Chapter

Number System & Its Operations

Learning Objectives

- Introduction
- Types of Numbers
- Representation of Numbers
 on Number Line
- Operation on Whole Numbers
- Indian Number System or Hindu
 -Arabic Number System
- 🗇 🛛 Bodmas Rule

Number System and its Operations

$\langle \rangle$ Introduction

We all are familiar with the numbers. Everything is counted by the numbers therefore, the numbers are the symbolic representation of counted objects. In this chapter, we will learn about number system, and its operations.

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Types of Numbers

Natural Numbers

Every counting number is called natural numbers. Zero is excluded from the natural numbers because it does not represent the number of counted objects.

1, 2, 3, 4, 5, etc. are natural numbers.

Therefore, the numbers that are used in counting are called natural numbers. Highest natural number is infinite or cannot be defined but lowest natural number is 1. Natural numbers are represented by N (First capital letter of its name).

Illustrative	
EXAMPLE	
Find the fi	rst five natural numbers from th

e following sets of numbers:

(a) 2, 3, 5, 7, 8 (c) 10, 11, 12, 13, 14 (e) All of these

(b) 1, 2, 3, 4, 5 (d) None of these

Answer: (b)

Explanation 1, 2, 3, 4, 5 are the first five natural numbers.

Whole Numbers

When 0 is included with counting numbers, it becomes whole number. Whole number is represented by W (First letter of its name). Whole numbers (W) = {0, 1, 2, 3, 4 ... infinite}. Highest whole number cannot be defined but lowest is 0.

All natural numbers are whole number but all whole numbers are not natural numbers.

Illustrative EXAMPLE

If N is the set of all natural numbers and W is the set of all whole numbers then overlapped part of N represent of which one of the following numbers?



(a) 1 (c) 2 (e) None of these (b) 0 (d) All of these

Answer: (b) Explanation Zero is not the member of the set of natural numbers. Hence, overlapped part of N represent zero.

Prime Numbers

The numbers which have only two factors, 1 and the number itself are called prime numbers. The following numbers 2, 3, 5,7,11,13,17,19, 23 do not have factor other than 1 and the number itself, therefore, they are called prime numbers.

Illustrative EXAMPLE



Consider the following statements:

Statement 1: The set of all natural numbers is prime number.

Statement 2: The set of numbers which does not have factor other than 1 and the number itself is called prime number.

Which one of the following options is correct?

- (a) Statement 1 is true and 2 is false
- (b) Statement 1 is false and 2 is true
- (c) Both the statements are false
- (d) None of these
- (e) All of these

Answer: (b)

Explanation Every natural number is not prime number and the number which has only two factors 1 and the number itself is called prime number.

Composite Numbers

The numbers which have more than two factors are called composite numbers.

The factors of the following number, 4, 6 and 10 are:

Factors of 4 = 1, 2, 4 (Three factors) Factors of 6 = 1, 3, 6 (Three factors)

Factors of 10 = 1, 2, 5, 10 (Four factors). Therefore, the numbers 4, 6 and 10 are composite numbers, whereas the factors of 11, 13, and 17 are:

Factors of 11 are 1 and 11. Factors of 13 are 1 and 13 and factors of 17 are 1 and 17, therefore, the numbers 11, 13 and 17 are not the composite numbers.

Note: Except 2 all the even numbers are composite numbers.

Illustrative EXAMPLE

If a number is divided by 2 leaves no remainder then the number is:

- (a) Even number
- (b) Odd Numbers
- (c) Prime numbers
- (d) None of these
- (e) All of these

Answer: (a)

Explanation Every even number is exactly divisible by 2.

Co-Prime

Two numbers whose H.C.F. (Highest Common Factor) is 1 are called Co - Prime.

HCF of 2 and 3 is 1 therefore, pair of 2 and 3 is called co - prime. HCF of 3 and 9 is 3, therefore, 3 and 9 is not a co - prime.

Illustrative EXAMPLE

From the following sets of numbers, which one is the set of co-primes?

(a) {8, 16} (c) {3, 5} (e) None of these (b) {10, 100} (d) All of these

Answer: (c)

Explanation Positive common factor of 3 and 5 is not other than 1, therefore, called co prime.

Rational and Irrational numbers

The number in the form of $\frac{p}{q}$ where $p \neq 0$ and p, q are integers is called rational number. Therefore,

rational numbers are always in ratio form. Integer 6 can also be represented in the form of $\frac{6}{1}$ hence, 6 is

also a rational number.

The decimal number which decimal part is neither terminating nor repeating is called irrational number, i.e. Decimal form of $\sqrt{2} = 1.4142134623$. The decimal part of $\sqrt{2}$ is non-terminating non-repeating. Hence, $\sqrt{2}$ is an irrational number.

Illustrative EXAMPLE

Simplify the following: $\sqrt{\frac{1}{2} + \frac{5}{2}}$ and find the solution is a rational or irrational number.

(a) Irrational number(c) Solution is zero

(e) None of these

(b) Rational number(d) All of these

Answer: (a)

Explanation $\sqrt{\frac{1}{2} + \frac{5}{2}} = \sqrt{\frac{6}{2}} = \sqrt{3}$, which is an irrational number.

Successor

Successor of every number comes just after the number. Therefore, the successor of every number is obtained by adding 1 to the number. Successor of 25 = 25 + 1 = 26 but 25 - 1 = 24 is not the successor of 25.

Illustrative EXAMPLE

Consider the following two statements:

Statement 1: Successor of every number is obtained by multiplying 1 to the number.Statement 2: Successor of every number is obtained by adding 1 to the number.Which one of the following options is correct?

- (a) Statement 1 is false and 2 is true
- (b) Statement 1 is true and 2 is false
- (c) Both statements are false
- (d) All of these
- (e) None of these

Answer: (a)

Predecessor

Predecessor of every number comes just before the number. Predecessor of 23 is obtained by subtracting 1 from the number therefore, the predecessor of 23 = 23 - 1 = 22.





A set of numbers is {45, 67, 89}. Which one of the following is the predecessor of the given set of numbers? (a) {44, 68, 90} (b) {44, 66, 88} (c) {46, 68, 90}

(e) None of these

(d) All of these

Answer: (b)

Explanation Predecessor of given set of numbers is {44, 66, 88}.

Representation of Numbers on Number Line

Every number on number line represents position from its greater and smaller numbers. Negative, positive, whole, natural, prime, etc. all are represented on number line. Numbers on number line are represented by the following: **Step 1:** Draw a line and mark a point zero on it.

Step 2: Distance between the numbers is always equal. Therefore, the length of number line should be divided into required number of interval.

Step 3: The arrow mark at the far end point of number line, indicates infinitive.

Illustrative **EXAMPLE**

Representation of whole numbers from 0 to 8 on number line.

Step 1: Draw a horizontal line and mark a point 0 on it.

Step 2: Mark another point and divide the distance among them into 8 equal parts.

Step 3: Write numbers 1 to 8 at each division.



Operation on whole Numbers

We are familiar with the basic operations of addition, multiplication, subtraction and division of the whole numbers. We will learn about these operations on whole numbers.

Properties of Addition

Closure Property

The sum of two whole numbers is always a whole number. If a and b are two whole numbers, their addition (a + b) is also a whole number.

2 + 10 = 12, 2 and 10 are whole numbers and their sum 12 is also a whole number.

Consider the following two statements: Statement 1: Subtraction of two whole numbers is always a whole number. Statement 2: Subtraction of two whole numbers never be a whole number. Which one of the following options is correct?

- (a) Statement 1 is true and B is false
- (b) Statement 1 is false and 2 is true
- (c) Statement 1 and 2 are false
- (d) All of these
- (e) None of these

Answer: (a)

Explanation Subtraction of two whole numbers is always a whole number.

Commutative Property

The sum of two & more whole numbers remains same even if the order of the numbers are changed. If a and b are two whole numbers then a + b = b + a. The order of a + b is changed into b + a but the sum remains same. i.e. 4 + 5 = 9, on changing their order 5+4=9. Therefore, 4+5=5+4.

Illustrative EXAMPLE



If the sum of two numbers remains same on changing the order of the numbers then what will be the difference of the numbers if their order is changed?

- (a) Difference of the numbers is not same on changing their order
- (b) Difference of the numbers is same on changing their order
- (c) Cannot be defined
- (d) All of these
- (e) None of these

Answer: (a)

Explanation The result of subtraction of two numbers is changed on changing their order.

Associative Property

The addition or multiplication of a set of numbers is the same regardless of how the numbers are grouped. The associative property involves 3 or more numbers. If a, b and c are three whole numbers then their sum is same on grouping the numbers in different way, (a + b) + c = a + (b + c). The sum of (3 + 4) + 5 = 12 and the sum of 3 + (4 + 5) = 12, therefore, the sum of both groups is equal.



If the sum of x+(y+z)=m+n then the sum of (y+z)+x is?

(a) m – n
(c) m+ n
(e) None of these
Answer: (c)

(b) n– m (d) All of these Explanation According the associative property of addition if the sum of x+(y+z) = m+n then the sum of (y+z)+x = m+n.

Additive Identity

Zero (0) is called the additive identity of every whole number. When 0 is added to the whole number its identity does not change or number remains unchanged. If a is a whole number then a+0=0+a=a/therefore, the number remains same. The sum of 5+0=5, 0+5=5 and the sum of 6+0=6, 0+6=6.

Illustrative

EXAMPLE

Consider the following two statements:

Statement 1: Zero is the additive identity of every number.
Statement 2: Zero is the additive inverse of every number.
Which one of the following options is correct?

- (a) Statement 1 is false and 2 is true
- (b) Statement 1 is true and 2 is false
- (c) Both the statements are true
- (d) All of these
- (e) None of these

Answer: (b)

Explanation If a number is added with zero the result is the number itself. Therefore zero is called additive identity of every number.

Additive Inverse

Additive inverse of a is - a and additive inverse of -a is a, therefore, the sum of number with its additive inverse is always zero.

Let us consider a number 5 and its additive inverse -5, 5 + (-5) =5-5=0, therefore, the sum of both the number is always zero.



Find the additive inverse of (3x+2x-x)?

(a) 2x
(c) -4x
(e) None of these

(b) 4x(d) All of these

Answer: (c) **Explanation** (3x+2x-x)=5x-x=4x and additive inverse of 4x = -4x.

Properties of Subtraction

- Subtraction is inverse process of addition, and subtraction of two whole numbers is always a whole numbers even if, a > b or a = b then their subtraction a b is a whole number, i.e. 5-3≠3-5 or 2 = -2, Therefore, the subtraction of 3 from 5 is 2 but the subtraction of 3 5 is 2 therefore, on reversing the order of the expression, LHS is not equal to RHS. The order of the subtraction of two whole numbers does not change.
- ♦ If a < b then their subtraction, a b is not a whole number.</p>

Subtraction is not a commutative or associative, i.e. $8 - (6-5) \neq (8-6) - 5$ or $8 - 1 \neq 2 - 5$ or $7 \neq -3$.



Which one of the following options is correct?

- (a) (0.345 0.001) = (0.001 0.345)
- (b) (0.345 0.001) < (0.001 0.345)
- (c) $(0.345 0.001) \neq (0.001 0.345)$
- (d) All of these
- (e) None of these

Answer: (c)

Explanation According to the properties of subtraction $(0.345 - 0.001) \neq (0.-001 - 345)$



Properties of Multiplication

Closure Property

If a and b are whole numbers, their product $a \times b$ is also a whole number. Let us consider two whole numbers, 3 and 4, their product, 12 is also a whole number.

Illustrative EXAMPLE



The sum and difference of two whole numbers is a whole number then the product of two whole numbers is?

(a) Prime number(b) Whole number(c) Composite number(d) All of these(e) None of these

Answer: (b)

Explanation Product of two whole numbers is always a whole number.

Commutative Property

The product of the whole numbers remains same even if the order of the multiplication is changed. In other words if a and b are whole numbers, their product $a \times b = b \times a$ i.e. $5 \times 6 = 30$, on changing their order, $6 \times 5 = 30$, Thus $5 \times 6 = 6 \times 5$. $10 \times 15 = 150$ and $15 \times 10 = 150$, thus,

 $10 \times 15 = 15 \times 10$.

Illustrative



Consider the following two statements: Statement 1: The product of two composite numbers remains same on changing their order. Statement 2: The product of a pair of co - primes is changed on changing their order. Which one of the following options is correct?

- (a) Statement 1 is true and 2 is false
- (b) Statement 1 is false and 2 is true
- (c) Both statements are false
- (d) All of these
- (e) None of these

Answer: (a)

Explanation The product of two composite numbers remains same on changing their order.

Associative Property

The product of more than two numbers remains same by changing the groups of the 8numbers. If a, b and c are three numbers then their product $(a \times b) \times c = a \times (b \times c)$.

i.e. $(4 \times 5) \times 6 = 20 \times 6 = 120$ and $4 \times (5 \times 6) = 4 \times 30 = 120$. Thus

 $(4 \times 5) \times 6 = 4 \times (5 \times 6).$

Which one of the following options is correct?

(a) $(3-x) \times y = y \times (x+3)$ (b) $(3-x) \times y = y \times (-x+3)$ (c) $(3-x) \times y \neq y \times (-x+3)$ (d) All of these (e) None of these

Answer: (b)

Explanation According to the associative property, of multiplication $(3-x) \times y = y \times (-x+3)$.

Multiplicative Identity

The product of every whole number with 1 is the number itself.

If a is a whole number then, $a \times 1 = 1 \times a = a$

Multiplication of a number by 1 is the number itself, therefore, the identity of the whole number does not change thus 1 is called multiplicative identity of the whole number, i.e. $5 \times 1 = 1 \times 5 = 5$ and $10 \times 1 = 1 \times 10 = 10$.

Which one of the following is called the product of a number and 1?

(a) Multiplicative inverse(c) Cannot be defined

(b) Multiplicative identity(d) All of these

(e) None of these

Answer (B)

Explanation the product of a number with 1 is called multiplicative identity **Distributive Property of Addition**

If a, b, c are three whole numbers then according to the distributive property of addition, $a \times (b+c) = a \times b + a \times c$ or

 $(b+c) \times a = a \times b + a \times c.$

i.e. $10 \times (12 + 13) = 10 \times 25 = 250$ therefore,

 $10 \times (12+13) = 10 \times 12 + 10 \times 13$. Group of numbers cannot be changed in the expression, $a \times (b+c)$, therefore, $a \times (b+c) \neq (a \times b) + c$ or $a \times (b+c) \neq (a \times c) + b$.

 $10 \times (10-5) = 10 \times 5 = 50 \text{ or } 10 \times 10 - 10 \times 5 = 100 - 50 = 50$, Thus

 $10 \times (10-5) = 10 \times 10 - 10 \times 5.$

For whole numbers, a,b,c,d,e;

 $a \times (b+c+d+e) = a \times b+a \times c+a \times d+a \times e$,

Thus,

 $4 \times (1 + 2 + 3 + 4) = 4 \times 1 + 4 \times 2 + 4 \times 3 + 4 \times 4 = 4 + 8 + 12 + 16 = 40$

Illustrative

EXAMPLE

In a class, 20 students are boys and 12 are girls. The number of teachers in the school is the difference of total number of boys and girls students in the school.

If the number of chairs in the class is 10 times the difference between the number of boys and girls students in the class, then which one of the following expressions is correct about the number of chairs in the class?

(a) $20 \times (12 - 10)$ (b) $10 \times (10 - 20)$ (c) $10 \times (20 - 12)$ (d) All of these (e) None of these

Answer: (c)

Explanation Number of chairs in the class = 10 times of difference of number of boys and girls students $=10 \times (20-12)$.

Multiplication of Whole Numbers by 0

When a whole number is multiplied by 0, it becomes equal to zero. In other words $0 \times a = a \times 0 = 0$. i.e. $0 \times 11 = 0$ and $11 \times 0 = 0$

Illustrative EXAMPLE

Simplify: $\{(0.004+1.00) \times \frac{1}{2}\} \times 0$ (a) 0 (b) 2 (c) 3 (d) All of these (e) None of these

Answer: (a)

Explanation Product of number with 0 is always 0.

Multiplicative Inverse

Multiplicative inverse of a number a is $\frac{1}{a}$ and their multiplication is 1.

Let us consider a number 4 and its multiplicative inverse $\frac{1}{4}$, therefore, its multiplication is $4 \times \frac{1}{4} = 1$.



Simplify the $(34+20) \times 2$ and find the multiplicative inverse of the resulting simplification.

(a) $\frac{2}{108}$ (b) $\frac{1}{108}$ (c) $\frac{3}{108}$ (d) All of these (e) None of these Answer: (b) Explanation $(34+20) \times 2 = 54 \times 2 = 108$. Multiplicative inverse of $108 = \frac{1}{108}$.

Properties of Division

1. If a and b are two whole numbers in the form of $a \div b$ then it can be expressed by $\frac{a}{b}$. The division of a by b may or may not be a whole number. Where $b \ne 0$.

may or may not be a whole number. where $b \neq 0$.

i.e. $10 \div 5 = \frac{10}{5} = 2$ is a whole number. The division of $25 \div 15 = \frac{25}{15} = \frac{5}{3} = 1.666$ is not a whole number.

Illustrative EXAMPLE

If remainder of a division is greater than 0 then the quotient of complete division is a/an?

(d) All of these

- (a) Composite number (b) Decimal number
- (c) Whole number
- (e) None of these

Answer: (b)

Explanation If remainder of a division is greater than zero then quotient will be a decimal number.

0

2. For any non-zero whole number $a \div 1 = \frac{a}{1} = a$ and $a \div a = \frac{a}{a} = 1$ therefore, the division of every number by 1

is the number itself.

i.e.
$$6 \div 1 = \frac{6}{1} = 6, 6 \div 6 = \frac{6}{6} = 1, 10 \div 1 = \frac{10}{1} = 10, \div 10 = \frac{10}{10} = 10$$

Illustrative EXAMPLE

Which one of the following options is correct?

(a)
$$\left(\frac{4}{3} \div 1\right) - \frac{4}{3} = 1$$

(b) $\left(\frac{4}{3} \div 1\right) - \frac{4}{3} = 1$
(c) $\left(\frac{4}{3} \div 1\right) - \frac{4}{3} = 0$
(d) All of these

(e) None of these Answer: (c)

Explanation
$$\left(\frac{4}{3} \div 1\right) - \frac{4}{3} = \frac{4}{3} - \frac{4}{3} = 0$$

3. If a is a number where, a \land 0 then 0 a = 0 and a 0 cannot be defined. The division f 0 by 4 or 0 4=0 and $4 \div 0$ cannot be defined.

Illustrative EXAMPLE

Is this statement true or false " $\left(\frac{x}{2} \div y\right) \div 0 = 12$ "?

- (a) True
- (b) False
- (c) Cannot be defined
- (d) All of these
- (e) None of these

Answer: (c)

Explanation The terms in the bracket is divided by 0 thus, it cannot be defined.

4. If a, b and care whole numbers then $(a \div b)$ c a (b c) therefore, division is not associative, i.e.

 $(164) \div 216(4 \div 2)$ or $4 \div 2162$ or, 28.

Illustra EXAMPL	
т	he division of y by x is z then the division of x by y is?
(a	a) z (b) Other than z
(c	c) Less than z (d) All of these
(e	e) None of these
A	nswer: (b)
E	xplanation According to the question hence, $\frac{x}{y} \neq z$
5. If	a, b, c, d are whole numbers in the form of a $a \int \frac{b}{d}$ then a is called divisor, b is dividend, c is quotient and d
is A	s called remainder. Whereas, Dividend = divisor x quotient + remainder. It is also known as division algorithm. The division of 69063 by 35 is:
Ŵ	Where, quotient = 1973 and reminder = 8
A	ccording to the division algorithm $35 \times 1973 + 8 = 69055 + 8 = 69063$ is the dividend.
Illustra	ative
EXAMPL	
lf	f x is dividend and y is remainder then which one of the following options is correct about the quotient?
(a	a) Quotient is greater than the divisor

- (b) Remainder is less than divisor
- (c) Dividend is exactly divisible
- (d) All of these
- (e) None of these

Answer: (b)

Indian Number System or Hindu-Arabic Number System

This system was introduced by Indians therefore, called Indian number system. In this system 10 is considered as the base.

10 units = 10, 10 tens = 1 hundred, 10 hundreds = 1 thousand Hindu -Arabic number system is based on the place value of the numbers. A single number is read as once and first digit from the right side of more than one digit number is also read as once while second, third, fourth, fifth, digits from right side are read as tens, hundreds, thousands, ten thousands respectively.

Indian Place Value Chart

Crores	Ten lakhs	Lakhs	Ten Thousand	Thousand	Hundred	Ten	Unit
			9	8	7	3	2
	2	5	7	8	6	3	2

The number ninety eight thousand seven hundred and thirty five is written by placing.

9 at the place of "Ten thousands", 8 at "Thousands", 7 at "Hundreds". 3 at "Tens", 5 at "Ones" place, therefore, the expanded from of the number 98735

 $=9 \times 10000 + 8 \quad 1000 + 7 \times 100 + 3 \times 10 + 5.$

The number twenty five lakhs, seventy eight thousand, sixty hundred and thirty two is written by placing 2 at ten lakhs, 5 at lakhs, 7 at ten thousands, 8 at thousands, 6 at the place of hundreds, 3 at tens, 2 at ones, therefore, the expanded form of the number,

 $2578632 = 2 \times 1000000 + 5 \times 100000 + 7 \times 10000 + 8 \times 1000 + 6 \times 100 + 3 \times 10 + 2.$

Illustrative EXAMPLE

The place value of 5 in the number 65744678 is:

- (a) 5 lakhs
- (c) 50 lakhs

- (b) 57 lakhs(d) None of these
- (e) All of these
- (u) None of the

Answer: (c)

Explanation Place value of 5 in the numerals 65744678 is 50 lakhs.

Place Value

If a number contains more than one digit then the place occupies by each digit is its place value. In the number 732 the number 7 occupies the place of hundreds, therefore, the place value of 7 in the number is seven hundred. The number 3 occupies the place of tens and therefore, the place value of 3 in the number is 30 and the number 2 occupies the place of ones therefore, the place value of 2 in the number is 2. Expanded form of number 732 is, $732 = 7 \times 100 + 3 \times 10 + 2 \times 1$.





Find the difference of place values of 4 in the number 54675846.

(a) 390099

- (b) 3999960 (d) All of these
- (c) 5400000 (e) None of these

Answer: (b)

Explanation Difference of place values of 4 in the numeral 54675846 = 4000000 - 40 = 3999960.

Comparison between Indian and International Number System

Indian	International
Kharab	Hundred Billion
Ten Arab	Ten Billion
Arab	Billion
Ten Crore	Hundred Million
Crore	Ten million
Ten lakh	Million
гакһ	Hundred Thousand
Ten Thousand	Ten Thousand
Thousand	Thousand
Hundred	Hundred
Ten	Ten
Unites	Ones

In the above table the equivalent of Indian in terms of international number system has been given. The place value of digits of number 320075066 are:

Тс	С	TI	L	Th	Т	Н	Т	U
З	2	0	0	7	5	0	6	6

Illustrative EXAMPLE

Three hundred five billion six million and four hundred ninety nine is written by which one of the following numbers?

(a) 305006000499 (c) 305, 60, 000, 4, 99 (e) None of these

(b) 305, 600, 0499 (d) All of these

Answer: (a)

Explanation Three hundred five billion six million and four hundred ninety nine = 305,006000499.

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Face Value

The face value of a number does not change regardless of the place it occupies.

Therefore, the face value of a number is the number itself. In the number 732 face value of 7 is seven, the face value of 3 is three and the face value of 2 is 1

Illustrative

EXAMPLE

Find the difference between the face value of 9 and 5 in any number.

(a) 4	(b) 13
(c) 45	(d) All of these
(e) None of these	

Answer: (a) Explanation 9 - 5 = 4.

International Place Value Chart

Perio	d Bi	illions		Millio	ns		Thous	and			
	Ten Billion	Billion	Hundred Million	Ten million	Million	Hundred thousand	Ten	Thousand	Hundred	Tens	Ones
		5	6	8	4	3	2	5	4	3	1

The above chart is the international place value chart.

The number 5,684,325,431, in the above chart read as five billion, six hundred eighty four million, three hundred twenty five thousand, four hundred thirty one.

The expanded form of the number 5684325431 is:

Illustrative EXAMPLE

Which one of the following options represents the numerals 6403955025 in words in Indian and international number system?

(a) Indian system: Six Kharab forty crore thirty nine lakh fifty five thousand and twenty five. International system: Six million four hundred three million nine hundred fifty five thousand and twenty five.

(b) Indian system: Six crore thirty nine lakh fifty five thousand and twenty five.

International system: Six billion four million nine hundred fifty five thousand and twenty five.

(c) Indian system: Six arab forty crore thirty nine lakh fifty five thousand and twenty five. International system: Six billion four hundred three million nine hundred fifty five thousand and twenty five.

- (d) All of these
- (e) None of these

Answer: (c)

Explanation

Indian system: Six arab forty crore thirty nine lakh fifty five thousand and twenty five. International system: Six billion four hundred three million nine hundred fifty five thousand and twenty five.

Bodmas Rule

When a single expression contains many mathematical operations then BODMAS rules are used for the simplification of the expression. The word BODMAS has been arranged according to the priority of the operations.

The letters of BODMAS express the following operations:

B Stands for Bracket

O Stands for of

D Stands for Division

M Stands for Multiplication

A Stands for Addition and

Stands for Subtraction

Brackets

There are three types of Brackets, small, middle or medium and big.

Small Bracket is denoted by ()

Middle Bracket is denoted by {}

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Big Bracket is denoted by []
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Brackets are used according to the placement of operations. First we use small bracket then middle Bracket and Big bracket is used at last in an expression.

i.e. $[{(4+5)\times 6}+7]$.

Elimination of Brackets

The solution of the expression is obtained by eliminating the brackets. The first priority of eliminating the bracket is small bracket then middle bracket and finally big bracket.

The following steps are used to simplify the expression, $\left[\{(4+5) \times 6\} + 7 \right]$:

I st: Eliminate the small bracket by adding 4 and 5, in small bracket,

 $[{(4+5)\times 6}+7][{9\times 6}+7].$

 II^{nd} : Eliminate the middle bracket by multiplying 9 and 6, in middle bracket, $[{9 \times 6} + 7] = [54 + 7]$.

 III^{rd} : Add 54 and 7 to eliminate big bracket [54 + 7] = 61. The solution of the above given expression is 61.

Illustrative **EXAMPLE**

Simplify: $[{(34+17)-20}+21]-20?$ (a) 31 (b) 32 (c) 36 (d) Both (a) and (c) (e) None of these

Answer: (b)

Explanation $[{(34+17)-20}+21]-20$ $=[{51-20}+21]-20=[31+21]-20=52-20=32.$

Commonly Asked

UESTIONS

How many different three digit numbers can be obtained by using the digits 0,1,3 without repeating any digit in the number? (a) 4 (b) 5

(c) 3	(d) 2
(e) None of these	

Answer: (a)

(a) 1230000

- Which one of the following is the smallest seven digit number having four different digits? (b) 0000123 (d) 1000032
- (c) 1000023 (e) None of these

Answer: (c)



Simplify: $45+3\times 2$ of $5-(16+4)-8\div 4$. (a) 55 (b) 43 (c) 53 (d) Both (a) and (c)

(e) None of these

Answer: (c)

Explanation $45+3\times 2$ of $5-(6+4)-8\div 4$ $=45+3\times 2 \text{ of } 5-20-8 \div 4 \text{ [Bracket removed]}$ $= 45 + 3 \times 2 \text{ of } 5 - 20 - 2$ [Operation of division $8 \div 4 = 2$] = 45+30 - 20 - 2 [Operation of multiplication $3 \times 2 \times 5 = 30$] = 75 - 20 - 2 [Operation of addition 45 + 30 = 75] = 75 – 22 = 53 [Operation of subtraction]



Find the value of 6 + 2 [3 + 5{28 - 12 (12 - 10)}]. (a) 56 (b) 52 (c) 53 (d) Both (a) and (c) (e) None of these

Answer: (b)

Explanation $6 + 2[3 + 5\{28 - 12(12 - 10)\}] = 6 + 2[3 + 5\{28 - 12 \times 2\}]$ = $6 + 2[3 + 5\{28 - 24\}] = 6 + 2[3 + 5 \times 4] = 6 + 2[3 + 20]$ = $6 + 2 \times 23 = 6 + 46 = 52$

A man gets pass for 1 year for Rs 1500. If the man has been paid 11 payments then find the amount paidby him.(a) Rs 16500(b) Rs 17000(c) Rs 17500(d) Both (a) and (c)(e) None of these

Answer: (a) Explanation Man paid the amount for one year. Hence, the total money paid by him = 1500 x 11 = Rs 16,500

As per International number system, what comes after ten thousand? (a) Lakh (b) Ten Lakh (c) Hundred Thousand (d) Million (e) None of these Answer: (c) Explanation As per International number system hundred thousand comes after ten thousand.

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Alien gives Mike 123 millions and after a month, Mike returns him 67,735.
How much more money Mike should return him to equal the amount?
(a) 122 millions+932 thousands+265
(b) 12 lakhs + 93 thousands + 265
(c) 12 crores + 29 lakhs + 32 thousands + 265
(d) Both (a) and (c)
(e) None of these
Answer: (d)
Explanation 123 millions - 67,735 = 122 millions + 932 thousands + 265 = 12 crores + 29 lakhs + 32 thousands + 265.
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Ten millions represent which one of the following Indian numbers?

(a) One lakh
(b) Ten lakhs
(c) 1 crore
(d) Both (a) and (b)
(e) None of these
Answer: (c)
Explanation Ten millions = 1 crore

6		2

The base of Indian number system is:

- (a) Ten (b) Two
- (c) Eight

(d) Both (a) and (c)

(e) None of these

Answer: (a)

Explanation The base of Indian number system is 10.

How many rows are required to plant 507 rose plants if a man plants minimum possible number of plants which is other than 1 plant in each row?

(a) 170 rows (c) 180 rows (b) 169 rows (d) Both (a) and (c)

(e) None of these

Answer: (b) **Explanation** $507 = 3 \times 13 \times 13$. Hence, the required number of rows $= 13 \times 13 = 169$.



Fill in the blanks by choosing the number from the given options. 1254 + 200 = ____ + 200

- (a) 200
- (b) 300
- (c) 1254
- (d) All of these
- (e) None of these

Answer: (c)



Answer: (b) **Explanation** The difference of largest and smallest 5 digit number is 89999.



If the subtraction of $6540 - 232^* = 4220$ then find the value of * from the following options.

- (a) 4
- (b) 0
- (c) 1
- (d) None of these
- (d) All of these

Answer: (b)

Explanation $6540-232^* = 4220 \Longrightarrow 6540-4220 = 2320$. Hence, the symbol * will be replaced by 0.



Explanation x + 0 = x represents the additive identity property.



The following numbers 0, 2, 7, 9, 17, are to be represented on the number line. Which one of the following options satisfy the position of give numbers on the number line?

- (a) These numbers should be on the left hand side from 0
- (b) These numbers should be on the right hand side from 0
- (c) These numbers cannot be represented on the number line
- (d) All of these
- (e) None of these

Answer: (b)



The following numbers 0,-2, 7, -9, 17, represented on the number line.

Which one of the following options is correct about the position of the give numbers on number line?

(a) -2, -9 will come on the left hand side from 0 and the position of numbers 7 and 17 on right hand side from 0.

- (b) These numbers will come on the right hand side from 0
- (c) These numbers cannot be represented on the number line
- (d) All of these
- (e) None of these

Answer: (a) Explanation Negative numbers come left from 0 and positive numbers come right from 0. Q

The following options are the representation of the given numbers on number line, 4, 6, -8, 7, 7, -9. Find the correct option.



Represent the addition of 5 and 6 on the number line and choose which one of the following options is representing their addition?



Consider the following statements, Statement 1: Whole numbers and fractional numbers both can be represented on the number line. Statement 2: Only whole numbers can be represented on the number line. Which one of the following options is correct about the above statements? (a) Statement 1 is true and 2 is false (b) Statement 1 is false and 2 is true (c) Both statements are false (d) Both statements are true (e) None of these Answer: (a)

Explanation Fractions can also be represented on the number line.

Every natural number is a whole number but every whole number is not a natural number. If natural and whole numbers are represented by N and W respectively then which one of the following options is correct?

- (a) {N}={W} (b) {W}>{N} (c) {W}<{N}
- (d) All of these
- (e) None of these
- Answer: (b)

Explanation The set of all whole numbers is always greater than the set of all natural numbers.



How many prime numbers are there between 100 and 125?

- (a) 5 (b) 6
- (c) 3
- (d) All of these
- (e) None of these

Answer: (a)

Explanation The numbers which have only two factors, land number itself are called prime number. The prime numbers between 100 and 125 are, 101, 103, 107, 109, 113.

Counting numbers are called natural numbers. The smallest natural number is____. (a) 0 (b) 2 (c) 1 (d) All of these (e) None of these Answer: (c) Explanation Counting number 1 is the smallest natural number.



Choose the correct option of predecessor and successor of 100 from the following options:

- (a) 98 and 102
- (b) 99 and 101
- (c) 97 and 103
- (d) All of these
- (d) None of these

Answer: (b)

Explanation The predecessor of a number is just before the number and successor of a number is just after the number.



- Aryabhatta gave the base of Indian number system.
- Binary numbers are used in computers.
- Western world uses base ten or Indian number system.
- Zero was introduced by Brahmgupta.
- Roman numerals are also known as Chinese numerals.





- * The numbers with decimal are called decimal numbers or decimal.
- The value of number does not change on adding zero to extreme right of the fractional or decimal part of the number.
- BODMAS rule express the priority of algebraic operations.
- The fractions those have 10, 100 etc. as a denominator can be changed into decimal by placing decimal point among the digits of numerator in this way that the number of digits of fractional part should be equal to the number of zeroes.
- The product of zero with a number is always zero.

Self Evaluation



1.	The successor of the low	vest composite number is?					
	(a) 6	(b) 5					
	(c) 3	(d) 4					
	(e) None of these						
2.	Smallest four digit num	per is divided by smallest prime number. Find the predecessor of the quotient.					
	(a) 500 (b) 501						
	(c) 499	(d) 599					
	(e) None of these						
3.	Which one of the follow	ving is not correct?					
	(a) Successor of a number	er can be obtained by adding 1					
	(b) The difference betwee	en successor and predecessor of a number is smallest composite number					
	(c) Successor of greatest 5 digit number is smallest six digit number and predecessor of smallest 6 digit						
	number is greatest 5 dig	number is greatest 5 digit number					
	(d) The difference between lowest natural number and whole number is 1						
	(e) None of these						
4.	M and N are co-prime numbers, M represents lowest composite number and N represents lowest odd						
	prime number. Which one of the following is the factor of their product?						
	(a) 12	(b) 24					
	(c) 10	(d) 20					
	(e) None of these						
5.	8 m – 145 = Greatest 5	digit number, find the value of m.					
	(a) 12618	(b) 12718					
	(c) 12818	(d) 12518					
	(e) None of these						
6.	Which one of the follow	ving is the set of the single digit prime number?					
0.	$(a) \{ 0 \ 1 \ 2 \ 3 \ 5 \ 7 \}$	ing is the set of the single digit prime humber.					
	$(a) \{0, 1, 2, 3, 5, 7\}$ (b) $\{2, 3, 5, 7\}$						
	$(c) \{2, 3, 3, 7\}$						
	(c) (2, 3, 4, 3, 7) (d) {0 1 2 5\						
	(a) $(0, \pm, 2, 3)$ (e) None of these						

Smallest 3 digit number is multiplied by smallest prime number and smallest composite number is added 7. to it. Find the number.

(a) 200	(b) 204
(c) 206	(d) 202
(e) None of these	

A man takes rest for 10 minutes after every 30 minute, if he runs 2 km in 10 minutes, find the distance 8. covered by him in 80 minutes.

(a) 11 km	(b) 7km
(c) 10km	(d) 12km
(e) None of these	

9. Two cars, one red and another blue coloured are running in a racing competition. The track is 500 km long. Speed of red car in the beginning is 350 km/hour which reduces to 275 km/hour after running 45 minutes and speed of blue car in the beginning is 325 km/ hour which increases to 350 km/hour after running 45 minutes. Which car would win the race?

(a) Red car

- (b) Blue car
- (c) Both will complete the race at equal time
- (d) Data is insufficient to answer the question
- (e) None of these

10. A fan rotates on its shaft around 5 times in one second. How many times does the fan rotate in a day if there was no electricity for 2 hours?

- (a) 396000 times
- (b) 39600 times
- (c) 395000 times
- (e) No .f +ŀ
- (d) 398000 times

e)	None	OT	these	

Answers – Self Evaluation Test																		
1.	В	2.	С	3.	В	4.	А	5.	D	6.	В	7.	В	8.	D	9.	В	10. A

Self Evaluation



- **1.** The lowest composite number is 4 and its successor is 5.
- 2. Smallest four digit number = 1000 Smallest prime number = 2 Division of both the number $=\frac{1000}{2}=500$ Predecessor of 500 = 500 - 1 = 499

3. The difference between successor and predecessor of a number is not the smallest composite number

- Lowest composite number =4 Lowest odd prime number = 3 Their product = 12
- Largest 5 digit number = 99999 8m - 145 = 99999 8 m = 99999 + 145, 8 m = 100144, m = 12518
 2, 3, 5, and 7 are single digit prime numbers.
- **7.** 100 x 2 + 4 = 200 + 4 = 204.
- **8.** Distance covered by man in first 30 minutes = 6 km, he takes rest for 10 minutes and again in next 30 minutes distance covered = 6 km and again 10 minutes rest.
- 9. 9. Distance covered by red car in first 45 minutes = 350 km/ 60 minutes x 45 minutes = 262.5 km Remaining distance = (500 - 262.5) km = 237.5 km

Time taken by the red car to cover the remaining distance $=\frac{237.5}{275} \times 60$

Total time taken by red car = (45 + 57) minutes = 102 minutes Distance covered by blue car in first 45 minutes = 325 km/ 60 minutes x 45 minutes =243.75 km Remaining distance = (500 - 243.75) km = 256.25 km

Time taken by the blue car to cover the remaining distance $=\frac{256.25}{350} \times 60 = 43.93$

Total time taken by blue car = (45 + 43.93) minutes = 88.93 minutes

Therefore, the winner is blue car.

Fan rotates 5 times in 1 second
 Number of times rotates fan in 1 hour = 5 x 3600
 Number of times rotates fan in 22 hours = 5 x 3600 x 22 = 396000 times.