INFINITY
THINK BEYOND............
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Mind Curve Series

IX MATHEMATICS

SUBJECTIVE QUESTION BANK

VOLUME 1

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"Let's multiply the fun and divide the fear!"

HELLO FOLKS

I'm **Deepika Bhati**, a dedicated mathematics educator since 2009. Over theyears, I've seen many students walk into my class with a fear of math—and leave with confidence. I believe in breakingdowncomplex concepts into simple, relatable ideas, using real-life examples, interactivesessions, and a lot of encouragement.

My classroom is a space where questions are always welcome, mistakes are part of learning, and no one feels judged. I design content that's engaging and stress-free, helping students enjoy math instead of fearing it.

With an **M.Phil** in Operational Research , along with Masters and Bachelor degree in PURE MATHEMATICS from Delhi University, my mission is to make math not just understandable, but truly enjoyable.

"LET'S THINK BEYOND UNUSUAL"
Warm regards,
Deepika Bhati
Maths Educator /Learner
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Chapter – 1 Number system

TYPES OF NUMBERS : -

(i) Natural Numbers: Counting numbers are called natural numbers

N={1,2,3,4,........} is a set of all natural numbers.

(ii) Whole Numbers : All counting numbers together with zeros from a set of all whole numbers.

W={0,1,2,3,4,......} is a set of all whole numbers.

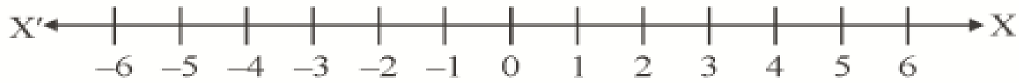
(iii) Integers :All natural numbers ,0 and negative of natural numbers from set of integers .

I ={...........-4,-3,-2,-1,0,1,2,3,.........} is a set of all integers.

FOCUS POINT

All integers can be represented on the number line.

Number line:



Positive Integers: On the right hand side of 0,the point at distance of 1unit , 2 units , 3units etc. from 0 denote respectively the integers 1 , 2 , 3 etc.

Negative Integers: On the left side of 0, the point at the distance of 1unit , 2 units , 3 units etc. From 0 denote respectively the integers -1, -2, -3 ,.....etc.

Note: "0" is neither positive , nor negative.

RATIONAL NUMBERS :-

A number which can be expressed in the form $\frac{p}{q}$ where p, q are integers, and q $\neq$ 0 is called a rational number.

Each integers is a rational number, an integers m can be written as $\frac{m}{1}$ to put in the form $\frac{p}{q}$ where p,q are integers and q≠0.

Equivalent Rational Numbers: Rational numbers do not have a unique representation. For instance,$\frac{2}{3}$ can be represented by one of the following :

$\frac{4}{6}, \frac{6}{9}, \frac{10}{15}, \frac{-44}{-66}$,.............

All such numbers are called equivalent rational numbers.

DECIMAL REPRESENTATION OF RATIONAL NUMBERS:-

FINITE TERMINATING DECIMAL

Every fraction $\frac{1}{9}$ can be expressed as a decimal, if the decimal expression of $\frac{p}{q}$ terminates ,i.e. comes to an end, then the decimals so obtained is called a terminating decimal.

e.g.(i) $\frac{1}{4}$ = 0.25 (ii) $\frac{5}{8}$ = 0.625 (iii)$2\frac{3}{5}$ = $\frac{13}{5}$= 2.6

Thus, each of the numbers $\frac{1}{4}, \frac{5}{8}, 2\frac{3}{5}$ can be expressed in the form of terminating decimal.

FOCUS POINT

All fraction $\frac{p}{q}$is a terminating decimal only ,when prime factors of q are 2 and 5 only.

e.g. Each one of the fraction $\frac{1}{2}, \frac{3}{4}, \frac{7}{20}, \frac{13}{25}$ is a terminating decimal ,since the denominator of each has no prime factor other then 2 and 5.

REPEATING (RECURRING) DECIMALS : -

A decimals in which a digit represent periodically, is called a repeating decimals. In a recurring decimal, we place a bar over the first block of the repeating part and omit the other repeating blocks.

e.g. (i) $\frac{2}{3}$ = 0.666.............. = 0.6

(ii) $\frac{15}{7}$ = 2.142857142857.............. = 2.142857

Special Charcateristics of Rational

- Every rational numbers is expressible either as a terminating decimal or as a repeating decimal.
- Every terminating decimal is a rational number.
- Every repeating decimal is rational number

IRRATIONAL NUMBERS : -

A number is an irrational number, if it has a non- terminating and non-terminating decimal representation. A number that cannot be put in the form $\frac{p}{q}$ where ,p , q are integers and q≠0 is called irrational number.

e.g. $\sqrt{2}$,$\sqrt{3}$,$\sqrt{11}$,π.

FOCUS POINT

Real Numbers :

- The collection of real numbers consists of all the rational numbers and is denoted R.
- Every real number corresponds to a point on the line and conversely, evey pont on the number line represents a real number

REPRESENTING THE SQUARE ROOT OF A POSITIVE NUMBER ON THE NUMBER LINE : -

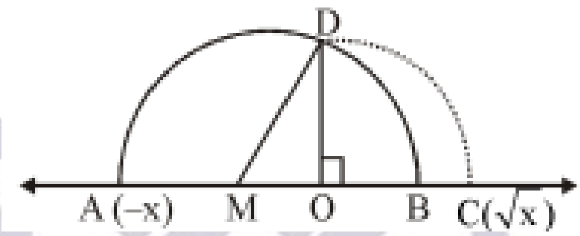
Let x be a positive real number. We will now locate$\sqrt{x}$ on the number line.

Step 1 : Mark- x on the real number line. Let this point be represented by A. Mark 1 unit on the number line. Let this be represented by B.

Step 2 : Locate the midpoint M of AB.

Step 3 : With M as the centre and MA or MB as radius draw a semicircle since diameter AB=(X-1) units, MA=MB=(X+1) units.

Step 4: Draw OD perpendicular to AB meeting the semicircle in D. Join MD. Note the DMO is a right triangle with MD=$\frac{1}{2}$(x+) units and MO=[($\frac{1}{2}$ (x+1)-1)] units=[$\frac{1}{2}$ (x+1]units.



Step 5: Using the Pythagorean theorem

OD^2=MD^2- MO^2

= $\frac{1}{4}$(x +1$)^2$ = $\frac{1}{4}$ (x-1$)^2$

= $\frac{1}{4}$ (4x)

= x

= OD = $\sqrt{x}$

With O as the centre and OD as the radius, draw an arc to meet the number line at C . The point C represent = $\sqrt{x}$.

SURDS OR RADICALS

- An expression written under a radical sign is called a radical expression. The radical is the number under the radical.
- A surd is the simplest type of irrational number, one whose radical is a rational number.
- e. g. $\sqrt{5}$,3 $\sqrt{7}$, $\sqrt{7}$ and $\frac{1}{\sqrt{3}}$ are surds whereas $3\sqrt{5-\sqrt{2}}$ and $\sqrt{\sqrt{3}}$ are not surds.
- The order of a surds is indicated by its index.
- The order of radical is the denominators of its fractional exponent.
- Order → $\sqrt[n]{a}$ = $a^{\frac{1}{n}}$; order n