

# Introduction to Mathematical Problems

## Key Concepts:

- Mathematical problems
- Problem-solving
- Mathematical competitions
- Recurrence relations
- Limits and integrals

## Important Definitions:

- Mathematical problem: A statement or question that requires a mathematical solution
- Problem-solving: The process of finding a solution to a mathematical problem

## Examples:

- Problem 1: Prove that the equation  $y^2 = x^3 + 2$  has no integer solutions
- Problem 2: Evaluate the limit  $L = \lim (n! / n^n)$  as  $n$  approaches infinity

## Sources of Mathematical Problems

- D. J. Newman, A Problem Seminar
- Kenneth S. Williams, The Red Book of Mathematical Problems
- Kenneth Hardy, The Green Book of Mathematical Problems
- William Lowell Putnam Mathematical Competitions

## Types of Mathematical Problems

- Algebraic problems
- Geometric problems
- Calculus problems
- Number theory problems

## Summary:

This topic introduces the concept of mathematical problems and problem-solving, with a focus on various types of problems and their solutions.