MATHEMATICS

Class-VI

Topic-02

WHOLE NUMBERS

WHOLE NUMBERS

TERMINOLOGIES

Betweenness, number line, closure property, commutative property, associative property, additive identity , additive inverse , multiplicative identity, multiplicative inverse , distributive property

INTRODUCTION

How many children are there in your class who are more than 25 years old ? Your answer will be 0.

Is 0 a natural number ? (NO) If we include 0 in the set of natural numbers , we have the set of whole numbers. We denote the set of whole numbers by W. W = { 0,1,2, 3 ...}

2.1 WHOLE NUMBERS

(a) Zero

Let us consider an example to understand the concept of zero. If we want to divide 7 sweets equally among 3 children, 1 sweet will be left. But if we were to divide 6 sweets equally among 3 children, we are left with no sweets.
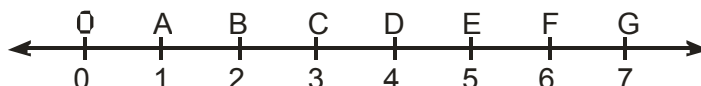
Zero means absence of the item (or no item)

(b) Representation of whole numbers on a number line

We represent the whole numbers on a number line in the following manner :

(a) Draw a line and mark point O on it.

(b) Mark points A, B, C, D, E, F, G to the right of O at equal intervals.

(c) Label the points O as 0 , the point A as 1, the point B as 2 , the point C as 3 ,.... and so on.

The following observation can be verified from the number line.

(a) There is no whole number on the left of '0' . Thus 0 is the smallest whole number.

(b) Two is 'One more than one', three is 'One more than two' and so on.

(c) Betweenness

Between any two consecutive whole numbers , we cannot mark any whole number. For example, there is no whole number between 6 and 7. But between any two non-consecutive whole numbers we can mark at least one whole number. For example , 5 lies between 4 and 6 , 17 lies between 16 and 18.

Illustration 2.1

In each of the following pairs of numbers , which one is on the left of the other on the number line? Also write them by using < or > between them

(a)   98765 , 56789   **(b)**   9830415, 10023001

Sol.   **(a)**   56789 is on the left 98765 > 56789

         (b)   9830415 is on the left 9830415 < 10023001
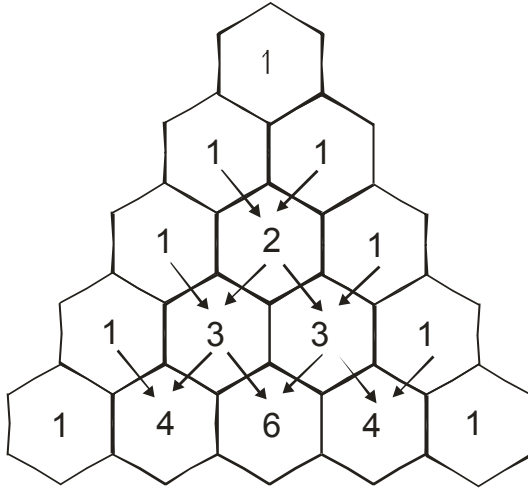
Illustration 2.2

Write numbers between :

(a)   5635 and 5639

(b)   99999 and 100003

Sol. **(a)**   5636, 5637,5638

(b)   100000,100001,100002

(d)   Patterns in Whole Numbers

Study the following :

(i)   (a) 225 + 9 = 225 + 10 – 1 = 235 – 1 = 234
(b) 225 + 99 = 225 + 100 – 1 = 325 – 1 = 324
(c) 225 + 999 = 225 + 1000 – 1 = 1225 – 1 = 1224
(d) 225 + 9999 = 225 + 10000 – 1 = 10225 – 1 = 10224

(ii)   (a) 7512 – 9 = 7512 – 10 + 1 = 7502 + 1 = 7503
(b) 7512 – 99 = 7512 – 100 + 1 = 7412 + 1 = 7413
(c) 7512 – 999 = 7512 – 1000 + 1 = 6512 + 1 = 6513

Multiplication by 9,99,999 etc.

Study the following

(a) $173 \times 9 = 173 \times (10 - 1) = 1730 - 173 = 1557$

(b) $173 \times 99 = 173 \times (100 - 1) = 17300 - 173 = 17127$

(c) $173 \times 999 = 173 \times (1000 - 1) = 173000 - 173 = 172827$

Illustration 2.3

Study the pattern and write the next two steps :

$1 \times 8 + 1 = 9$

$12 \times 8 + 2 = 98$

$123 \times 8 + 3 = 987$

$1234 \times 8 + 4 = 9876$

$12345 \times 8 + 5 = 98765$
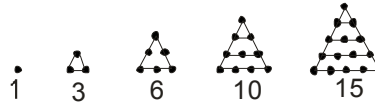
Sol.   The next two steps will be

$123456 \times 8 + 6 = 987654$

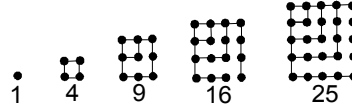$1234567 \times 8 + 7 = 9876543$

Triangular and Square Numbers

Let one dot (.) represent the number 1

(i) Now look at the following figures made with dots :

1   3   6   10   15

These numbers 1, 3, 6, 10, 15 .... form triangles. They are called triangular numbers.
Try to write next two triangular numbers.

(ii) Again look at the following figures made with dots :

1   4   9   16   25

These numbers 1, 4, 9, 16, 25,.... form squares. They are called square numbers.
Try to write next square numbers.

Ask yourself

1. Which three whole numbers will be just on the left of 2000 on the number line ?

2. Which two whole numbers will be just on the right of 6908 on the number line ?

3. How many whole numbers are there in between 24 and 35 ?

4. Write the numbers between :
   (a) 5678543 and 5678547   **(b)** 1000000 and 999999

5. In each of the following pairs of numbers , which one is on the right of the other on the number line?
   Also write them by using < or > between them
   (a) 7005, 7050   **(b)** 8976542, 8976540

Answers

1.	1999 , 1998 , 1997	**2.**	6909 , 6910	**3.**	10
4.	**(a)** 5678544 , 5678545 , 5678546		**(b)** 0		
5.	**(a)** 7005 < 7050		**(b)** 8976542 > 8976540		

2.2 PROPERTIES

(a) Properties of Addition

(i) Closure Property :

If 'a' and 'b' are two whole numbers and their sum is c, i.e., $a + b = c$, then c will always be a whole number. This property of addition is called the closure property of addition.

For ex. : $3 + 4 = 7$
$2 + 8 = 10$ i.e., whole number + whole number = whole number

(ii) Commutative Property :

If a and b are two whole numbers then $a + b = b + a$. This property of addition, where the order of addition does not alter the sum, is called the commutative property of addition
For ex. $3 + 4 = 7$
Also, $4 + 3 = 7$ i.e., $3 + 4 = 4 + 3$

(iii) Associative Property :

If a, b and c are three whole numbers then, a + (b + c) = (a + b) + c. In other words, in the addition of whole numbers, the sum does not change even if the grouping is changed. This property is called the associative property of addition.

For ex.   2 + (3 + 4) = (2 + 3) + 4
                2 + 7 = 5 + 4
                9 = 9

(iv) Additive Identity :

If a is a whole number ,then a + 0 = 0 + a = a.

Hence, zero is called the additive identity of the whole numbers because it maintains (or does not change) the identity (value) of the numbers during the operation of addition.

For ex. 7 + 0 = 7 = 0 + 7

Illustration 2.4

Add 837 , 208 and 363.

Sol.   837 + 208 + 363 = (837 + 363) + 208 = 1200 + 208 = 1408

Illustration 2.5

Find the sum of 1962 , 453 , 1538 and 647

Sol.   1962 + 453 + 1538 + 647 = (1962 + 1538) + (453 + 647) = 3500 + 110 = 4600

(b)   Properties of Subtraction

(i) Closure Property :

If a and b are two whole numbers, then a – b will be a whole number only if a is greater than b or a is equal to b. If a is smaller than b, then the answer will not be a whole number. Hence, subtraction is not closed under whole numbers.

For ex.   7 – 2 = 5 is whole number
                but 3 – 8 is not a whole number

(ii) Commutative Property :

If a and b are two distinct whole numbers, then a – b is not equal to b – a. Hence, the commutative property is not true for subtraction of whole numbers.

For ex. $a - b \neq b - a$
                $7 - 2 \neq 2 - 7$

(iii) Associative Property :

If a, b and c are whole numbers, then (a – b) – c is not equal to a – (b – c). So, the associative property also does not hold true for subtraction of whole numbers

For ex.   (12 – 4) – 3 = 8 – 3 = 5
                12 – (4 – 3) = 12 –1 = 11
                $\therefore (12 - 4) - 3 \neq 12 - (4 - 3)$

(iv) Property of Zero :

If zero is subtracted from any whole number, then the result is the number itself. a – 0 = a, for any whole number a.

For ex.   3 – 0 = 3

Illustration 2.6

Fill in the place holder : _____ + 6 = 11

Sol.   To find the required number, we guess a number which when added to 6 gives the sum 11. Obviously, it is 5 , since 5 + 6 =11

(c)   Properties of Multiplication

(i) Closure Property :

If a and b are whole numbers, then their product a × b = c will always be a whole number. That is whole numbers are closed under multiplication.

For ex.   7 × 3 = 21, 6 × 8 = 48, 3 × 0 = 0

(ii) Commutative Property :

In general a × b = b × a for all whole numbers a and b. Consider the following example

$$2 \times 3 = 3 \times 2 = 6$$
$$8 \times 9 = 9 \times 8 = 72$$

(iii) Associative Property :

If a,b and c are whole numbers, then (a × b) × c = a × (b × c)

That is, whole numbers have the associative property of multiplication.

For ex.   (3 × 4) × 2 = 3 × (4 × 2)
$$12 \times 2 = 3 \times 8$$
$$24 = 24$$

(iv) Multiplicative Identity :

1 × a = a × 1 = a. Hence, 1 is called the multiplicative identity for whole numbers.

For ex. 10 × 1 = 1 × 10 = 10
$$3 \times 1 = 1 \times 3 = 3$$
$$672 \times 1 = 1 \times 672 = 672$$
$$0 \times 1 = 1 \times 0 = 0$$

(v) Property of Zero :

When any whole number a is multiplied by zero, the product is zero. That is ,
$$a \times 0 = 0 \times a = 0$$
For ex. 27 × 0 = 0 × 27 = 0

Illustration 2.7

Find 4 × 1813 × 25.

Sol.   4 × 1813 × 25 = (4 × 25) × 1813 = 100 × 1813 = 181300

Illustration 2.8

Find the value of 738 × 25 + 738 × 75.

Sol.   738 × 25 + 738 × 75 = 738 (25 +75) = 738   × 100 = 73800.

(d)   Properties of Division

(i) Closure Property :

If a and b are whole number , then the quotient a ÷ b need not always be a whole number. So, division in whole numbers is not closed.

For ex. $6 \div 3 = 2, 6 \div 4 = 1\dfrac{1}{2}$, $6 \div 7 = \dfrac{6}{7}$

$1\dfrac{1}{2}$ and $\dfrac{6}{7}$ are not whole numbers.

(ii) Commutative Property :

If a and b are whole numbers, then a ÷ b is not equal to b ≠ a. So, the commutative property does not hold true for whole numbers.

For ex. 6 ÷ 3 = 2 is not the same as 3 ÷ 6 = $\frac{1}{2}$

(iii) Associative Property :

If a, b, and c are whole numbers, then (a ÷ b) ÷ c is not equal to a ÷ (b ÷ c).
(a ÷ b) ÷ c ≠ a ÷ (b ÷ c)

For ex. (81 ÷ 9) ÷ 3 = 3 and 81 ÷ (9 ÷ 3) = 27
So, (81 ÷ 9) ÷ 3 is not equal to 81÷ (9 ÷ 3)
Hence, the associative property does not apply to the division of whole numbers.

(e) Special properties

1. Whenever a whole number is divided by 1, we get the same whole number as the answer.
   For ex. 6 ÷ 1 = 6, 8 ÷ 1 = 8
   If 6 sweets are divided between 2 children, we have 6 ÷ 2 = 3. Each child gets 3 sweets. If 6 sweets are divided among 3 children, then 6 ÷ 3 = 2. Each child gets 2 sweets in this case. If 6 sweets are given to one child, then 6 ÷ 1 = 6. The child gets 6 sweets. So, when we divide by taking 1 as the divisor, the quotient (answer) is the same as the dividend. Hence, a ÷ 1 = a

2. If zero is divided by any whole number, the result will always be zero.
   For ex. 0 ÷ 3 = 0
   If there are zero chocolates or no chocolates in a packet and we divide into equal parts, each part will still have only zero chocolates.
   So, 0 ÷ a = 0

3. Division of a whole number by zero is meaningless and is not allowed.
   For example, to speak of dividing 12 oranges between zero students is meaningless.

(f) Distributive property

If a,b,c are whole numbers, then
a x (b + c) = a x b + a x c
This property is called the distributive property of multiplication over addition.
For ex. 7 x (8 + 3) = 7 x 8 + 7 x 3
7 x 11 = 56 + 21
77 = 77
If a,b,c are whole numbers (b > c), then
a x (b – c) = a x b – a x c
This property is called the distributive property of multiplication over subtraction.
For ex. 5 x (7 – 3) = 5 x 7 – 5 x 3
5 x 4 = 35 – 15
20 = 20

Illustration 2.9

Solve using distributive property.

(i)   8 x 107   (ii)   18 x 95

Sol. (i)   8 x 107 = 8 x (100 + 7)

= 8x100 + 8 x 7

= 800 + 56

= 856

(ii)   18 x 95 = 18 x (100 –5)

= 18 x100 – 18 x 5

= 1800 – 90

= 1710

Illustration 2.10

Using suitable arrangement , find the product of :

(i)   8, 9, 25, 3   (ii)   4, 897, 25   (iii)   250, 2986, 4

(iv)   4000, 625, 32   (v)   125, 40, 8, 25

Sol. Since the number may be grouped in any order we group those numbers which make the calculations most convenient.

(i)
$$8 \times 9 \times 25 \times 3$$
$$200 \times 27$$
$$5400$$

(ii)   4 × 897 × 25 = (4 × 25) × 897 = 100 × 897 = 89700

(iii)   250 × 4 × 2986 = 250 × 4 × 2986

= (250 × 4) × 2986 = 1000 × 2986

= 2986000.

(iv)   4000 × 625 × 32

= 4000 × 625 × 16 × 2

= (4000 × 2) × (625 × 16)

= 8000 × 10000 = 8,00,00,000.

(v)   125 × 40 × 8 × 25

= (125 × 40) × (8 × 25) = 5000 × 200 = 10,00,000

Illustration 2.11

Find the value of the following using properties of multiplication.

37 × 865 + 18 × 865 – 49 × 865 – 6 × 865

Sol. 37 × 865 + 18 × 865 – 49 × 865 – 6 × 865

= 865 × (37 + 18 – 49 – 6)

= 865 × (55 – 55) = 865 × 0 = 0

Illustration 2.12

25 sets containing a pencil and a ruler are made. The cost of each pencil is Rs. 2 and that of a ruler is Rs. 8. What is the total cost of 25 sets ?

Sol. Cost of 25 pencils = 25 × Rs. 2 = Rs. 50

Cost of 25 rulers = 25 × Rs. 8 = Rs. 200

∴ Total cost = 25 × 25 + 25 × 8 = 50 + 200 = Rs. 250

Alternatively,

Total cost = 25 × Total cost of pencil and ruler

= 25 × Rs. (2 + 8) = 25 × Rs. 10 = Rs. 250

Thus, we can see here,

25 × (2 + 8) = 25 × 2 + 25 × 8 = 250 , i.e.,

we have used distributive property.

Ask yourself

1. Find the sum (use the most convenient combinations)
   (a) 414 + 386 + 520
   (b) 2098 + 1435 + 302 + 865

2. What is whole number x in each case ?
   (a) (7 + x) + 11 = (11+7) + 8
   (b) (17 +14) + x = (9+14) +17

3. Which of the following statements are true and which are false ?
   (a) 25 + 98 = 98 +25
   (b) (29+41) is a whole number
   (c) 35 + 0 = 0 +35 = 35
   (d) (3+25) + 9 = (3+9)+25

4. Which of the following statements are true and which are false ?
   (a) 25 – (13 –11) = (25 –13) – 11
   (b) 809 – 0 = 809
   (c) If 25 – 13 = 12 , then 13 + 12 = 25
   (d) 87 – 99 is a whole number

5. By using properties of multiplication, find
   (a) 8778×102
   (b) 9135×495

6. By suitable arrangements , find the products :
   (a) $4 \times 88 \times 25$
   (b) $8 \times 125 \times 73$
   (c) $4 \times 80 \times 125 \times 75$

7. Use distributive property over addition for multiplication to simplify the following :
   (a) $65 \times 75 + 35 \times 75$
   (b) $64 \times 331 + 64 \times 169$

8. Find the following products :
   (a) $38 \times 27 \times 1$
   (b) $245 \times 20 \times 0 \times 98$

Answers

1.	**(a)** 1320	**(b)** 4691	**2.**	**(a)**	x = 8	**(b)** x = 9

3.   **(a)** True   **(b)** True   **(c)** True   **(d)** True

4.   **(a)** False   **(b)** True   **(c)** True   **(d)** False

5.   **(a)** 895356   **(b)** 4521825

6.   **(a)** 880   **(b)** 73000   **(c)** 3000000

7.   **(a)** 7500   **(b)** 32000
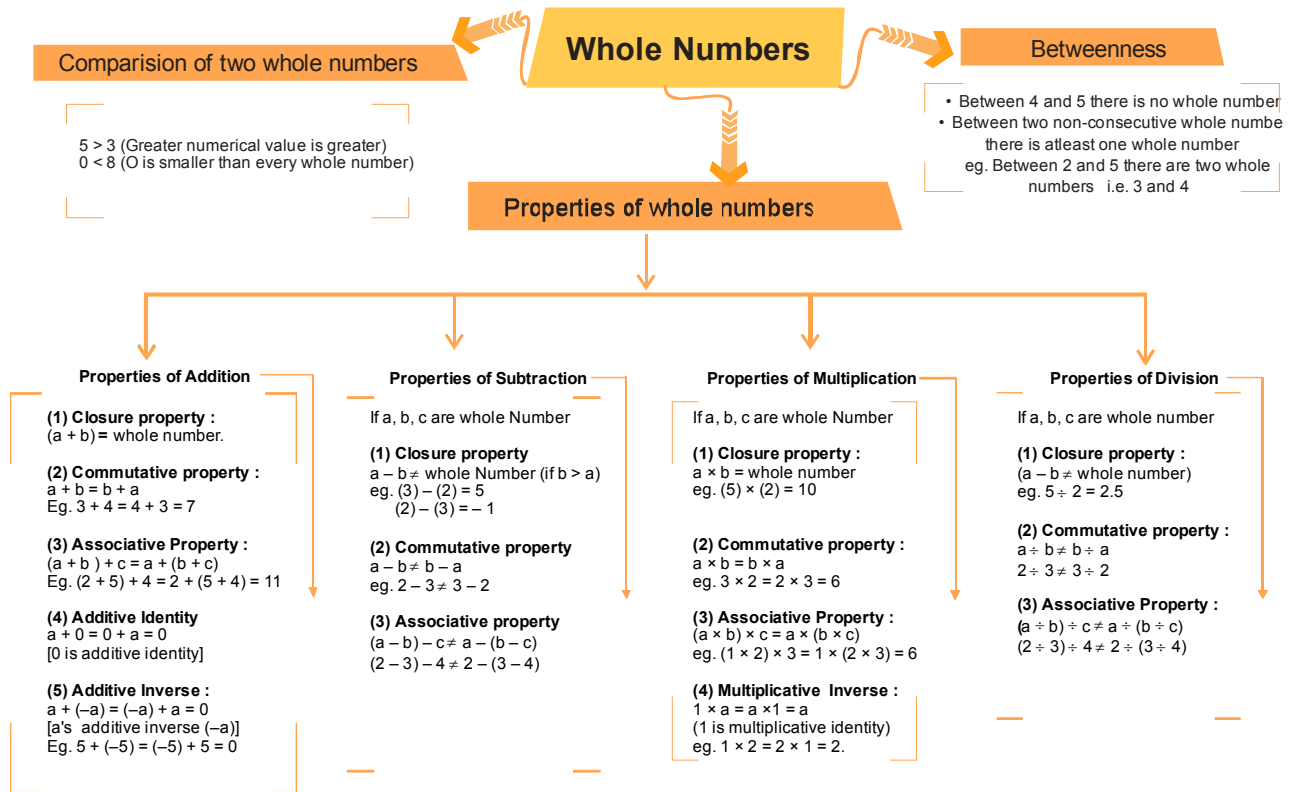
8.   **(a)** 1026   **(b)** 0

Add to Your knowledge

Sequence :

A sequence is an arrangement of numbers in a definite order according to some rule.

e.g. (i) 2, 5, 8, 11, …   (ii) 4, 1, – 2, – 5, …   (iii) 3, –9, 27, – 81, …

Concept Map

Comparision of two whole numbers

Whole Numbers

Betweenness

5 > 3 (Greater numerical value is greater)
0 < 8 (O is smaller than every whole number)

- Between 4 and 5 there is no whole number
- Between two non-consecutive whole numbe there is atleast one whole number
eg. Between 2 and 5 there are two whole numbers i.e. 3 and 4

Properties of whole numbers

Properties of Addition

(1) Closure property :
(a + b) **=** whole number.

(2) Commutative property :
a + b = b + a
Eg. 3 + 4 = 4 + 3 = 7

(3) Associative Property :
(a + b) + c = a + (b + c)
Eg. (2 + 5) + 4 = 2 + (5 + 4) = 11

(4) Additive Identity
a + 0 = 0 + a = 0
[0 is additive identity]

(5) Additive Inverse :
a + (–a) = (–a) + a = 0
[a's additive inverse (–a)]
Eg. 5 + (–5) = (–5) + 5 = 0

Properties of Subtraction

If a, b, c are whole Number

(1) Closure property
a – b ≠ whole Number (if b > a)
eg. (3) – (2) = 5
    (2) – (3) = – 1

(2) Commutative property
a – b ≠ b – a
eg. 2 – 3 ≠ 3 – 2

(3) Associative property
(a – b) – c ≠ a – (b – c)
(2 – 3) – 4 ≠ 2 – (3 – 4)

Properties of Multiplication

If a, b, c are whole Number

(1) Closure property :
a × b = whole number
eg. (5) × (2) = 10

(2) Commutative property :
a × b = b × a
eg. 3 × 2 = 2 × 3 = 6

(3) Associative Property :
(a × b) × c = a × (b × c)
eg. (1 × 2) × 3 = 1 × (2 × 3) = 6

(4) Multiplicative Inverse :
1 × a = a ×1 = a
(1 is multiplicative identity)
eg. 1 × 2 = 2 × 1 = 2.

Properties of Division

If a, b, c are whole number

(1) Closure property :
(a – b ≠ whole number)
eg. 5 ÷ 2 = 2.5

(2) Commutative property :
a ÷ b ≠ b ÷ a
2 ÷ 3 ≠ 3 ÷ 2

(3) Associative Property :
(a ÷ b) ÷ c ≠ a ÷ (b ÷ c)
(2 ÷ 3) ÷ 4 ≠ 2 ÷ (3 ÷ 4)

Summary

1. All natural numbers together with the number zero form the set of whole numbers.

2. 0 is a whole number but not a natural number.

3. Given any two distinct whole numbers , one is always smaller than other.

4. Given any two non-consecutive whole numbers, then there is at least one whole number between them.

5. Closure property :
   (i) $a + b$ is a whole number.
   (ii) $a \times b$ is a whole number
   (iii) $a - b$ is not necessarily a whole number.
   (iv) $a \div b$ is not necessarily a whole number.

6. Commutative property :
   (i) $a + b = b + a$
   (ii) $a \times b = b \times a$
   (iii) $a - b \neq b - a$
   (iv) $a \div b \neq b \div a$

7. Associative property :
   (i) $(a + b) + c = a + (b + c)$
   (ii) $(a \times b) \times c = a \times (b \times c)$
   (iii) $(a - b) - c \neq a - (b - c)$
   (iv) $(a \div b) \div c \neq a \div (b \div c)$

8. Additive Identity :
   $a + 0 = 0 + a = a$
   0 is the additive identity.

9. Multiplicative Identity :
   $a\,1 = 1a = a$
   1 is the multiplicative identity.

10. $a \div 1 = a$

11. $a \div a = 1$

12. $0 \div a = 0$

13. $a \div 0 =$ not defined.

14. Dividend = divisor × quotient + remainder.

EXERCISE » 01

SECTION -A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS

1. How many whole numbers are smaller than 9 ?
(A) 1   (B) 2   (C) 3   (D) 9

2. The smallest whole number is :
(A) 0   (B) 9   (C) 2   (D) 1

3. The predecessor of whole number 1 is :
(A) 2   (B) 9   (C) 0   (D) Does not exist

4. Which is not the successor of any whole number ?
(A) 1   (B) 0   (C) 2   (D) 9

5. The predecessor of 9099 is :
(A) 9088   (B) 9098   (C) 9100   (D) 9091

6. The whole number which is not a natural number, is :
(A) 1   (B) 0   (C) 9   (D) 2

7. How many times does the digit 2 occur between 1 and 100 ?
(A) 10   (B) 9   (C) 12   (D) 20

8. Number of whole numbers between 38 and 68 is
(A) 31   (B) 30   (C) 29   (D) 28

9. A whole number is added to 25 and the same number is subtracted from 25. The sum of the resulting number is
(A) 0   (B) 25   (C) 50   (D) 75

10. By using dot (.) patterns, which of the following numbers can be arranged in all the three ways namely a line, a triangle and a rectangle ?
(A) 9   (B) 10   (C) 11   (D) 12

11. Given two whole number a and b, which of the following may not always be whole numbers.
(A) a + b   (B) a – b   (C) a × b   (C) 2a + b

12. A student wrote 5 + 24 + 25 + 6 = 5 + 25 + 24 + 6. Which property of addition did he use ?
(A) Closure property   (B) Commutative property
(C) Associative property   (D) Property of zero

13. 27 + 52 + 73 + 10 = 100 + ☐ . Which value shall come in the box ?
(A) 52   (B) 73   (C) 62   (D) 37

14. Which of the following statements does not represent a property of addition of whole number?
(A) 38 + 53 = 53 + 38   (B) 16 + 7 is a whole number
(C) 899 + 10 = 8990   (D) 4 + (9 + 23) = (4 + 9) + 23

15. The additive identity of whole number 1 is :
(A) 0   (B) 1   (C) 2   (D) none of these

16. Which of the following statements is not true for three whole numbers a,b and c ?
(A) $a + (b + c) = (a + b) + c$ (B) $a \times (b + c) = (a \times b) + (a \times c)$
(C) $a (b c) = (a b) c$ (D) $(a \times b) \times c = a \times (b \times c)$

17. Which of the following is not true ?
(A) $(7 + 8) + 9 = 7 + (8 + 9)$ (B) $(7 \times 8) \times 9 = 7 \times (8 \times 9)$
(C) $7 + (8 \times 9) = (7 + 8) \times (7 + 9)$ (D) $7 \times (8 + 9) = (7 \times 8) + (7 \times 9)$

18. In whole numbers $a - b$ o $b - a$, o means :
(A) =   (B) >   (C) <   (D) $\neq$

19. The multiplicative identity of whole number is :
(A) 0   (B) 1   (C) 9   (D) none of these

20. Which is not defined ?
(A) $4 \div 2$ (B) $0 \div 4$ (C) $9 \div 3$ (D) $3 \div 0$

21. The relation $a + b = b + a$, where a, b are whole number is :
(A) closed   (B) associative   (C) commutative   (D) none of these

22. Subtraction in whole numbers is :
(A) commutative   (B) closed   (C) associative   (D) none of these

23. Whole number are closed under the operation :
(A) addition   (B) subtraction
(C) multiplication   (D) addition and multiplication

24. The value of $300 \times 4 \times 0 \times 10$ is
(A) 1200   (B) 12000   (C) 120000   (D) 0

25. The population of a village is 1500. If 489 are men and 472 are women, find the number of children.
(A) 549   (B) 439   (C) 559   (D) 539

26. Find the number of pages in a book which has on an average 305 words on a page, and contains 2,32,715 words altogether ?
(A) 1111 pages   (B) 1001 pages   (C) 763 pages   (D) 973 pages

27. Which of the following will not represent zero ?
(A) $1 \ 0$ (B) 0×0 (C) $\dfrac{0}{2}$ (D) $\dfrac{10 - 10}{2}$

28. On dividing a number by 68, we get 269 as quotient and 0 as remainder. On dividing the same number by 67, what will be the remainder ?
(A) 0   (B) 1   (C) 2   (D) 3

29. $a \div a = 1$, for which whole number it is not true ?
(A) 1   (B) 2   (C) 0   (D) none of these

30. Which of the following does not give whole number ?
(A) $12 \div 4$ (B) $1 \div 8$ (C) $0 \div 2$ (D) none of these

FILL IN THE BLANKS

1. Smallest whole number is _____

2. _____ is a whole number which is not a natural number.

3. The number of whole number between the smallest whole number and the greatest 2-digit number is_____

4. If any two whole number are added , we always get a _____ number.

5. If any two whole number a and b are added, a to b or b to a , the _____ is always _____. This property is called _____ property of addition of whole number.

6. _____ is the additive identity for whole number.

7. Division by _____ is not defined

8. _____ is the multiplicative identity in whole numbers

9. 67 + 33 = 33+67 is an example of _____

10. 7 × (32 × 56) = (7 × 32) × ___

TRUE / FALSE

1. Every whole number is a natural number

2. 1 has no predecessor in whole numbers

3. 1 is the smallest natural number

4. Zero is the smallest whole number.

5. Every whole number is greater than zero

6. Every whole number is the successor of another whole number.

7. On a number line, every whole number represents exactly one point and every point is represented by exactly one whole number.

8. Whole number are closed under division

9. Commutativity and associativity are properties of addition of whole numbers

10. There is a whole number which when added to a whole number, gives that number

11. 64 – 36 = 36 – 64

12. 1 is the additive identity for Whole number

13. The sum of two whole number is always greater than or equal to their difference.

14. If a and b are two whole numbers such that a – b = b – a, then a = b.

Class_VI_ - 45

MATCH THE COLUMN

1.

	Column –I			Column–II
(A)	137 +63 = 63 +137		**(p)**	Associative property of multiplication
(B)	(16×25) is a whole number		**(q)**	Commutative property of multiplication
(C)	$365 \times 18 = 18 \times 365$		**(r)**	Distributive law of addition over multiplication
(D)	$(86 \times 14) \times 25 = 86 \times (14 \times 25)$		**(s)**	Commutative property of addition
(E)	$23 \times (80+5) = (23 \times 80) + (23 \times 5)$		**(t)**	Closure property for multiplication

SECTION -B (FREE RESPONSE TYPE)

VERY SHORT ANSWER TYPE

1. How many whole numbers are there between 3 and 23 ?

2. How many whole numbers, each less than 47, are there in Hindu-Arabic system of numeration?

3. We know that 0 + 0 = 0. Is there some other whole number p such that p + p = p

4. What number should replace each n ?

   (i) $3 (n + 6) = (3 \times 5) + (3 \times 6)$ **(ii)** $(7 \times 4) + (n \times 3) = 7 (4 + 3)$

   (iii) $(9 \times 8) + (8 \times 8) = (9 + 8)n$

5. In each of the following fill in the blanks, so that the statement is true :

   (a) $(500 + 7) \times (300 – 1) = 299 \times$ ------   **(b)** $888 + 777 + 555 = 111 \times$ ------

   (c) $75 \times 425 = (70 + 5) \times (25 +$ ------)   **(d)** $89 \times (100 – 2) = 98 \times (100 –$ ------)

   (e) $9 \times (10000 +$ ------) = 98766]

SHORT ANSWER TYPE

6. Which three whole numbers will be just on the left of 345 on the number line ?

7. Which three whole numbers will be just on the right of 8209 on the number line ?

8. Ali cycle for 16 days, riding 20 km each day. Sam cycles 20 days, riding 16 km each day. Who cycles a further distance ?

9. Tripti sold 5 books of raffle tickets. Hari sold 10 books of raffle tickets. If the books sold by Tripti had 10 tickets each, and those sold by Hari had 5 tickets each, who sold more tickets?

10. Show that 7 x (12 x 15) = (7 x 12) x 15

11. The digits 6 and 9 of the number 36490 are interchanged. Find the difference between the original number and the new number.

12. Find the value of each of the following :

    (i) (3278 3278) – (5098 5098)   **(ii)** 0 975

    (iii) 701 – (1869 1869)

13. Find each of the following products by using properties of multiplication :

    (i) $972 \times 8 + 972 \times 2$

    (ii) $46 \times 982 + 27 \times 982 - 58 \times 982 - 15 \times 982$

    (iii) $957 \times 10 \times 583 - 483 \times 9570$

14. Multiply using suitable rearrangements, $25 \times 7896 \times 4 \times 50 \times 2$

15. Rohan spends Rs. 30 for dinner and Rs. 15 for juice each day. How much money he spends in 5 days on these things ?

LONG ANSWER TYPE

16. Find the sum of the four numbers given below :

Successor of 32, predecessor of 49 predecessor of the predecessor of 56 and successor of the successor of 67

17. Solve using distributive property

    (i) 12 x 197   **(ii)** 37 x 102

18. The population of a village is 10725.1 out of every 15 persons is uneducated. How many educated persons live in the village ?

19. Sheela brought a Hindi novel from the library which had 378 pages. She read 152 pages on the first two days. If she read 79 pages on the third day, how many pages remain unread ?

20. Ashok buys 20 notebook and 20 pens. The cost of each notebook is Rs. 45 and that of each pen is Rs. 13. Find the amount of money he spent ?

21. Using most convenient combinations, find the sum

1802 + 2652 + 3376 + 1024 + 2348 + 98

22. The school canteen charges Rs. 30 for lunch and Rs. 5 for milk each day. How much money does Rajesh spend in 7 days on these things ?

23. A taxi driver filled his car petrol tank with 40 litres of petrol on Monday. The next day, he filled the tank with 55.5 litres of petrol. If the petrol costs Rs. 50 per litre, how much did he spend in all on petrol.

24. There are 222 red balls in a basket. A boy takes out 6 red ball from it and replaces them by 12 white balls. He continues to do so till all red balls are replaced by white balls. Determine the number of white balls put in the basket.

25. The first February of a leap year falls on a FRIDAY. On what day of the week would the first April of the year fall?

EXERCISE » 02

MULTIPLE CHOICE QUESTIONS

1. The product of a whole number(other than zero) and its successor is
   (A) an even number   (B) an odd number   (C) divisible by 4   (D) divisible by 3

2. The product of the predecessor and successor of an odd natural number is always divisible by
   (A) 2   (B) 4   (C) 6   (D) 8

3. RHS part of the equation 36 (8 – 3) = _____ .
   (A) 38 – 36   (B) (36 × 8) × (36 – 3)
   (C) (36 × 8) – (36 × 3)   (D) (36 × 8) – 3

4. Which of the following statement is true ?
   (A) Every whole number is a natural number
   (B) Every natural number is a whole number
   (C) '1' is the least whole number
   (D) None of these

5. Number of Whole numbers between 38 and 68 is
   (A) 31   (B) 30   (C) 29   (D) 28

6. Which of the following whole number does no have a predecessor ?
   (A) 10   (B) 9   (C) 1   (D) 0

7. Which of the following gives the quotient as a natural number ?
   (A) 08   (B) 181   (C) 12   (D) 1020

8. Which of the following statements is not true ?
   (A) 0+0 = 0   (B) 0 – 0 = 0   (C) 0 × 0 = 0   (D) 1 ÷ 0 = 0

9. How many whole numbers are not natural numbers ?
   (A) 1   (B) 2   (C) 3   (D) none

10. Which of the following statements is not true ?
    (A) Both addition and multiplication are associative for whole numbers.
    (B) Zero is the identity for multiplication of whole numbers.
    (C) Addition and multiplication both are commutative for whole numbers.
    (D) Multiplication is distributive over addition for whole numbers.

11. A whole number is added to 25 and the same number is subtracted from 25. The sum of resulting numbers is
    (A) 0   (B) 25   (C) 50   (D) 75

12. Sum of the number of primes between 16 to 80 and 90 to 100 is
    (A) 20   (B) 18   (C) 17   (D) 16

13. What least number should be added to 1330 to get a number exactly divisible by 43 ?
    (A) 46   (B) 1   (C) 3   (D) 7

14. What least number must be subtracted from 13,601 to get a number exactly divisible by 87 ?

(A) 25   (B) 29   (C) 27   (D) 23

SECTION -B (TECHIE STUFF)

15. The 2009th letter of the word sequence MATHTALENT MATHTALENT MATHTALENT ... is

(A) M   (B) A   (C) N   (D) T

16. The 25th term in the sequence (1,2), (2,3), (3,5), (4,7), (5,11), (6,13),..... is

(A) (25, 87)   (B) (25, 97)   (C) (24, 97)   (D) (25, 93)

17. Nine bus stops are equally spaced along a bus route. The distance from the first to the third is 600m , How far is it from the first stop to the last ?

(A) 2400m   (B) 2500 m   (C) 2600 m   (D) 2700 m

18. In the following sequence 11, 88, 16, 80, 21, 72, ..,....,....,... the blanks are two digit numbers. No number in the blank ends with

(A) 4   (B) 6   (C) 8   (D) 7

19. Laxman starts counting backwards from 100 by 7's. He begins 100, 93, 86, ... which number will not come in his countdown ?

(A) 46   (B) 35   (C) 15   (D) All of these

EXERCISE ≫ 03

(PREVIOUS YEAR EXAMINATION QUESTIONS)

1. What property is shown in the equation below?   **(NSTSE 2009)**

$3 \times (4 \times 5) = (3 \times 4) \times 5$

(A) Inverse property of multiplication   (B) Identity property of multiplication

(C) Associative property of multiplication   (D) Commutative property of multiplication

2. Which of the following could be the rule used to create the number pattern shown below ?

250,130,70,40,25   **(NSTSE 2009)**

(A) Subtract 120   (B) Subtract 10; then divide the result by 2

(C) Divide by 2   (D) Divide by 2; then add 5 to the result

3. Which of the following property/ properties satisfied by whole numbers under multiplication?   **(NSTSE 2010)**

(A) Closure   (B) Commutative   (C) Associative   (D) All the given

4. The whole numbers from 1 to 1000 are written. How many of these numbers have at least two 7's appearing side-by-side ?   **(NSTSE 2011)**

(A) 10   (B) 11   (C) 21   (D) 19

5. Which of the following statements is CORRECT?   **(IMO 2011)**

(A) All whole numbers are natural numbers. (B) Every natural number has a predecessor.

(C) Division by zero is not defined.   (D) Every whole number has a predecessor.

6. What is the value of 8937 x 648 + 8937 x 122 + 8937 x 230 ? **(NSTSE 2012)**
   (A) 8937000 (B) 8936000 (C) 893800 (D) 8935000

7. Which of the following will not represent zero ? **(NSTSE 2012)**

   (A) $\frac{0}{2} \times 56$ (B) 5687 × 0 (C) $\frac{1002}{2} + 0$ (D) $\frac{0}{679}$

8. Match the Column-I with Column-II.
   If a, b, c. are whole numbers. then **(IMO 2013)**

   Column-I   **Column-II**

   (i) a + b = b + a   (a) Distributivity of multiplication

   (ii) (a + b) + c = a + (b + c)   (b) Commutativity under addition

   (iii) a x (b + c) = a x b+ a x c   (c) Associativity of addition
                                          (d) Commutativity under multiplication

   (A) (i) → (c) ; (ii) → (d) ; (iii) → (a)   (B) (i) → (b) ; (ii) → (c) ; (iii) → (d)
   (C) (i) → (a) ; (ii) → (b) ; (iii) → (c)   (D) (i) → (b) ; (ii) → (c) ; (iii) → (a)

9. Study the number pattern gives

   $$3 \times 37 = 111$$
   $$6 \times 37 = 222$$
   $$9 \times 37 = 333$$
   $$\cdots \cdots \cdots$$
   $$\cdots \cdots \cdots$$
   $$Z \times 37 = 888$$

   Identify the value of Z **(NSTSE 2014)**
   (A) 32 (B) 24 (C) 12 (D) 14

10. When we multiply a whole number and the multiplicative identity of whole numbers, then
    we get _____ **(IMO 2014)**
    (A) The number itself   (B) The multiplicative identity
    (C) 0   (D) Negative of that number

11. Mihika makes S gift packs containing chocolates for Diwali. She puts 12 vanilla chocolates.
    14 milk chocolates and 8 nut chocolates in each pack. With the help of which property. can
    you calculate the total number of chocolates in 8 packs? **(IMO 2014)**
    (A) Commutative property   (B) Associative property
    (C) Distributive property   (D) None of these

12. Study the given pattern and find the value of X and Y respectively. **(IMO 2014)**

    (A) 20, 17 (B) 25,19 (C) 22, 25 (D) 19, 25

ANSWER KEY >>

EXERCISE >> 01

SECTION -A (FIXED RESPONSE TYPE)

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	D	A	C	B	B	B	D	C	C	D	B	B	C	C	A	C	C	D	B	D

Ques.	21	22	23	24	25	26	27	28	29	30
Ans.	C	D	D	D	D	C	A	B	C	B

FILL IN THE BLANKS

1. 0 **2.** 0 **3.** 98 **4.** whole number

5. sum, same , commutative

6. 0 **7.** 0 **8.** 1 **9.** Commutative property

10. 56

TRUE / FALSE

1. False **2.** False **3.** True **4.** True **5.** False

6. False **7.** False **8.** False **9.** True **10.** True

11. False **12.** False **13.** True **14.** True

MATCH THE COLUMN

1. (A) - (s) , (B)-(t) , (C)-(q) , (D) -(p) , (E) - (r)

SECTION -B (FREE RESPONSE TYPE)

VERY SHORT ANSWER TYPE

1. 19 **2.** 47 **3.** No, zero is the only number

4. (i) n = 5 (ii) n = 7 (iii) n = 8

5. (a) 507 (b) 20 (c) 400 (d) 11 (e) 974

SHORT ANSWER TYPE

6. 342 , 343, 344 **7.** 8210 , 8211 , 8212 **8.** Both travels equal distance

9. Equal tickets **11.** 2970

12. (i) 0 (ii) 0 (iii) 700

13. (i) 9720 (ii) 0 (iii) 957000

14. 78960000 **15.** 225

LONG ANSWER TYPE

16. 204 **17.** (i) 2364 (ii) 3774 **18.** 10010

19. 147 **20.** Rs. 1160 **21.** 11300 **22.** 245

23. 4775 **24.** 444 **25.** Tuesday

EXERCISE » 02

SECTION -A (COMPETITIVE EXAMINATION QUESTION)

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Ans.	A	A	C	B	C	D	B	D	A	B	C	C	C	B	C	B	A	D	D

EXERCISE » 03

(PREVIOUS YEAR EXAMINATION QUESTIONS)

Ques.	1	2	3	4	5	6	7	8	9	10	11	12
Ans.	C	D	D	D	C	A	C	D	B	A	C	C