MATHEMATICS WORKBOOK

3

For the preparation of National & International Olympiads

- Chapter-wise practice exercises
- Previous year paper

CREST Mathematics Olympiad (CMO)

Mathematics Olympiad

Exams Preparation Book

CMO | IMO | UMO | iOM | UIMO | HMO

Grade 3

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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-class 3-597

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

Number Sense

Number

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

The smallest four-digit number is 1000.

We call it one thousand.

The biggest four-digit number is 9999.

We call it nine thousand nine hundred ninety-nine.

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

According to their values, the digits are placed from right to left at one's place, ten's place, hundred's place and thousand's place.

For example, let us take 2385:
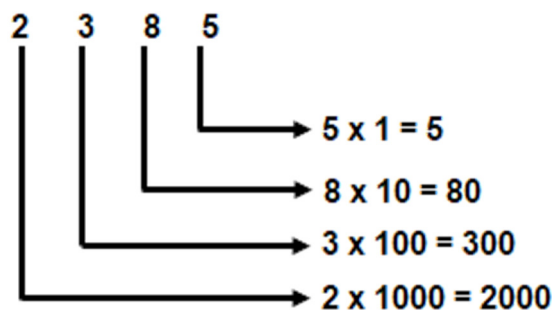
We can write it in the expanded form as:

2000 + 300 + 80 + 5

We know that:

2000 = Two thousand (2 thousands)

300 = Three hundred (3 hundreds)

80 = Eighty (8 tens)

5 = Five (5 ones)

When added together it is written as:

2385 = Two thousand three hundred and eighty-five.

Odd Number

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

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.

Unitary Method

It is the technique using which the value of the single unit is determined from 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 kg = $40

1 kg = $40/4 = $10

We 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 sugar by simply multiplying the value.

1 kg = $10

5 kg = $10 × 5 = $50

Hence, 5 kg of sugar costs $50.

Natural Numbers

The positive numbers starting from 1 and going up to infinity are known as natural numbers. It does not include a fraction or a decimal.

"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.

Some commonly used numerals are:

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				

We can also represent a clock in roman numbers:

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

Let us solve some examples to understand the topic better.

Example 1: I am a four-digit number. My unit's place is an even number. My ten's place is occupied by 7. The digit present in my thousand's place is one less than the digit present in my ten's place. 4 is present in my hundred's place. Find me.

a. 6477   b. 6466
c. 6476   d. 6566

Solution 1: c

In a four-digit number we have four place values:

One's place, Ten's place, Hundred's place and Thousand's place

It is given that:

One's place = any even number

Ten's place = 7

Hundred's place = 4

So, the number should be _47_

The number present in my thousand's place is one less than the digit present in my ten's place

7 - 1 = 6

Thousand's place = 6

So, the number = 647_

Option a can't be the answer as 7 is an odd number.

The correct answer can be 6476

Hence, option c is the correct answer.

Example 2: The relation between heart and stars are given below:

How many hearts will be equal to the stars given below?

a.

b.

c.

d.

Solution 2: c

1 heart = 3 stars

So, using the unitary method:

2 hearts = 3 × 2 = 6 stars

3 hearts = 3 × 3 = 9 stars

In the question figure, 9 stars are given and we need to find out the equivalent hearts.

Therefore, "3 hearts" is the correct answer.

Practice Questions

1. Which of the following options is the correct expanded form of 5894?

a. 5000 + 700 + 90 + 4
c. 500 + 80 + 9 + 4

b. 5000 + 800 + 90 + 4
d. 500 + 70 + 9 + 4

2. Arrange the following numbers in descending order.
5412, 4587, 4158

a. 5412, 4587, 4158
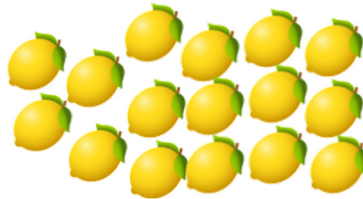c. 5412, 4158, 4587

b. 4158, 4587, 5412
d. 4587, 4158, 5412

3. Which number is represented by image shown below?

V

a. 10
c. 4

b. 3
d. 5

4. How many groups of 4 lemons can be formed from the total lemons given below?

a. 16
c. 4

b. 8
d. 6

5. Which of the following is the correct representation of 125 + 148?

a. 200 + 30 + 7
c. 100 + 70 + 4

b. 200 + 70 + 3
d. 100 + 30 + 7

6. Which option is equal to six thousand five hundred and fifty-nine?

a. 5659
c. 6559

b. 6569
d. 5569

7. What is the Roman representation of 18?

a. XIII
c. XVII

b. XVI
d. XVIII

8. I am an odd number that comes after 67 and before 82. The sum of my digits is 10. Both the numbers in the ten's place and unit's place are odd numbers. Find me.

a. 64
b. 73
c. 55
d. 77

9. Which of the following has the same value as 8475?

a. 8544 - 67
b. 7791 + 624
c. 8173 + 332
d. 8880 − 405

10. If

 + + = **69**

and

 + = **45**

then find the sum of the below objects:

 + + = **?**

a. 67
b. 66
c. 76
d. 69

11. Which of the following options has the largest value?

a. 160 tens less than 4 thousand
b. 690 ones less than 20 hundred
c. 115 tens less than 49 hundred
d. 1800 ones less than 2 thousand

12. What is the Roman representation of 63?

a. LXIV
b. XIL
c. LXVII
d. LXIII

13. If we subtract seven hundred forty-two from one thousand six hundred ten, we will get:

a. 848
b. 868
c. 878
d. 858

14. Tony deleted 163 unnecessary files from the laptop. After deleting, there were still 854 files present on his laptop. Find the total number of files on the laptop, before the files were deleted.

a. 691
b. 1007
c. 1017
d. 699

15. 7 tens and 40 ones together make _____.

a. 740
b. 100
c. 110
d. 74

16. Arrange the numbers in ascending order.

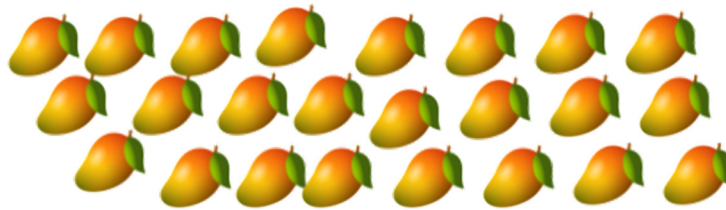   i.   1547
    ii. 1425
    iii. 1552
    iv. 1447

    a. ii, iv, i, iii   b. i, iv, ii, iii
    c. ii, iv, iii, i   d. ii, iii, i, iv

17. Which of the following numbers is the smallest?

    a. Three hundred sixty-nine   b. CXXXIII
    c. 60 ones + 9 ones   d. 2 tens + 70 ones

18. How many groups of 8 mangoes can be formed from the total mangoes given below?

    a. 4   b. 3
    c. 2   d. 5

19. Which of the following numbers is equivalent to 567 + 876?

    a. One thousand four hundred and thirty-four
    b. One thousand three hundred and thirty-three
    c. One thousand three hundred and twenty-four
    d. One thousand four hundred and forty-three

20. When the largest two-digit number is subtracted from the smallest four-digit number, we obtain:

    a. 901   b. 91
    c. 99   d. 900