Math 300 * Mathematical Concepts for Future Teachers II* Spring '10
Course Syllabus

Instructor: Dr. Perla Myers
Email: pmyers@sandiego.edu
Web Page: http://www.sandiego.edu/~pmyers
Meeting Times: Tuesdays and Thursdays: Section 2: 9:15am-10:35am; Section 1: 10:45am-12:05pm

Office Hours: Monday 11:30-2:30, Tuesday & Thursday 2:00-3:00 or by appointment

Math Tutoring Center Hours: Monday & Wednesday: 10am-5pm & 7pm-10pm, Tuesday & Thursday: 11am-5pm & 7pm-10pm, Friday: 10am-2pm, Sunday: 7pm-10 pm (Serra Hall 310—a couple weeks after school starts)

Prerequisites: Math 115: College Algebra with a grade of C or above
Math 200: Mathematical Concepts for Future Teachers I with a grade of C or above

Required Supplies: Elementary Geometry for Teachers by Baldridge and Parker
New Elementary Mathematics I (Syllabus D) by Sin Kwai Meng
Primary Mathematics 3B, 4A, 5A, 5B, and 6B Textbooks from Singapore Mathematics
A large three-ring binder with dividers and loose-leaf paper, graphing paper, ruler, compass, protractor, a small shoebox, stapler, scissors, and colored pens/pencils

Computer Account: I will use email to communicate with you and I encourage you to communicate that way with me and with others in our class. I will post assignments and place other relevant information on the course web page.

Purpose of the Course: Math 300 is a content course for people intending to become elementary school teachers. It is designed to improve, broaden and deepen your proficiency, appreciation and understanding of mathematics, and to help you acquire some specialized mathematical knowledge for teaching. Issues such as “the mathematics kids need to know” and “methods for teaching elementary school mathematics” will be addressed in the mathematics methods courses you take through the School of Leadership and Educational Sciences.

As future teachers you will be responsible for the mathematical education of children. One of the most important gifts you can give children is to help them grow as discoverers, inventors, and users of mathematics in order to better understand the world. Children can become powerful mathematical thinkers if the learning environment is structured so that children's work in mathematics more closely resembles the work of mathematicians in the field. Since doing mathematics often involves ill-defined situations and complex problems, young mathematicians must develop persistence and flexibility, build on one another's ideas, and communicate and justify their findings. In order for you, the teacher, to help children develop these life-long skills, you too must be a successful, confident problem-solver with a deep understanding of fundamental mathematics.

We will spend a lot of our class time working on problems and explaining problem-solving approaches to each other to help you develop your intuitive reasoning, problem-solving skills, and explanation abilities. You will practice explaining and understanding other students' explanations, and determining their mathematical validity. The skills you gain while attempting to make sense of the thought process of your peers and to help them grasp concepts will be essential when you become a teacher. An important part of learning to solve problems is the willingness to struggle with a problem even after you get stuck, and this is one of the first things you will face this semester. You may be surprised by how much you can do if you just keep working! The National Council of Teachers of Mathematics (NCTM) recommends:

Knowing mathematics means being able to use it in purposeful ways. To learn mathematics, students must be engaged in exploring, conjecturing, and thinking rather than only rote learning of rules and procedures... When students construct knowledge derived from meaningful experiences, they are much more likely to retain and use what they have learned. This fact underlies the teacher's new role in providing experiences that help students make sense of mathematics, to view and use it as a tool for reasoning and problem solving.

One of the main purposes of this course is to increase your problem-solving abilities. To this end, many of the problems you will encounter are not at all similar to examples you will have seen, and some of the individual homework and exam problems will probably take you longer than you may be used to.
Goals for the Course:
• Becoming confident in your ability to do mathematics with understanding
• Becoming a persistent and successful mathematical problem solver
• Learning to reason and justify mathematically
• Learning to communicate mathematically; helping others understand why a claim is true and listening and appraising other students’ explanations
• Becoming an independent learner; learning to read mathematics for understanding
• Understanding the role of language and precision in mathematics; defining mathematical terms
• Learning to choose and use representations (verbal, symbolic, visual, material, manipulative, technological); examining correspondences and equivalences among representations; making sense of representations used by others
• Acquiring some depth of knowledge in mathematics. Specifically:
  1. Understanding measurement concepts (length, angles, weight, capacity, area, volume, units, etc.).
  2. Becoming acquainted with different geometric objects and their characteristics (polygons, triangles, quadrilaterals, polyhedra, prisms, cylinders, pyramids, cones, spheres, circles, etc.).
  4. Understanding the characteristics of congruence transformations (reflection, translations, rotations) and similarity.
  5. Knowing the different area and volume formulas and understanding why they are true.
  6. Understanding the Pythagorean theorem.
  7. Knowing terminology associated with geometry, measurement, probability and statistics.

Course Expectations:
What I expect from you:
• You will act in a professional and ethical manner as befits the teaching profession. The effort, detail, and thoughtfulness you put into your work should reflect the standards of performance you will be expected to meet as a teacher.
• You will come to class ready to expand your knowledge of mathematics.
• You will work hard and take initiative in your learning as well as other's learning. You will work actively with your peers, sharing, taking and giving, listening and explaining, questioning and answering. You will be genuinely curious about others’ ideas, and take the responsibility for being prepared for participation in class discussions and group work, and for assisting your peers in coming to an understanding of mathematics. You should expect the same from your classmates.
• You will come ready to ask questions, explore, make mistakes, reflect and grow while helping others grow.
• You will not settle for answers, rules and formulas—you will work until the rules and formulas are fully understood, and the answers are justified and connected to other ideas.
• You will stay organized, keep up with the work, and get help if you feel lost. The usual rule of thumb for college courses is a minimum of two hours of study out of class for every hour in class. Expect to spend at least 6 hours per week studying for this challenging college-level course. IF YOU FEEL THAT YOUR MATHEMATICS BACKGROUND NEEDS STRENGTHENING, BUDGET SEVERAL MORE HOURS PER WEEK TO FILL IN THE GAPS.

What you can expect from me:
• Respect and Encouragement. I respect your decision to pursue a degree in education in order to take on such an important role in our society—that of teaching our future generations. I assume you are in this class because you want to be, just as I am. We share a common desire to grow as teachers and learners. You can expect our time together to be productive.
• I want you to succeed! I will provide the learning environment and opportunities for you to improve, broaden and deepen your understanding and appreciation of mathematics. I will provide the support necessary for you to succeed in this course, both in and out of class. I am available during my office hours and by appointment, as well as via email.

Attendance Policy: I expect that you are committed to learning and will attend every class on time and ready for a prompt start. The time in class is crucial for achieving the goals of the course.
The learning community we create in class will benefit from the sharing of ideas, questions and mistakes. *For those students that miss no more than one class (excused or unexcused) the final exam score may replace the single lowest exam grade.*

**Grading:** Your grade will be determined by 2 exams (35%), quizzes (10%), cumulative final exam (30%), homework (10%), community service learning (10%) & class participation (5%).

* **Weekly quizzes:** You will have a short quiz most Tuesdays in the beginning of class. There will be no make-ups for quizzes you miss, but your lowest quiz score will not be counted in your quiz grade. These quizzes are designed to give you an idea of areas that need more work and therefore, you may make up quizzes for some credit after they have been graded.

* **Two exams:** The first exam will be a written exam. The second exam will consist of two parts, a written part, and an oral part. The exams are tentatively scheduled: Exam #1: Thursday, March 4th, Exam #2 (written part): Thursday, April 15th, Exam #2 (oral part): TBA.

* **A Cumulative final exam:** (May include written and oral parts.)
  
  Section 1: Tuesday, May 18th, 11:00 am – 1:00 pm
  
  Section 2: Thursday, May 20th, 8:00 am – 10:00 am

* **Homework and Writing Assignments:**

  1) *Reading Questions:* The elementary school curriculum is in constant flux, and teachers are expected to adjust to the new methods. Thus, you will be required to learn new mathematics on your own. Searching for information and reading to learn mathematics (or any other technical material) are skills that take practice. The reading questions provide opportunities to develop these important skills.

  2) *Practice/Exploration questions/Projects:* Questions from the book and additional questions from other resources will help you practice your math skills and your problem-solving abilities. Homework assignments will usually be given on Tuesday and will be due by the beginning of class the next Tuesday. Budget your time wisely, and start working on the homework as soon as you receive it. You may ask questions during office hours and via email.

Budget your time wisely, and start working on the homework as soon as you receive it.

*Late homework will only be accepted with your attached “late voucher” up to one class after the due date.*

**Community Service Learning Component:**

*Family Math Night (scheduled at Monarch School):*

Our class will be holding a Family Math Night for Elementary School families. Each pair of students will develop a "worthwhile mathematical task" appropriate for elementary school children and their parents. Our goals for the school are to provide positive mathematics experiences for the families, to engage children and their parents in mathematical thinking, to give children an opportunity to see that their parents value mathematics and to help students discover the fun of doing mathematics, reinforcing their positive attitudes. More information will be provided later.

**Academic Integrity Policy:** Cheating and Plagiarism are serious offenses and will be treated severely (see [http://sa.sandiego.edu/studentcode.html#rulesofconduct](http://sa.sandiego.edu/studentcode.html#rulesofconduct)). Although I encourage you to work with others, the work you turn in should be your own. Always cite your sources and your collaborators.

“Those who can, do. Those who understand, teach.” --Lee Shulman
Homework Guidelines

The following are some guidelines for homework assignments:

- Turn in your best work on time (if you can't attend a class arrange for a classmate to turn in your work, put it in my mailbox before class, or email it!).
- Write clearly and neatly. If you use more than one piece of paper, staple them together. If you use paper from a spiral notebook, cut off the ragged edges.
- Clearly label each problem and provide complete solutions to problems, including explanatory text. Answers without work get no credit.
- Write in complete sentences, using correct spelling, punctuation, and grammar. Write up the solutions so that a student in a different section can understand them. Don't use haphazard presentations to cover up disorganized thinking!
- Give a complete verbal interpretation of the solution of verbal problems.
- Some of your solutions may need to be rewritten. Many times the process of solving a problem is quite messy and disorganized. The process of organizing your solution will help strengthen your understanding.
- Use diagrams and graphs (use a straight edge or ruler), when appropriate. Use graph paper and label all your graphs. Graphs must be neat, accurate, and clearly labeled.
- On your homework cover write a statement acknowledging any people who discussed any part of the homework with you (including peers, professors, tutors, etc.).
- Homework is due when class starts. Start your homework ahead of time so that you have the opportunity to ask questions before it is due.

Some suggestions:

- Give yourself plenty of time! Attempt the homework after reading the section, and finish it after the section is discussed in class.
- If you do not know where to start on a problem, discuss it with other students, come by office hours, go to the Math Tutoring Center (don't let them solve the problem for you), or send me email!
- Follow Pólya's Four Steps to Problem Solving.
- I encourage you to work with other students to complete the homework:
  * Do the assigned reading and homework before you meet with your group.
  * Discuss the homework problems with your group until everyone agrees on a solution and understands it. Often there are different ways to approach a problem. Working in a group you get the added benefit of experiencing other students' approaches.
  * Write up your homework solutions on your own. Your explanations should be in your own words.
  * Follow the academic integrity policy: Cheating and Plagiarism are serious offenses and will be treated severely (see http://sa.sandiego.edu/studentcode.html#rulesofconduct).

Although I encourage you to work with others, the work you turn in should be your own. Always cite your sources and your collaborators.

Late homework will only be accepted if accompanied by your “late homework voucher” up to one class-time after it is due.