e.g. bathroom or food, or to respond to social networks, e.g. cell phone or text);

distracting movements, sidechat,

unprofessional dress,

exclusivity toward other class members, unseemly behavior,

passivity, unpreparedness,

destructive comments, refusing to think analytically,

failing to check Blackboard or email, and

negative attitude including refusal to make eye contact with the person talking.