CRN: 01253 Math 46.27, Mathematics for Elementary Education, Spring, 2014

Instructor: Dr. Karl Schaffer
Class meeting days: Tue./Thu.
Class time 4:00-6:15 PM
Classroom: E-36
email: schafferkarl@fhda.edu

Office phone: 408-864-8214
Office**:** E-23A
Office Hrs: **MW 5:30-6:20 PM, TT 12:30-1:20 PM**
or by appointment
Class web site: http://nebula2.deanza.edu/~karl/
Class link login name: damath password: memath

Description: Designed for prospective elementary and middle school teachers. An introduction to the discipline of mathematics as the use of logical, quantitative, and spatial reasoning in the abstraction, modeling, and problem solving of real-world situations. The main topics in the course include the origins of mathematics, mathematical reasoning and problem solving strategies, theory of sets, integers and integral number theory, rational numbers and proportion, real numbers and decimal notation, and measurement. Throughout the course students will experience the learning of mathematics in a way that models how they can create an active learning environment for their future students.

Student Learning Outcomes:
(1) Analyze mathematical problems from elementary mathematics, apply problem solving techniques using a variety of methods, solve these problems individually and in groups, and communicate results mathematically through a variety of forms.
(2) Utilize ideas from number theory, distinguish types and properties of numbers, and employ mathematical rules for operating on rational and irrational numbers using verbal, symbolic, geometric, and numerical methods.
(3) Examine and evaluate myths and realities about the contemporary discipline of mathematics and its practitioners.
(4) Identify and discuss developments in the history of elementary mathematics from a variety of cultures.

Required text:: *Mathematical Reasoning for Elementary Teachers* (5th Ed.) by Long and DeTemple.
ISBN-10: 0321460847 or ISBN-13: 978-0321460844. This is not the current edition, so it is available cheaply online. You need to have it during the first week of classes!
Not allowed: computers or other communication capable devices may not be used during class time or timed exams. Please put them away and DO NOT use cell phones during class.

Students **must** have either a graphing or scientific calculator and bring it to class. You may use it on all exams. All exams are open book, open notes.

Grades: 90-100 A, 80-89 B, 70-79 C, 60-69 D, < 60 F, based on:

Participation. You may miss 3 class sessions during the quarter, **including** absences due to illness or family emergencies; however, you will be dropped from the class if you miss more than 3 classes. If you are late by more than 20 minutes or leave early by more than 20 minutes you will be marked absent for 1/2 class. If you know already know that you will be absent more than 3 times during the quarter, please wait to take the class at another time! If you are consistently late or consistently leave early, you may also be dropped.

There are two essays, each counting 5% of the grade:

5% Mathematical Autobiography. See 3rd page of this sheet for a description.

5% Essay. A short paper on a subject related to the course that catches your interest. References will be provided by the instructor. One possibility will be discussed during the first class. See 2nd page of this sheet for a description

You may turn in first (either) paper **Thursday, April 17.**

15% One hour exam Thursday, May 8. Open book, open notes, no make-ups or early exams**.**

Due dates for the second (other) paper is **Thursday, May 22**.
One of your two papers must be the math autobiography. You will turn in both using Turnitin.com.

15% Take-home exam given out **Thursday, May 22,** due **Two weeks later Thursday, June 5.**

10% Portfolio (4%) **and journal** (6%) You will keep a portfolio of your work and journal of your experiences in this class. You should have one journal entry per class session. Record your observations, feelings, and reactions to the class. I will check your journal entries 3 times during the quarter, each check worth 2%.

15% Short in-class activities, quizzes, or writing assignments, (usually unannounced) usually to be given during class. These will often involve group work. You may drop your lowest score.

20% Homework assignments. Homework is assigned during each class and must be kept current. Your homework will be turned in **at the end of each chapter**. Homework is graded for completion, not correctness. NO LATE HOMEWORK ACCEPTED! Homework assignments from the text are on **page 4 of this green sheet.**

of this green sheet, and will be listed at the class web site.

First homework assignment is to do section 1.1 and 1.2 homework, which we will discuss during the 2nd class. It will not be taken up until we reach the end of chapter 1.

15% Final Exam: mandatory, comprehensive, open book, open notes, no make-ups or early exams**.** Given on: **Tuesday, June 26, 4-6 PM.** Your final exam will replace the lower of the previous two exams, but ***if and only if*** the final is higher – that is, only if it would raise your score on an earlier exam. You MUST take the final!

There will be no makeups or early exams. The final exam score may be used to replace one of the one hour exams, only if either is lower. NO LATE WORK IS ACCEPTED - NO MAKE-UPS. IF YOU MUST MISS ONE MAJOR EXAM, IT WILL BE REPLACED WITH THE FINAL EXAM SCORE, BUT THIS IS NOT A GOOD IDEA! HOMEWORK ASSIGNMENTS MAY BE CHECKED AT ANY TIME, SO KEEP YOUR WORK CURRENT!

Some background on the instructor: Ph.D. and MA in Mathematics from UC Santa Cruz, undergraduate work at University of Chicago and University of Alabama. Grew up in New England and Alabama. Do research in the mathematics of "networks," (graph theory) and am very active in math education for K-12. I am also a modern dance performer and choreographer, and company I co-direct does shows about math and dance, among other things. For more background on this see http://www.mathdance.org and/or www.movespeakspin.org.

MATH and DANCE. In fact, we have a wonderful concert this coming weekend, April 11-13, 2014, called **The Daughters of Hypatia: Circles of Mathematical Women**, about the lives of great women mathematicians throughout history, and their struggles to create groundbreaking mathematics. Math 46 students may have half price tickets to the Friday night (8 PM), Saturday matinee (2 PM), Saturday night (8 PM) shows for $6. For the Sunday matinee show (2 PM) you may have free tickets. Please use the code Math46Hypatia50 for the 50% off tickets and Math46Hypatia100 for the 100% off tickets at the Hypatia ticket site. The theater is West End Studio Theatre at 402 Ingalls St., #3, Santa Cruz, CA. More info at http://www.mathdance.org. You may write your non-math autobiography paper on this concert, see below for more info.

Second Essay Assignment.

You have a short (600 word) paper on a subject related to the course that catches your interest due **either Th., Apr. 17 or Th., May 22,** and worth 5% of your grade. You will turn the paper in via Turnitin.com. If you attend the dance concert you may write about it. Please include your reaction to the show, what interested you in attending, what your expectations were, and descriptions of the pieces that stood out for you. Background study guide for the performance may contain information useful to your paper, and is at http://nebula2.deanza.edu/~karl/Handouts/2014.04.03.TheDaughtersOfHypatia.StudyGuide.pdf

Here's the description of the non-math autobiography essay, if you decide to do it on some other subject:

Report on an article or chapter from a popular book about mathematics or math education. The report will be one to two pages long, typewritten, (it must be at least 600 words), and will cover the mathematics from one to several chapters of a book from the following list; other books or sources may also be used. You must use published material, not just web sites, unless you get permission from the instructor, and you MUST cite your sources. A short oral report to the class will also be required.

You should include in what you write and talk about:

(1) why you chose this topic,
(2) what you learned, and
(3) what you think about the subject in question.
(4) What you might like to find out about the subject in the future.

Examples of books with mathematical content:

The Mathematical Tourist and Islands of Truth, by Ivars Peterson.
Any of the books of Martin Gardner on mathematics (over 15 titles).
Game, Set, Math and Does God Play Dice by Ian Stewart, or other titles on math by Stewart.
The Mathematical Experience by Davis and Hersh.
A Number For Your Thoughts and Numbers At Work and At Play by Stephen P. Richards.
Tilings and Patterns by Grunbaum and Shepard.
Mathematical Snapshots by Steinhaus.
Mathematics: The New Golden Age by Keith Devlin, or other titles by Devlin.

The Emperor's New Mind by Roger Penrose.
The Mathematics of Games by John Beasley.
Archimedes' Revenge by Paul Hoffman
What is Happening in the Mathematical Sciences, ed. by Barry Cipra, Vols 1-5 (on reserve in campus library)

Examples of books with cultural content:
Ethnomathematics by Marcia Ascher.
You can also consult this **Multicultural Mathematics Bibliography.** Many of the references are in our library, and the bibliography contains call numbers for those that are in the library.
A number of Martin Gardner's books are in the De Anza library.

Mathematical "autobiography." Due as either paper 1 or 2.

(Those of you who have taken a class from me before may turn in a previous autobiography with a page attached about your recent experiences. Please use a word processor.)

Write a "mathematical autobiography." Think about experiences you have had doing mathematics, both in and out of school. Include at least one successful and one not-so-successful episode. You might write about teachers, particular math problems, courses, or real-life applications of mathematics that have affected you and of which you have strong recollections. Include the good, the bad, and the ugly, and be as entertaining as you like. This will give me an opportunity to get to know you a little better; it should also give you an opportunity to reflect on your own experiences with mathematics.

Please also include a statement as to when you took math most recently, which class it was, where you took the class, and how well you did.

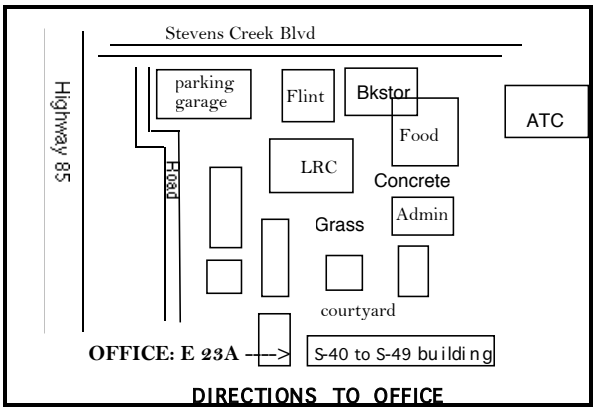
You must write at least 600 words (about one page SINGLE-SPACED typewritten or two pages longhand. (You should check the number of words using the "word count" command in most word processors – for example, in Microsoft Word, that command is found in the "Tools" menu.) For full credit write a little TOO much! (These will *not* be read to the class! Write about anything you feel comfortable about having the teacher read.)

Many, if not all of us have had particularly negative experiences with mathematics and especially mathematics teaching. Perhaps you can remember a specific incident which seems to have impacted your learning and study of mathematics since that time. Or your experiences might have been primarily positive and supportive: success in a difficult class, a teacher who acknowledged your skills at mathematics, an enjoyment in doing mathematics. Write about those experiences that have been most important to you in the greatest detail. Be specific and describe the circumstances and the people involved. Think about the later impact of your experiences - how do they still affect you today?

You might also want to think about how you actually use mathematical thinking in everyday life - diverse mathematical skills are used in building or designing or in doing craft work, estimating money or amounts, planning complex activities, collecting and organizing data. These activities might not necessitate the use of the quadratic formula, but they probably require good intuitions and understandings about geometric and quantitative knowledge. Write about activities you do which require this kind of mathematical insight.

I would particularly like to read about any cultural influences on your mathematical background. Have you learned ways of doing mathematics that you can identify as being from a culture other than the dominant one in this country? Did you begin learning mathematics in another country, and if so, what changes did you find when you moved here? Can you identify specific cultural influences on how you see your own mathematical knowledge and on your motivation to study mathematics?

Please do not simply list the classes you have taken and the grades received. I am much more interested in whether you were affected by the class, the teacher, and the experience, and in what ways. Describe in detail!



DIRECTIONS TO OFFICE

First week assignment: Put together your portfolio, a loose-leaf notebook with these sections:

Homework
Handouts and papers provided at the web site
Exams
Class notes
Articles
Your papers or essays

For your two papers you will use Turnitin.com. I have added everyone to the class list using the roster email address.
Class name: Math 46, Spring 2014
Enrollment password: M46Spr2014
Class ID: 7920406

Write a journal entry for each class. It should be one long or several short paragraphs detailing your reflections on each day's class. What struck you as interesting, useful, helpful, unhelpful, puzzling, etc.? How are you feeling about the class? What are your expectations of the class and your own participation? Imagine you are writing to your future self (as in a popular South Park episode?!) and mention those things most memorable!

Keep your journal entries at a page you get at an etherpad site. Email the URL for your site to the instructor at schafferkarl@deanza.edu. There are many free etherpad sites; I suggest you use a "public pad" at https://etherpad.mozilla.org/, at which you will click on "Create new public pad;" this is not really public, since the URL is a code that you must record. You must email me the URL for your etherpad journal. Use this format:

Stanley Student (keep your name at the top of the site! Place the most recent entry at the top in reverse chronological order.)

Th. Jan. 12 (most recent entry)
Blah, blah, blah (at least 2 long or 3 medium size paragraphs).

Tue. Jan. 10 (older entry)
Blah, blah, blah (at least 2 long or 3 medium size paragraphs).

If you have trouble using the etherpad site, try opening it with a different browser. I have only occasional trouble using the (free) Google Chrome browser.

Here's a complete list of the homework from the textbook. Other homework will be assigned periodically:

Ch. 1.1, # 4,5,9,10,11,12,14,15
Ch. 1.2, # 4,5,11,13,19,22
Ch. 1.3, # 1,3,6,7,10,13,17,22
Ch. 1.4: # 5,7,8,9,10,12,18,21
Ch. 1.5: # 4,7,9,11,13,14,15,19
Ch. 1.6: # 2,5,8,15

Ch. 2.1: 3,7,10,12,14,17,18,23,24
Ch. 2.2: 4,9,11,13,17,22,23
Ch. 2.3: 2,7,13,18,20,29,33,34
Ch. 2.4: 1,2,3,5,9,16,25,31,32

Ch. 3.1 # 1,4,5,10,11
Ch. 3.2 # 1,6,9a,10a,11a,13a,14,19
Ch. 3.3 # 1a,7a,16,17,20,24
Ch. 3.4 # 1a,7,13,17,21,23,24,25
Ch. 3.5 # 1,2,3,4,8a,18,22
Ch. 3.6 # 1,5,16

Ch 4.1 # 6,8,11,14,15,16, group: 22-24, 25, group: 31-32

Ch 4.2 # 1,2,6,9,10,12,14, group: 16 & 17, group: 20
Ch 4.3 #1a, 2a, 3a, 4a, 5a, 12, 26, 32,
group:16,group:17&20, group:21
Ch 4.4 # 1, 3, 5, 6a, 7a,14,17,18

Ch. 5.1: # 1,4,7,8,17,18,22,23
Ch. 5.2: # 1,2,13,16,19,27,28,30,31
Ch. 5.3: # 5,6,11,13,14,18,20,21
Ch. 5.4: # 2,3,6,8,9,13,14,20

Ch. 6.1: # 2,3,5,6,11,23,24,30,31,41
Ch. 6.2: # 1,2,9,13,21,22,23
Ch. 6.3: #1,2,10,13,14,16,17,18,20,34
Ch. 6.4: # 1,12,13,16,19,27,28,29,34

Ch. 7.1: # 1-7,9,10,18,19,20,21,22,25,34
Ch. 7.2: # 7,8,17,18,21,28,29
Ch. 7.3: # 1,3,7,8,12,18,19,29,36
Ch. 7.4: # 4,6,8,19,20,22,23,26,34