Math 5320 **Usual and Unusual Problems Using Algebra** Office: FN 3..308C **6/3/05A**
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Summer 05 Home phone: 214- 526-9705
Overview e-mail: tbutts@utdallas.edu or
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Text Materials: Websites and Handouts [get a large notebook]

Graphing Calculator: You will need a TI-83/84 or TI-83/84$^+$ graphing calculator. We will occasionally use a TI-89 for demonstrations, but you need not have one.

Course Overview

This course will explore the various definitions of algebra in 6 -12 including [1] algebra as generalized arithmetic and quantitative reasoning,[2] algebra as the study of multiple representations with an emphasis on graphs, tables, and formulae, [3] algebra as the study of functions and function relationships, [4] algebra as a language, and [5] algebra as a formal mathematical system [connecting "school algebra" with abstract algebra]. Students will solve problems that emphasize students' conceptual understanding of the ideas central to algebra; will address strategies for implementing various instructional approaches that emphasizes algebraic thinking; and consider the role of technology in the teaching and learning of algebra.

Brief Outline of Mathematical Topics

1. Foundations for Functions: Variables, Expressions, and Representations
2. Linear Functions and Linear Systems
3. Quadratic and other Non-linear Functions
4. Optimization, Linear Programming and Sensitivity Analysis [as time permits]

Assessment: Assignments [probably 4] that involve solving problems and writing activities including reflecting on the problem solving process; finding/designing activities and lesson plans; critiquing articles, finding/reacting to Internet sites, etc.

Two tests [Day 7 or 8 and Day 13 or 14]
Two Portfolios [see below] as a final exam

Portfolios: The two portfolios described below will serve as the "final exam". Assignments will be given throughout the semester that will contain problems to solve, issues to consider, etc. A selection from these assignments, and a few "new" problems and/or issues will become the portfolio. A key ingredient will be a discussion of the reasons for your choices. More details TBA.

1. A portfolio on "**You as an Algebra Student".** It will contain your "experiences" with selected problems/investigations and your comments on why you chose each problem/investigation for inclusion in your portfolio; "journal" comments on your methods of approaching these concepts/problems in algebra and how they might have changed during this course, etc.

2. A portfolio on "**You as a Teacher of Algebra".** It will include some of: a discussion of several "teaching behaviors" that you use, or hope to use, to improve the "algebraic ability" of your students; your reactions to several issues in the teaching of algebra; your response to the question: "What is Algebra?"; your selection and critique of Internet sites containing resources for teachers, etc.

Academic Honesty: In this course students will conform to the University rules for academic honesty. For more information see http://www.utdallas.edu/student/slife/dishonesty.html.

Students with disabilities: Information from this course can be provided to students with disabilities through University services. For more information see http://www.utdallas.edu/student/slife/hcsvc.html.