MATH 5003/7003
Algebra and Problem Solving
Fall 2008

M/W 1st and 2nd Period, 8:00-9:15
Room 155 Geology, Geography and Speech
Instructor: Dr. Calvin M. Burgoyne
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Office Hours: T/R 3:20 – 4:30
M/W 1:00 – 2:00
Text: *Mathematics for elementary Teachers.* by Sybilla Beckmann. Also the Activities Manual to accompany *Mathematics for elementary Teachers.*

Course Objectives: To strengthen and deepen knowledge and understanding of probability and statistics, elementary number theory and algebra and how they are to be used to solve a wide variety of problems. To strengthen the ability to communicate clearly about mathematics both orally and in writing. To promote the exploration and explanation of mathematical phenomena. To show that many problems can be solved in a variety of ways. To learn to pose and modify mathematical problems.

Topical outline:
Fractions, ratio, and proportion: Division of fractions: why the "invert and multiply" procedure is valid. Division of decimals. Understanding ratio and proportion in terms of fractions and in terms of multiplication and division.

Number Theory: Factors and multiples, greatest common divisor, and least common multiple. Prime numbers. Divisibility tests. Evan and Odd.

Algebra and functions: patterns, sequences, formulas and equations. Functions and their graphs. Relating qualitative descriptions to their graphs.

Basic descriptive statistics: Designing investigations and gathering data. Common ways to display data. The average, mean and percentiles.

Probability: Basic principles of probability. Using tree diagrams and the meaning of fraction multiplication to understand simple probability calculations.

Solving, posing and modifying problems: Posing and modifying problems involving fractions, decimals and percents.

Critique of mathematics lessons: students should critique several mathematics lessons that they taught and discuss ways to improve and extend the lessons. The critique should focus on mathematics content.

Grading: Your course grade will be calculated as follows.

Two tests (25% each)	50%
Homework	20%
Final Exam	30%

All your written assignments will be graded on a 5 point scale.

Letter grades on the homework will be assigned as follows.

4.4 → 5	A
3.8 → 4.4	B
3.2 → 3.8	C
2 → 3.2	D
below 2	F

Homework

Homework will be assigned on a regular basis. I encourage you to work together on homework (as well as class) problems. Of course, you should adhere to UGA's Academic Honesty Policy, as described on the website:

http://www.uga.edu/vpaa/polproc/ahpol/main.html

Therefore always write your homework up on your own and do not allow anyone to copy your work. If you work with others, it must be a genuine partnership with "give and take" discussions from all partners.

Assignments: You will work on three different types of assignments throughout the semester: *don't hand in* assignments, *checked* assignments and *scored* assignments. Assignments will be made weekly.

Late homework will not be accepted. The lowest assignment will be dropped in order to compensate for any illnesses or emergencies.

Don't hand in assignments: Most sections in the text include a number of exercises that have detailed solutions. These exercises will be assigned for you to solve without handing in your work. These exercises will help prepare you to solve the checked and scored problems, do not skip them. I suggest you read the solutions only after you have made a serious attempt to solve the problems. There is often more than one way to solve a problem so your solution need not be identical with the solution given in the text.

***Checked* assignments** will give you an opportunity to develop ideas and deepen your thinking without holding you to a polished level of performance that is expected on the scored assignments. A checked assignment will receive a score of 3, 3- or 0 as follows.

3 (counts as 5 points) will be assigned to work with the following characteristics:

The work addresses the problem that was posed and makes significant progress.
The work is neatly written and is understandable.

3- (counts as 3 points) will be assigned to work that represents a serious attempt but fails to meet the standards set for a 3.

0 will be assigned to work not handed in or that does not represent a serious effort.

***Scored* assignments** will ask you to write polished mathematical explanations of facts or phenomena in elementary mathematics. Your explanation should meet the following criteria:

1. The explanation is factually correct.

2. The explanation addresses the specific question or problem. It is focused, detailed and precise. There are no irrelevant or distracting points.

3. The explanation is clear, convincing, and logical.

   You should be able to use your explanation to teach another student.
   It should convince a skeptic.
   Key points are emphasized.
   It is coherent.
   It should include supporting graphs, pictures, diagrams and/or equations.
   Clear, complete sentences are used.

Attendance is required!

Tests and Final Exam: Test questions will ask for explanations of material developed in class activities. Look for the "big picture". The final will be comprehensive.

Schedule of tests: (tentative).

Exam #1 Monday Sept. 21

Exam #2 Wednesday Nov. 18

Final Exam: Friday Dec. 11 8:00-11:00.

No make-up exams will be given. Tests will be graded on the basis of 100 points.

Of course, you should adhere to UGA's Academic Honesty Policy, as described on the web-site: http://www.uga.edu/vpaa/polproc/ahpol/main.html

You are expected to attend class. If you have 4 absences you will be dropped from the course!

Changes to this syllabus may become necessary as the term goes on.