Math 107B : Fundamental Mathematical Concepts II

California State University, Sacramento · Department of Mathematics & Statistics

The focus of this course is the students' mastery of specific mathematical content which is substantially more than that contained in the K-8 curriculum. The students will examine the structure and basic properties of the real number system and its subsystems. They will also examine fundamental concepts and proper ties in geometry and measurement.

Various methods of instruction will be used, with a problem-solving approach providing the general basis. Historical and multi-cultural perspectives will be interwoven through the course. Appropriate materials and calculators will be used as often as possible.

May not be taken for credit toward a math major or minor.

Catalog Description

Second half of a one-year course in the structure of the real number system and its sub-systems and in the basic properties and concepts of geometry. Topics will include: definitions and properties of set theory and their use in the development of the natural and whole number systems, definitions and properties of the arithmetic relations and operations for the natural numbers, whole numbers, integers. Note: May not be taken for credit toward a mathematics major or minor. Graded: Graded Student. Units: 3.0

Prerequisites

Pass Math 107A with a grade of C- or better.

Course Outline

Rational Number System

Extension of $\mathbb{Z}$ to $\mathbb{Q}$, models for rational numbers (fractional form), operations, properties, decimal representation.

Real Number System

Irrationality of $\sqrt{2}$, irrational numbers, extension of $\mathbb{Q}$ to $\mathbb{R}$, operations, properties, relation of types of real numbers to forms of decimal expansions, density and approximation via decimal expansions, rounding and truncating on a calculator, ratio, proportion, percentage, completeness of $\mathbb{R}$.

Geometry

Properties of circles and related segments and lines, similarity, congruence, development of π and its use in circumference and area problems, tessellations, regular polyhedra, aesthetic and cultural aspects, history of geometry, types of geometry (Euclidean, non-Euclidean geometries, topology), geometry in nature, transformations (translations, rotations, reflections, and their compositions), isometries, development and application of mensuration formulas.