

MATH 328 Mathematics for Elementary Teaching II

1. Catalog Description

MATH 327, 328, 329 Mathematics for Elementary Teaching I, II, III (4) (4) (4)

Introduction to set theory, number theory, real numbers, probability, statistics and geometry. Computer applications. 2 lectures, 2 activities. **MATH 327** prerequisite: Completion of ELM requirement, and passing score on appropriate Mathematics Placement Examination, or MATH 118 or equivalent. **MATH 328** prerequisite: MATH 327 with a grade of C- or better or consent of instructor. **MATH 329** prerequisite: MATH 328.

2. Required Background or Experience

Math 118 or equivalent, and completion of Math 327 with a grade of C- or better.

3. Learning Objectives

Mathematical Content

- **Rational and Real Numbers**

The student will understand:

- a. Fundamental relations (greater than, less than, equal to) and operations (addition, subtraction, multiplication, and division) on rational numbers and real numbers. This includes both the ability to write word problems as well as the ability to solve those problems using multiple representations, standard algorithms, and nonstandard algorithms.
- b. The special roles of the unit and equivalence in the rational number system.
- c. The rational numbers as fractions, decimals, and percents including how to convert from one form into another.
- d. Algorithms with non-terminating repeating decimals, and to order decimals.
- e. Proportions and ratios.
- f. The connections between probabilities, ratios, proportions, decimals and percents.
- g. The properties of irrational numbers including their similarities and differences with the rational numbers.

- **Probability and Counting**

The student will:

- a. Understand a variety of representations for probabilities of one and two stage experiments, appealing to notions of complementary, mutually exclusive, dependent, and independent events.
- b. Understand basic counting techniques including the use of trees and organized lists.
- c. Use different counting techniques to calculate theoretical probabilities.

- **Statistics**

The student will:

- a. Collect, organize, and represent data through graphs and tables, and given a representation of data, the student will be able to interpret and draw conclusion about the data considering possible effects of bias.
- b. Understand how mean, median, mode, and range describe a set of data.

- **Other**

The student will:

- a. Identify errors in given calculations and identify typical error patterns found in children's mathematical thinking.

Mathematical Understanding

- Students will deepen their understanding of mathematics by:

- a. Experiencing concrete, investigative experiences in mathematics.
- b. Estimating and approximating to check the reasonableness of a solution.
- c. Developing and comparing physical, pictorial, and symbolic languages for representing mathematical ideas.
- d. Explaining why mathematics makes sense by integrating the English language with conventional mathematical notation, mathematical definitions, and concrete representations.
- e. Writing and solving mathematical problems and exercises.
- f. Watching and analyzing videos of young children solving mathematics problems.
- g. Addressing the fears and apprehensions of many people towards mathematics.

4. Text and References

Billstein, Rick, et al., Mathematics for Elementary School Teachers, 9th ed., Addison Wesley, 2006.

5. Minimum Student Materials

Required text, and activity materials provided by instructor.

6. Minimum University Facilities

Mathematics education classroom equipped with materials and technology.

7. Content and Method

<u>Topic</u>	<u>Lecture/Activity</u>
Chapter 5: Rational Numbers as Fractions The Set of Rational Numbers Addition and Subtraction of Rational Numbers Multiplication and Division of Rational Numbers	13
Chapters 6: Decimals, Percents, and Real Numbers Introduction to Decimals Decimals in Other Bases (<i>optional</i>) Operations on Decimals Operations on Decimals in Other Bases (<i>optional</i>) Nonterminating Decimals Real Numbers Percents	11
Chapter 7: Probability How Probabilities Are Determined Multistage Experiments with Tree Diagrams and Geometric Probabilities Using Simulations in Probability Odds, Conditional Probability, and Expected Value Using Permutations and Combinations in Probability	7
Chapter 8: Data Analysis/Statistics (<i>optional</i>) Statistical Graphs of Categorical and Numerical Data Measures of Central Tendency and Variation Abuses of Statistics	4
Total	35

Method

Lecture, discussion, and activity.

8. Methods of Assessment

Class activities, homework and lab assignments, term projects, midterm tests or quizzes, final examination.