

MATH 329 Mathematics for Elementary Teaching III

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

Successful completion of Math 328.

3. Learning Objectives

Mathematical Content

- Students will:
 - a. Be able to identify the axioms of Euclidean Geometry including undefined terms.
 - b. Be able to draw, identify, and define a variety of common two- and three-dimensional objects.
 - c. Understand attributes of two-dimensional objects (area, perimeter, sides, vertices) and three-dimensional objects (surface area, volume, edges, vertices, faces). This includes an understanding of the derivation of standard formulas by way of dissections as well as an understanding of common misconceptions associated with standard formulas.
 - d. Understand notions of similarity and congruence including how similar figures relate in terms of area, surface area, perimeter, and volume.
 - e. Understand linear and planar symmetries including translation, rotation, reflection, and glide reflection. This includes an ability to identify symmetries in a given object, to define the symmetries, and to implement the definitions with specific examples.
 - f. Understand the Pythagorean Theorem and its converse as well as at least one proof of the theorem.
 - g. Understand the roles of parallel and perpendicular lines and will be able to construct them with a straightedge and compass.
 - h. Be able to complete basic constructions with a straightedge and compass including copying an angle, copying a line segment, constructing a square, equilateral triangle, and regular hexagon.
 - i. Understand how to measure and estimate time, length, angles, perimeter, area, surface area, volume, weight, speed, and temperature in metric (SI), American, and nonstandard units. Students will be able to convert from one unit to another.
 - j. 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. 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 9: Introductory Geometry Basic Notions Polygons More about Angles Geometry in Three Dimensions Networks	9
Chapter 10: Constructions, Congruence, and Similarity Congruence through Constructions Other Congruence Properties (<i>Optional</i>) Other Constructions (<i>Optional</i>) Similar Triangles and Similar Figures Lines in a Cartesian Coordinate System (<i>Optional</i>)	9
Chapter 11: Concepts of Measurement Linear Measure Areas of Polygons and Circles The Pythagorean Theorem and the Distance Formula Surface Areas Volume, Mass, and Temperature	12
Chapter 12: Motion Geometry and Tessellations Translations and Rotations Reflections and Glide Reflections Size Transformations Symmetries Tessellations of the Plane (<i>Optional</i>)	5
	Total
	<u>35</u>
<u>Method</u>	

Lecture, discussion, activity.

8. Methods of Assessment

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