

Fully Revised

Shraddha Singh

# MATHS OLYMPIAD

International Mathematics Olympiad

## 2

Strictly according to the latest syllabus of Maths Olympiad

Numbers

Additon and Subtraction

Division

Multiplication

Money

Measurement

Patterns

Classification

Series Completion

The Gen X Series

A SUCCESS PACKAGE FOR ASPIRANTS OF MATHS OLYMPIAD

# IMO

INTERNATIONAL  
MATHEMATICS  
OLYMPIAD



Shraddha Singh



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**V&S PUBLISHERS**

F-2/16, Ansari road, Daryaganj, New Delhi-110002

☎ 23240026, 23240027 • Fax: 011-23240028

Email: info@vspublishers.com • Website: www.vspublishers.com

**Regional Office : Hyderabad**

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Opposite Sobo Central Mall, Mumbai – 400 034

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ISBN 978-93-505795-3-4

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# PUBLISHER'S NOTE

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V&S Publishers, after the grand success of a number of Academic and General books, is pleased to bring out a series of *Mathematics Olympiad books* under *The Gen X series – generating Xcellence in generation X* – which has been designed to focus the problems faced by students. In all books the concepts have been explained clearly through examples, illustrations and diagrams wherever required. The contents have been developed to meet specific needs of students who aspire to get distinctions in the field of mathematics and want to become Olympiad champs at national and international levels.

To go through Maths Olympiad, the students need to do thorough study of topics covered in the *Olympiad syllabus and those covered in the school syllabus as well*. The Olympiads not only tests subjective knowledge but Reasoning skills of students also. So students are required to comprehend the depth of concepts and problems and gain experience through practice. The Olympiad check efficiency of candidates in problem solving. These exams are conducted in different stages at regional, national, and international levels. At each stage of the test, the candidate should be fully prepared to go through the exam. Therefore, this test requires careful attention towards comprehension of concepts, thorough practice, and application of rules.

While other books in market focus selectively on questions or theory; V&S Maths Olympiad books are rather comprehensive. Each book of this series has been divided into four sections namely *Mathematics, Logical Reasoning, Achievers section, Model Papers*. The theory has been explained through solved examples. To enhance the problem solving skills of candidates, *Multiple Choice Questions (MCQs)* with detailed solutions are given at the end of each chapter. Two *Mock Test Papers* have been included to understand the pattern of exam. A CD containing Study Chart for systematic preparation, Tips & Tricks to crack Maths Olympiad, Pattern of exam, and links of Previous Years Papers is accompanied with this book. The books are also useful for various other competitive exams such as NTSE, NSTSE, and SLSTSE as well.

We wish you all success in the examination and a very bright future in the field of mathematics.

All the best



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**SECTION 1**

**MATHEMATICAL**

**REASONING**







# Unit-1 : Numbers Sense



**Learning Objectives :** In this unit we will study:

- Number System
- Place Value
- Comparing of Numbers
- Successor and Predecessor of a Number
- Odd and Even Numbers

## Number System

The number system contains ten digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Numbers are written using these digits. These digits are called ones. The numerals formed by the digits 1, 2, 3, 4, 5, 6, 7, 8 and 9 are known as Hindu-Arabic Numbers.

- 10 ones make 1 ten
- 10 tens make 1 hundred
- 10 hundred make 1 thousand

## Numerals

Numbers can be written by using different symbols. The numbers represented by particular symbols are known as the digits of the system. A number is an idea where the symbols used to represent the numbers are called numerals.

## Number Sense

It refers to a student's fluidity and elasticity with numbers.

## Number Names (3 Digit Numbers)

A three digit number can be written in hundreds, tens and ones. Example, 125 – 1 hundred, 2 tens and 5 ones.

<b>Example :</b>	Number	Number Name
	100	Hundred
	500	Five hundred
	700	Seven hundred
	999	Nine hundred ninety nine

## Largest and Smallest Numbers

- Smallest one digit number is 1.



- The largest one digit number is 9.
- The smallest two digit number is 10.
- The largest two digit number is 99.
- The smallest three digit number is 100.
- The largest three digit number is 999.

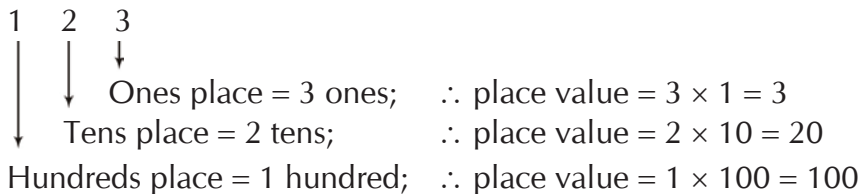
## Place Value

Place value of a digit depends on its position in the given number. As the digit moves to the left, its value increases.

In a three digit number there are three places named :

Ones place, Tens place and Hundred place.

**Example :** The place value of each digit in 123 is as follows :



**Note :** The place value of 0 is always zero.

## Expanded Form

Expanded form of 999 is

$$\begin{aligned} 999 &= 9 \text{ hundred} + 9 \text{ tens} + 9 \text{ ones} \\ &= 900 + 90 + 9 \end{aligned}$$

## Ascending Order of Numbers

Arranging the given numbers from the least to the largest is called Ascending order or Increasing order.

**Example :** 16, 67, 112, 157 are in ascending order.

## Descending Order of Numbers

Arranging the given numbers from the largest to the least is called Descending order or Decreasing order.

**Example :** 157, 112, 67, 16 are in descending order.

## Comparing the Numbers

We use the following signs to compare the given numbers.

- (i)  $>$  means greater than
- (ii)  $<$  means smaller than
- (iii)  $=$  means equal to