

MATHEMATICS WORKBOOK

4

For the preparation of National
& International Olympiads



- Chapter-wise practice exercises
- Previous year paper

Mathematics Olympiad

Exams Preparation Book

CMO | IMO | UMO | iOM | UIMO | HMO

Grade 4



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CREST Mathematics Olympiad Workbook for Grade 4

Fourth Edition

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Disclaimer: The information in the Workbook is to give you the path to success but it does not guarantee 100% success as the strategy is completely dependent on its execution. And it is based on previous year papers of CMO exam.

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Preface

We are pleased to launch a thoroughly revised edition of this workbook. We welcome feedback from students, teachers, educators and parents. For improvements in the next edition, please send your suggestions at info@crestolympiads.com. Our team will make an effort to work on those suggestions. The status of the improvements can be checked at <https://www.crestolympiads.com/corrections-class4-356>

CREST Olympiads is one of the largest Olympiad Exams with students from more than 60 countries. The objective of these exams is to build a competitive spirit while evaluating students on conceptual understanding of the concepts.

We strive to provide a superior learning experience, and this workbook is designed to complement the school studies and prepare the students for various competitive exams including the CREST Olympiads. This workbook provides a crisp summary of the topics followed by the practice questions. These questions encourage the students to think analytically, to be creative and to come up with solutions of their own. There is a previous year's paper given at the end of this workbook for the students to attempt after completing the syllabus. This paper should be attempted in 1 hour to get an assessment of the student's preparation for the final exam.

Publishers

Chapter 1

Number Sense

Number

Numbers are the core part of mathematics. In this workbook, the students will be introduced to five-digit numbers and their operations.

The smallest five-digit number is 10000.

It is named as ten thousand.

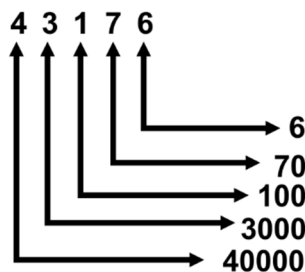
The biggest five-digit number is 99999.

It is named as Ninety-nine thousand nine hundred ninety-nine.

Let us see how to write five-digit numbers in words.

According to their values, the digits are placed from right to left as one's place, ten's place, hundred's place, thousand's place and ten thousand's place. Any number can be written just as a number or in expanded form or as number name.

For example, let us take 43176:



$$43176 = 40000 + 3000 + 100 + 70 + 6$$

Any number can be written just as a number or in expanded form or as number name.

$$40000 + 3000 + 100 + 70 + 6$$

We know that:

$$40000 = \text{Forty thousand (4 ten thousands)}$$

$$3000 = \text{Three thousand (3 thousands)}$$

$$100 = \text{One hundred (1 hundred)}$$

Number Sense

70 = Seventy (7 tens)

6 = Six (6 ones)

When added together it is written as:

43176 = Forty-three thousand one hundred and seventy-six.

Odd Number

The numbers which are not completely divisible by 2 are called odd numbers. They always leave a remainder 1 when divided by 2.

For example: 1, 3, 5, 7, 9, 11, 13, etc.

Even Number

The numbers which are completely divisible by 2 are called even numbers. They never leave a remainder. The remainder is always zero.

For example: 2, 4, 6, 8, 10, etc.

Place Value

Place value is the value of each digit in a number. The value of every digit in a number is different based upon its position (one's place or ten's place or hundred's place).

For example, the place value of 4 in 541 is $4 \times 10 = 40$.

Face Value

The face value of a digit in a number is the digit itself.

For example, the face value of 4 in 541 is 4.

Note:

Place value of a digit = (face value of the digit) \times (value of the place)

- The place value of 5 in 541 = $5 \times 100 = 500$
- 5 tens mean we multiply 5 with 10 = 50

Unitary Method

It is a technique in which the value of single unit is determined using the given information. Using this method, we can also determine the value of the multiple quantities.

For example, if 4 kg of sugar costs \$40, we can calculate the cost of 1 kg of sugar by dividing the quantities.

$$4 \text{ kg} = \$40$$

$$1 \text{ kg} = \$40/4 = \$10$$

We can obtain the value of 1 kg of sugar which comes out to be \$10.

We can also use this method further to calculate the value of 5 kg of sugar by simply multiplying the value.

$$1 \text{ kg} = \$10$$

$$5 \text{ kg} = \$10 \times 5 = \$50$$

Hence, 5 kg of sugar costs \$50.

Natural Numbers

The positive numbers starting from 1 to the last number, i.e., infinity are known as natural numbers excluding fractions and decimals.

“0” is not a natural number.

Natural numbers are represented as “N.”

For example:

4 is a natural number.

-2 is not a natural number.

0.5 is not a natural number.

$7/2$ is not a natural number.

Roman Numbers

It is a numeral system that originated in Rome. We use this method to represent the numbers.

We will discuss some commonly used numerals

1	I	11	XI	50	L
2	II	12	XII	100	C
3	III	13	XIII	500	D
4	IV	14	XIV	1000	M
5	V	15	XV		
6	VI	16	XVI		
7	VII	17	XVII		
8	VIII	18	XVIII		
9	IX	19	XIX		
10	X	20	XX		

For example: 72 is written as LXXII

Where L = 50, XX = 20 and II = 2

Ascending Order

Arranging numbers (or other items) in ascending order means arranging them from smallest to largest.

For example: 51, 14 and 20 can be arranged in the ascending order as:
14, 20 and 51.

Descending Order

Arranging numbers (or other items) in descending order means arranging them from largest to smallest.

For example: 51, 14 and 20 can be arranged in the descending order as:
51, 20 and 14

Factors

A factor is a number that divides other number completely without leaving any remainder. In other words, if a dividend is exactly divisible by any divisor, then the divisor is a factor of that dividend.

For example:

1 is a factor of 6

2 is a factor of 6

3 is a factor of 6

6 is a factor of 6

This means 6 has 4 factors.

Multiples

A multiple of a number is a number that is the product of a given number and some other natural number. This means that those numbers appearing in the mathematical table of a particular number are called multiples. For example, if 6 appears in 1, 2, 3, and 6 tables, then 6 is a multiple of all these 4 numbers.

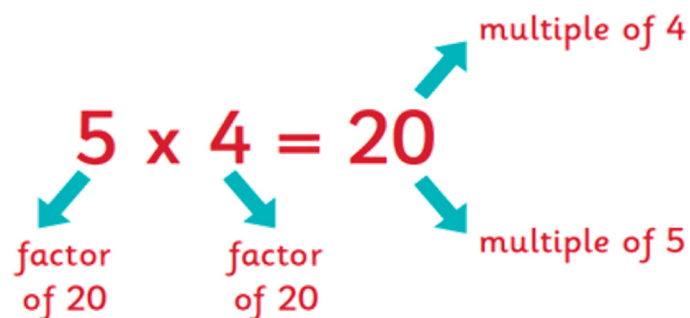
For example:

6 is a multiple of 1

6 is a multiple of 2

6 is a multiple of 3

6 is a multiple of 6



Rounding up of Numbers

Rounding up is a process to estimate a particular number or an approximate value in a context. To round a number, look at the next digit in the right place, if the digit is less than 5, round down and if the digit is 5 or more than 5, round up.

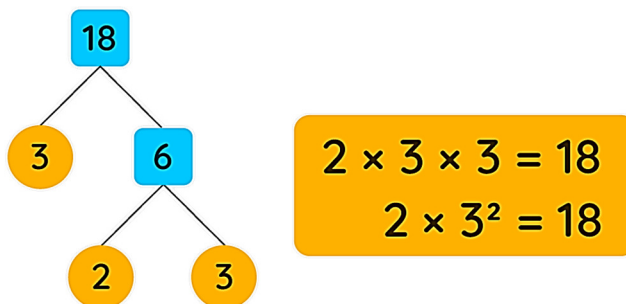
For example: Round 1045 to the nearest 100.

Since 4 is less than 5, we will round down and the answer will be 1000.

Number Sense

Let us solve some examples to understand the topic better.

Example 1: How many even factors are present for 18?



- a. 0
c. 2
- b. 1
d. 3

Solution 1: d

1, 2, 3, 6, 9 and 18 are factors of 18 out of which 2, 6 and 18 are even numbers so there are three even factors of 18.

Example 2: What is the Roman representation of two hundred sixty-five?

- a. CCLXV
c. CLXIV
- b. CCLXIV
d. CCLXXV

Solution 2: a

Two hundred sixty-five = 265

Roman number for 200 = CC

Roman number for 60 = LX

Roman number for 5 = V

So, 265 = CCLXV

Practice Questions

1. Arrange the following numbers in ascending order.

14852, 14258, 14425, 14825

- a. 14425, 14825, 14852, 14258
c. 14258, 14825, 14852, 14425
- b. 14425, 14258, 14825, 14852
d. 14258, 14425, 14825, 14852

2. What will you get on rounding 9847 to the nearest 100?

- a. 9800
c. 10000
- b. 9900
d. 9000

- 12.** I am a four-digit number. My unit's place is an odd number. My ten's place is occupied by 4. The digit present in my thousand's place is three less than the digit present in my ten's place. 2 is present in my hundred's place. Find me.
- a. 1247
c. 1244
- b. 1254
d. 1347
- 13.** Which of the following has the same value as 14900?
- a. $16440 - 1540$
c. $25720 + 3410$
- b. $14700 + 1340$
d. $16950 - 3550$
- 14.** What is the roman number representation for $140 + 12$?
- a. C
c. CLII
- b. CLIV
d. LCII
- 15.** If 130 is reduced from 670, we are left with _____.
- a. DX
c. DXC
- b. DXL
d. DII
- 16.** Which of the following numbers is the smallest?
- a. Four hundred and sixty-four
c. 80 tens + 4 ones
- b. LXIII
d. 200 tens + 7 ones
- 17.** When the smallest 3-digit number is subtracted from the smallest six-digit number, we obtain:
- a. 9900
c. 99090
- b. 99990
d. 99900
- 18.** The largest 3-digit number when rounded to the nearest 10, gives _____.
- a. 100
c. 990
- b. 1000
d. 990
- 19.** If 56 is added to 112, we obtain _____.
- a. CLXVIII
c. LXVII
- b. CLXIII
d. CLVIII
- 20.** What is the sum of the place value and face value of 6 in 1647?
- a. 660
c. 66
- b. 60
d. 606