

EXPANDING BRACKETS

We will see how the use of brackets allows us to make calculation simple and systematic.

- i. $7 \times 109 = 7 \times (100 + 9) = 7 \times 100 + 7 \times 9 = 700 + 63 = 763$
- ii. $102 \times 103 = (100 + 2) \times 103 = 100 \times 103 + 2 \times 103$
 $= 10300 + 206 = 10,506$
- iii. $17 \times 109 = 17 \times (100 + 9) = 17 \times 100 + 17 \times 9$
 $= 17 \times 100 + (10 + 7) \times 9$
 $= 1,700 + 10 \times 9 + 7 \times 9$
 $= 1,700 + 90 + 63$
 $= 1,790 + 63 = 1,853$

PRACTICE SUMS

- a. 9×108
- b. 18×107
- c. 102×105

ROMAN NUMERALS

We are well aware of the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. These numerals are used in Hindu- Arabic numeral system. However, one of the old systems of numeration developed by Romans is also in common use. This system is called Roman system of numeration. There are seven distinct numeral symbols in this system. These symbols and their corresponding Hindu – Arabic numerals are given below:

Roman Numerals	I	V	X	L	C	D	M
Hindu-	1	5	10	50	100	500	1000

Arabic Numerals							
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RULES FOLLOWED IN THE ROMAN SYSTEM OF NUMERATION-

Rule 1 If a symbol is repeated twice or thrice , the value of the numeral is obtained by adding the value of the symbol as many times as it is repeated.

For example: $XX = 10 + 10 = 20$

$$CCC = 100 + 100 + 100 = 300$$

Rule 2 The symbols I, X, C and M can be repeated to a maximum of three times.

Rule 3 The symbols V, L and D cannot be repeated.

Rule 4 If a symbol of smaller value is written to the right of the symbol of greater value , we add its value to the value of the greater symbol.

For example : $XII = 10 + 1 + 1 = 12$

$$DCC = 500 + 100 + 100 = 700$$

Rule 5 If a symbol of smaller value is written to the left of the symbol of greater value, its value is subtracted from the value of the greater value.

For example: $IX = 10 - 1 = 9$

$$CD = 500 - 100 = 400$$

Note: The symbols V, L and D cannot be written to the left of greater value symbols. The symbol X can be written to the left of L and C only. The symbol C can be written to the left of D and M only.

1. Write in Roman Numerals :

$$\begin{aligned} \text{a. } 69 &= 60 + 9 \\ &= (50 + 10) + 9 \end{aligned}$$

$$= LX + XI$$

$$= LXXI$$

b. $98 = 90 + 8$

$$= (100 - 10) + 8$$

$$= XC + VIII$$

$$= XCVIII$$

c. $326 = 300 + 20 + 6$

$$= (100 + 100 + 100) + (10 + 10) + 6$$

$$= CCCXXVI$$

d. $991 = 900 + 90 + 1$

$$= (1000 - 100) + (100 - 10) + 1$$

$$= CMXCI$$

2. Express each of the following in Hindu- Arabic numerals:

a. $XVII = 10 + 5 + 1 + 1 = 17$

b. $XCII = 100 - 10 + 1 + 1 = 92$

c. $MCDLV = 1000 + (100 - 500) + 50 + 5 = 1455$

d. $CDXLIX = (500 - 100) + (50 - 10) + (10 - 1)$

$$= 400 + 40 + 9 = 449$$

PRACTISE SUMS

1. Write the equivalent Roman numerals for the following Hindu – Arabic numerals:

a. 81

b. 45

c. 19

d. 209

2. Express each of the following in Hindu – Arabic numerals:

a. XVII

b. XLV

c. CLXXXVII

d. XCV

WHOLE NUMBERS

In natural numbers , we have seen that there is no predecessor of 1. A collection of natural numbers along with 0 are called **whole numbers**. Every natural number is a whole number but, on the other hand there exists a whole number '0' which is not a natural number which is not a natural number.

EXERCISE 2.1

1. Write the next three natural numbers after 10999.

Solution

The next three natural numbers are-

$$10999 + 1 = 11000$$

$$11000 + 1 = 11001$$

$$11001 + 1 = 11002$$

2. Write the three whole numbers occurring just before 10001.

Solution

$$10001 - 1 = 10000$$

$$10000 - 1 = 9999$$

$$9999 - 1 = 9998$$

3. Which is the smallest whole number ?

Ans. Zero '0' is the smallest whole number.

4. How many whole numbers are there between 32 and 53?

$$\text{Ans. } 53 - 32 = 21 - 1 = 20$$

As the ques. Is whole No. between 53 and 32 excluding 32 and 53.

5. Write the successor of:

a. 2440701

$$2440701 + 1 = 2440702$$

b. 100199

$$100199 + 1 = 100200$$

FOR PRACTISE

c. 1099999

d. 2345670

6. Write the predecessor of:

a. 94

$$94 - 1 = 93$$

b. 10000

$$10000 - 1 = 9999$$

FOR PRACTISE

c. 208090

d. 7654321

Note: The value of whole number increases from left to right.

7. In each of the following pairs of numbers, state which whole number is on the left of the other number on the number line. Also write them with the appropriate sign ($>$, $<$) between them.

a. 530 ,503

503 is on the left of 530. $530 > 503$.

b. 370 , 307

307 is on the left of 370. $370 > 307$

c. 98765 , 56789

56789 is on the left of 98765. $98765 > 56789$

8. Which of the following statements are true (T) and which are false (F)?

a. Zero is the smallest natural number. False

b. 400 is the predecessor of 399. False

c. Zero is the smallest whole number. True

d. 600 is the successor of 599. True

e. All natural numbers are whole numbers. True

f. All whole numbers are natural numbers. False

g. The predecessor of a two digit number is never a single digit number. False

h. 1 is the smallest whole number. False

i. The natural number 1 has no predecessor. True

j. The whole number 1 has no predecessor. False

k. The whole number 13 lies between 11 and 12. False

l. The whole number 0 has no predecessor. True

m. The successor of a two digit number is always a two digit number. False

