Whole Numbers

The numbers 1,2, 3, are called natural numbers or counting numbers.

Let us add one more number i.e., zero (0), to the collection of natural numbers. Now the numbers are 0,1,2, … These numbers are called whole numbers

We can say that whole nos. consist of zero and the natural numbers. Therefore, except zero all the whole nos. are natural numbers.

Facts of Whole numbers

1) The smallest natural number is 1.

2) The number 0 is the first and the smallest whole nos.

3) There are infinitely many or uncountable numbers of whole-numbers.

4) All natural numbers are whole-numbers.

5) All whole-numbers are not natural numbers. For example, 0 is a whole-number but it is not a natural number.

The first 50 whole nos. are

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,14, 15, 16, 17, 18, 19, 20, 21,22, 23, 24, 25,26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40,41, 42, 43, 44, 45, 46, 47, 48, 49, 50

Some other Important terms to remember

SUCCESSOR	The successor of a whole number is the number obtained by adding 1 to it. Clearly, the successor of 1 is 2; successor of 2 is 3; successor of 3 is 4 and so on.
PREDECESSOR	The predecessor of a whole number is one less than the given number. Clearly, the predecessor of 1 is 0; predecessor of 2 is 1; predecessor of 3 is 2 and so on. The whole number 0 does not have any predecessor.

1.Write the successor of

(a) 1070110701 (b) 100499100499 (c) 50999995099999 (d) 56705670

2. Write the predecessor of

(a) 1414 (b) 100000100000 (c) 80908090 (d) 43214321

Solution

1.a) 1070210702

b) 100500100500

c) 51000005100000

d) 56715671

2.a) 1213

b) 9999999999

c) 80898089

d)43204320

Properties of Whole Numbers

Closure Property

Closure property on Addition for Whole Number

0+2=20+2=2

+3=41+3=4

5+6=115+6=11

So Whole number are closed on Addition

Closure property on Multiplication for Whole Number

0×2=00×2=0

1×4=41×4=4

5×1=55×1=5

So Whole number are closed on Multiplication

Closure property on subtraction of Whole number

5−0=55−0=5

0−5=?0−5=?

1−3=?1−3=?

3−1=23−1=2

So Whole number are not closed on Subtraction

Closure property on Division of Whole number

21=221=2

12=?12=?

02=002=0

20=?20=? (Division by Zero is undefined)

So Whole Number are not closed on Division

In short

Closure Property	If a and b are any two whole numbers, then a+b, a × b are also whole numbers.

Commutative property

Commutativity property on Addition for Whole Number

0+2=2+0=20+2=2+0=2

So Whole number are Commutative on Addition
Commutativity property on Multiplication for Whole Number

0×2=0or2×0=00×2=0or2×0=0

So Whole number are Commutative on Multiplication
Commutativity property on subtraction of Whole number
5−0=55−0=5 but 0−5=?0−5=?

So Whole number are not Commutative on Subtraction
Commutativity property on Division of Whole number

21=221=2 but 12=?12=?

So Whole Number are not Commutative on Division
In short
You can add two whole numbers in any order. You can multiply two whole numbers in any order.

Commutative property	If a and b are any two whole numbers, then a+b=b+aa+b=b+aand a×b=b×aa×b=b×a

Associative property

Associativity property on Addition for Whole Number

0+(2+3)=(0+2)+3=50+(2+3)=(0+2)+3=5

1+(2+3)=6=(1+2)+31+(2+3)=6=(1+2)+3

So Whole number are Associative on Addition
Associativity property on Multiplication for Whole Number

0×(2×3)=00×(2×3)=0 or (0×2)×3=0(0×2)×3=0

So Whole number are Associative on Multiplication
Associativity property on subtraction of Whole number

10−(2−1)=910−(2−1)=9 but (10−2)−1=7(10−2)−1=7

So Whole number are not Associative on Subtraction

Associativity property on Division of Whole number

16÷(4÷2)=816÷(4÷2)=8 but (16÷4)÷2=2(16÷4)÷2=2

So Whole Number are not Associative on Division

So in Short

If a, b and c are any two whole numbers, then (a+b)+c = a+(b+c) and (a×b)×c = a×(b×c).

Distributive property

If a, b and c are any two whole numbers, then a(b+c)=a×b+a×ca(b+c)=a×b+a×c

Additive Identity

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

Example

2+0=22+0=2

0+3=30+3=3

5+0=55+0=5

Multiplicative Identity

If a is any whole number, then a×1=a=1×aa×1=a=1×a

Example

1×1=11×1=1

5×1=55×1=5

6×1=66×1=6

Multiplication by zero

If a is any whole number, then a×0=0=0×aa×0=0=0×a.

Example

1×0=01×0=0

5×0=05×0=0

0×0=00×0=0

Division by zero

If a is any whole number, then a ÷ 0 is not defined

Quiz Time

Question 1 Which of the following is not defined?

A)10+010+0

B)10−010−0

C)10×010×0

D)10÷010÷0

Question 2 Find the value of 6536 (?) 91 + 9 (?) 6536?

A)588240

B)594776

C)58824

D)653600

Question 3 Which of the following is true

A)Every whole number has predecessor

B)The product of two whole numbers need not to be whole number

C)1 is the identity for multiplication of whole numbers.

D)1 is the identity for addition of whole numbers.

Question 4 Which of the following is not true

A) Whole number are closed on addition

B) Whole number are Commutative on Multiplication

C) Whole number are Commutative on Subtraction

D) Whole number are Commutative on addition

Question 5 The product of a non-zero whole number and its successor is always?

A) even number

B) odd number

C) prime number

D) divisible by 5