

MA 1423

Problem Solving with Real Numbers

Credit: 3 semester hours

Catalog Description: Three hours lecture. Proportions, percents, problem solving and reasoning, probability, counting principles, statistics. (For Elementary and Special Education majors only. Prerequisite: a C or better in MA 1413)

Conceptual Framework: This course is designed to give pre-service elementary school teachers a basic knowledge and understanding of solving problems involving real numbers.

Instructional Objectives:

1. The student will be able to demonstrate a basic knowledge of symbolic logic.
2. The student will be able to solve mathematical problems through logical reasoning.
3. The student will be able to understand and use proportional reasoning to solve problems.
4. The student will be able to solve problems involving percents.
5. The student will be able to solve basic problems that involve real numbers.
6. The student will be able to compute basic probabilities and see the relationship to rational numbers.
7. The student will be able to use the language of mathematics to develop problems which model concepts and operations involving real numbers.
8. The student will be able to use basic counting principles.
9. The student will be able to graphically display basic statistical facts about a data set.
10. The student will be able to compute basic statistical measures.
11. The student will be able to use and apply statistical measures.
12. The student will be able to use the normal distribution curve.

Topics To Be Covered: (not necessarily in this order)

1. Logic – 8 hours
 - a. Determining the truth value of simple and compound statements
 - b. Determining the validity of an argument
 - c. Problem Solving through logical reasoning
2. Real Numbers – 8 hours
 - a. Proportional reasoning
 - b. Percents
3. Probability – 13 hours
 - a. Determine basic probability
 - b. Multiple stage experiments with probability
 - c. Conditional probability
 - d. Probability trees
 - e. Methods of counting
4. Statistics – 16 hours
 - a. Interpreting and creating statistical graphs
 - b. Calculating and using measures of central tendency and variation
 - c. Using and interpreting normal distribution

Suggested Student Activities:

The students will be placed in groups during the first class meeting. These groups can be used for study groups. They will be used for group projects (and for the Problem Based Learning cases). It is the responsibility of each student to get to know the other members of his or her group and establish contact times. The instructor for the course will set up email groups so that the students can make contact through that medium. These groups can be beneficial to all of the members if the students put forth the necessary effort.

Methods of Instruction:

This course is primarily a lecture course. There will be several group projects and possible cases to be explored through Problem Based Learning. There will also be some hands on activities. The students will learn to use a calculator. There will also be instruction in a computer lab using statistics software.

Text:

Mathematical Reasoning for Elementary School Teachers. 5th edition. Long, DeTemple, Millman. Addison Wesley Publishers.

