

Instructor: Dr. Karl Schaffer  
Class meeting days: Tue./Thu.  
Class time 4:00-6:15 PM  
Classroom: E-36  
email: [schafferkarl@fhda.edu](mailto: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: mathstudent password: 1234

**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* (6th Ed.) by Long and DeTemple. This is not the current edition, so it is available cheaply online. You **MUST** 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.** You will turn in both using Turnitin.com

**5% Mathematical Autobiography.** See 3<sup>rd</sup> page of this sheet for a description, due on **Tuesday, Jan. 12** at the start of class.

**15% One hour exam Thu., Jan. 28.** Open book, open notes, no make-ups or early exams.

**15% Take-home exam** given out **Feb. 9**, due two weeks **later Tue., Feb. 23.**

**5% Essay.** A short paper on a subject related to the course that catches your interest. References will be provided by the instructor. See 2<sup>nd</sup> page of this sheet for a description. Due on **Tue., Mar. 8.**

**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 week of class session. Record your observations, feelings, and reactions to the classes. I will check your journal entries 3 times during the quarter, each check worth 2%.

**15% Short in-class activities, or writing assignments,** (sometimes unannounced) usually to be given during class. These will usually 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 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 2<sup>nd</sup> 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: **Thursday, March 24, 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:** **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-college. I am also a contemporary dance performer and choreographer, and company I co-direct does shows about math and dance, among other things. For more background on this see [mathdance.org](http://mathdance.org), or see our [TEDx talk](#). One of our concerts, [The Daughters of Hypatia: Circles of Mathematical Women](#), about the lives of women mathematicians throughout history and their struggles to create groundbreaking mathematics, has begun touring nationally. See a few [video excerpts here](#).

### **Second Essay Assignment.**

You have a short (600 word) paper on a subject related to the course that catches your interest due **Tue., Mar. 8**, and worth 5% of your grade. You will turn the paper in via Turnitin.com. Here's the description of the essay:

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 at start of third class session.

**Turn in on TURNITIN.COM.** 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 the one math class you took most recently, which class it was, where you took the class, and how well you did.

**Also** include a paragraph explaining what are your most important values, and how you think they might be helpful to you in this course.

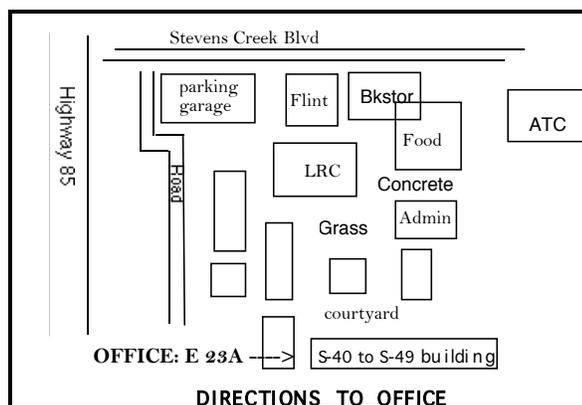
**You must write at least 600 words (about one page SINGLE-SPACED typewritten or two pages longhand. Do not use wide margins or point size larger than 12 point. (You should check the number of words using the “word count” command in most word processors – for example, in Microsoft Word, that command 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 affected 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.

**Report** on 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!



**First week assignment: Put together your portfolio, a loose-leaf notebook with the following sections. Also do the first homework assignment for chapter 1.1 and 1.2, and start your etherpad journal entries.**

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, Winter 2016

**Enrollment password:** Math46Now!

**Class ID:** 11377983

**Write a journal entry for each week of the 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](mailto:schafferkarl@deanza.edu). There are many free etherpad sites; I suggest you use a "public pad" at <https://public.etherpad-mozilla.org/> at which you will click on "New Pad". This is not really public, since the URL is a code that you must record – if you want it to really be private, choose a name that would be difficult to guess, or else click on "New Pad" and Mozilla will assign you a random coded name. You must email me the URL for your etherpad journal. Use this format for your journal entries:

**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.