

COURSE SYLLABUS
Math 184, Section 01
FOUNDATIONS OF MATHEMATICS FOR ELEMENTARY TEACHERS (I)
CREDIT HOURS: 3
Summer I 2008

Classroom and Schedule: Lee Drain Building, Room 431
Monday - Friday, 8:00-9:50 a.m.

Instructor information:

Dr. Dustin L. Jones

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Office hours: 10:00 a.m.-12:00 p.m. Monday - Friday (except for week of June 16-20)

Many other times available by appointment, email, or simply dropping by

COURSE DESCRIPTION: This course is the first in a series of courses designed to develop the necessary foundations in mathematics for prospective elementary teachers. Students are expected to practice communication skills and participate in hands-on activities, including the use of mathematics manipulatives and technology. Topics will include National and Texas standards for teaching mathematics, sets, numeration systems, operations with whole numbers, integers, and rational numbers, and number theory. Throughout the course, the five main themes recommended by the National Council of Teachers of Mathematics' *Principles and Standards for School Mathematics* (problem solving, reasoning, communication, connections, and representation) will be emphasized. Students will also participate in class discussions and group work during this course. Prerequisite: TASP score of 240 or Math 032D with a passing grade. 3 semester hours.

COURSE OBJECTIVES: Upon completion of this course, students will be able to:

- Analyze the structure of numeration systems and the roles of place value and zero in the base ten system
- Understand the relative magnitude of whole numbers, integers, rational numbers, and real numbers
- Demonstrate an understanding of a variety of models for representing numbers
- Demonstrate an understanding of equivalency among different representations of rational numbers
- Select appropriate representations of real numbers for particular situations
- Understand the characteristics and properties of the set of whole numbers, integers, rational numbers, and real numbers
- Demonstrate an understanding of how some situations that have no solution in one number system (e.g., whole numbers) have solutions in other number systems (e.g., real numbers)
- Work proficiently with real numbers and their operations
- Analyze and describe relationships between number properties, operations, and algorithms for the four basic operations involving integers, rational numbers, and real numbers
- Use a variety of concrete and visual representations to demonstrate the connections between operations and algorithms
- Justify procedures used in algorithms for the four basic operations with integers, rational numbers, and real numbers, and analyze error patterns that may occur in their application
- Relate operations and algorithms involving numbers to algebraic procedures
- Extend and generalize the operations on rational numbers and integers to include exponents, their properties, and their applications to the real numbers
- Demonstrate an understanding of ideas from number theory (e.g., prime factorization, greatest common divisor) as they apply to whole numbers, integers, and rational numbers, and use these ideas in problem situations
- Apply properties of the real numbers to solve a variety of theoretical and applied problems

Required Textbook:

Long, Calvin and DeTemple, Duane W. (2006). *Mathematical Reasoning for Elementary Teachers* (Fourth Edition). Boston, MA: Pearson Education, Inc.

Up-to-date course information will be posted on Blackboard. **Please check Blackboard regularly.**

MATERIAL TO BE COVERED:

Chapter 2	Sets and Whole Numbers	Sections 2.1–2.4
Chapter 3	Numeration and Computation	Sections 3.1–3.4
Chapter 4	Number Theory	Sections 4.1–4.3
Chapter 5	Integers	Sections 5.1–5.3
Chapter 6	Fractions and Rational Numbers	Sections 6.1–6.3

SUPPLIES: To be ready for action during each class, you will need to have:

- a scientific or graphing calculator
- colored pencils, pens, or crayons

ATTENDANCE POLICY: Regular and punctual attendance is expected of every student. As a prospective teacher, you must demonstrate your reliability and conscientious attitude by your faithful attendance. Any student who is more than 30 minutes late to class will be counted absent. Tardies will count against your attendance record, at the rate of 3 tardies equaling one absence. If absent or tardy, you are still responsible for all material covered in class, and you will need to check with a classmate about what was discussed. Serious health or family problems that are well documented will be handled individually.

In addition to attending class faithfully, students are expected to put forth their best effort in this class. This includes, but is not limited to, actively participating in class discussions and activities. By way of contrast, unprofessional behaviors (such as sleeping, texting, laying your head on the desk, reading the newspaper, or studying for other classes) will not be tolerated.

ASSIGNMENTS: In the “tentative schedule,” I have listed suggested problems and exercises from the textbook. I will not collect these, but problems on the midterm and final exams will be similar to these problems.

I will collect four assignments throughout the semester. These four assignments are described later in the syllabus. **NO LATE WORK WILL BE ACCEPTED.** If you know that you will be absent, you may turn in your assignment early, drop it by my office or send it by email by class time of the due date.

TESTS: There will be one midterm exam, and one final exam. The final exam is NOT comprehensive. These tests will contain problems similar to those worked in class and contained in the suggested problems and exercises. Test items will be in a variety of formats, such as multiple choice, short answer, or more extended items that require explanations.

No make-up tests will be given unless the student has an official University excused absence. If you know that you will be absent, arrangements must be made in advance of the exam.

Midterm Exam: Monday, June 16

Final Exam: Tuesday, July 1

COURSE EVALUATION: Each student’s grade will be based on the following:

Assignments (25 points possible for each)	100 points
Midterm Exam	150 points
Final exam	150 points
Total possible	400 points

Grading Scale

Points earned	360-400	320-359	280-319	240-279	less than 240
Course grade	A	B	C	D	F

ACADEMIC DISHONESTY: All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

CLASSROOM RULES OF CONDUCT: Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. **Cellular telephones and pagers must be turned off before class begins.** Students are prohibited from eating in class, using tobacco products, making offensive remarks, reading newspapers and magazines, sleeping, talking at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.

VISITORS IN THE CLASSROOM: Unannounced visitors to class must present a current, official SHSU identification card to be permitted in the classroom. They must not present a disruption to the class by their attendance. If the visitor is not a registered student, it is at the instructor's discretion whether or not the visitor will be allowed to remain in the classroom. This policy is not intended to discourage the occasional visiting of classes by responsible persons. Obviously, however, the visiting of a particular class should be occasional and not regular, and it should in no way constitute interference with registered members of the class or the educational process.

AMERICANS WITH DISABILITIES ACT: It is the policy of Sam Houston State University that no otherwise qualified disabled individual shall, solely by reason of his/her handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any academic or Student Life program or activity. Disabled students may request assistance with academically related problems stemming from individual disabilities by contacting the Director of the Counseling Center in the Lee Drain Annex or by calling (936) 294-1720.

STUDENT ABSENCES ON RELIGIOUS HOLY DAYS: University policy states that a student who is absent from class for the observance of a religious holy day must be allowed to take the examination or complete an assignment scheduled for that day within a reasonable time after the absence. Students will be excused to travel for observance of a religious holy day. A student who wishes to be excused for a religious holy day must present the instructor with a written statement describing the holy day(s) and the travel involved. The instructor will then provide the student with a written description of the deadline for the completion of missed exams or assignments.

TENTATIVE SCHEDULE

<i>Date</i>	<i>Sections</i>	<i>Topics</i>	<i>Suggested Exercises & Problems</i>
6/3	2.1	NCTM Standards Sets	Read inside back cover of textbook p. 83: 1, 15, 16
6/4	2.2	Counting Numeration Representing whole numbers	p. 97: 1, 2 p. 155: 13, 14, 16, 17, 21
6/5	3.2	Nondecimal number systems	p. 161: 5, 6, 7, 8, 9, 10
6/6	5.1 6.1	Representing integers Fractions concepts and representations	p. 291: 1, 2, 3, 8, 9, 14, 26 p. 310: 11, 12, 24 p. 354: 1, 3, 4, 5, 6
6/9	6.1 6.2	Representing fractions & rational numbers	p. 354: 11, 19, 20, 22, 23, 33 p. 376: 7, 8
6/10	2.3 5.2 6.2	Addition and subtraction: Whole numbers, integers, rational numbers	p. 111: 4, 5, 14, 20 p. 310: 1, 3, 4, 6 p. 375: 1, 2, 42ab
6/11	2.3	Properties of addition and subtraction	p. 111: 8, 9, 10, 12, 14
6/12	3.3 5.2 6.2	Algorithms for addition	p. 177: 1, 2, 3, 12, 13abcde, 17abc, 20abcd p. 375: 1, 2, 6, 7, 8, 9, 10, 12
6/13	3.3 5.2 6.2	Algorithms for subtraction	p. 177: 5, 6, 7, 13fgh, 17def, 20efgh p. 310: 5 p. 376: 9, 10, 12
6/16	Midterm Exam		
6/17	2.4 5.3 6.2	Multiplication: Whole numbers, integers, rational numbers	p. 130: 1, 2, 38 p. 321: 6 p. 377: 42c
6/18	2.4 6.2	Properties of multiplication	p. 130: 3, 5, 7, 9 p. 377: 15
6/19	3.4	Algorithms for multiplication	p. 188: 3, 4, 8, 13, 14, 17, 19, 20
6/20	5.3 6.2	Algorithms for multiplication	p. 320: 1 p. 377: 13
6/23	2.4 5.3 6.2	Models for division	p. 130: 15, 17, 18, 24, 29 p. 320: 3, 4 p. 377: 27, 42d
6/24	2.4 6.2	Division: Whole numbers, integers, rational numbers	p. 130: 16 p. 377: 21, 37, 39
6/25	3.4 5.3 6.2	Algorithms for division	p. 188: 6, 7, 10, 15, 20 p. 320: 2 p. 377: 17, 18, 29
6/26	4.1	Prime & Composite Numbers, Factors	p. 242: 2, 5, 7, 9, 15, 17, 19
6/27	4.2 4.3	Divisibility Tests GCF & LCM	p. 252: 1, 2, 6, 8, 12, 13 p. 264: 1, 2, 3, 4, 12, 13, 14
6/30		Catch-up and Review	Study for Final
7/1	Final (Comprehensive)		Have a Great Summer!

This is a tentative schedule and is subject to change. You will be advised of changes in class and on Blackboard. If you know that you will miss a class time when an assignment is due, please turn it in early and you will not be given a zero. If you know that you will miss a test, see me in advance. I look forward to a great semester!

For each of these assignments, please read the article and follow the specific directions listed below.

The assignments are worth 25 points each. **NO LATE WORK WILL BE ACCEPTED.**

Each assignment includes a 100-word *summary* of an article. The summary should:

- explain all of the important ideas from the article,
- make sense to someone who hasn't read the article,
- include only facts from the article, **NOT** your opinions.

It is difficult to summarize a four to eight page article 100 words. Because of this, **I encourage you to submit a rough draft of your work prior to the due date for feedback.**

Assignment 1: Due at 8:00 a.m., Friday, June 6

Cotter, J. (2000). Using language and visualization to teach place value. *Teaching Children Mathematics*, 7(2), 108-114.

1. Write a 100-word *summary* of the article. Please use the format guidelines listed below.
2. Write a 150-word *reaction* to the article. Please use format guidelines A, C, D, and E listed below. In the reaction, please answer the following questions:
 - a. Describe two things you learned from this article.
 - b. What was the most surprising thing you read in this article?
 - c. Because of reading this article, what questions do you have? (Please list at least two.)

Scoring rubric for Assignment 1	
1. Adherence to <u>format guidelines</u>	8 points
2. Includes all main points in <i>summary</i>	7 points
3. Adequately addresses three questions in <i>reaction</i>	10 points

Assignment 2: Due at 8:00 a.m., Friday, June 13

Uy, F. L. (2003). The Chinese numeration system and place value. *Teaching Children Mathematics*, 9(5), 243-247.

1. Write a 100-word *summary* of the article. Please use the format guidelines listed below.
2. Complete activities 1, 2, and 3 within the article. You may write your answers directly on the article, or you may use a separate sheet of paper for your answers.

Scoring rubric for Assignments 2, 3, and 4	
1. Adherence to <u>format guidelines</u>	8 points
2. Includes all main points in <i>summary</i>	7 points
3. Correct answers for activities	10 points

Assignment 3: Due at 8:00 a.m., Friday, June 20

Walmsley, A. L. E. (2006). Understanding Aztec and Mayan numeration systems. *Mathematics Teaching in the Middle School*, 12(1), 55-62.

1. Write a 100-word *summary* of the article. Please use the format guidelines listed below.
2. Complete activities 1, 2, and 3 within the article. You may write your answers directly on the article, or you may use a separate sheet of paper for your answers.

Assignment 4: Due at 8:00 a.m., Friday, June 27

Zaslavsky, C. (2003). The influence of ancient Egypt on Greek and other numeration systems. *Mathematics Teaching in the Middle School*, 9(3), 174-178.

1. Write a 100-word *summary* of the article. Please use the format guidelines listed below.
2. Complete activities 1 and 2 within the article. You may write your answers directly on the article, or you may use a separate sheet of paper for your answers.

Format guidelines

- A. Your summaries and reactions must be typed and double-spaced.
- B. Please include the reference for the article *exactly as it appears in the assignment description* in your summary.
- C. You must use proper English grammar and spelling.
- D. If you quote the author, please use quotation marks around the quote. Include the page number of the quote in parentheses.
- E. Do not go over the word limit.