

CBSE Class 09 Mathematics

Revision Notes

CHAPTER – 1

NUMBER SYSTEMS

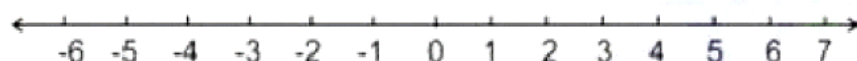
1 Rational Numbers

2 Irrational Numbers

3 Real Numbers and their Decimal Expansions

4 Operations on Real Numbers

5 Laws of Exponents for Real Numbers



- Natural numbers are : 1, 2, 3, denoted by N.
- Whole numbers are : 0, 1, 2, 3, denoted by W.
- Integers : -3, -2, -1, 0, 1, 2, 3, denoted by Z.
- Rational numbers - All the numbers which can be written in the form $\frac{p}{q}$ are called rational numbers where p and q are integers and $q \neq 0$. Every integer p is also a rational number, can be written as $\frac{p}{1}$.
- Irrational numbers - A number is called irrational, if it cannot be written in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$.
- The decimal expansion of a rational number is either terminating or non terminating recurring. Thus we say that a number whose decimal expansion is either terminating or non terminating recurring is a rational number.
- Terminating decimals: The rational numbers with a finite decimal part or for which the long division terminates after a finite number of steps are known as finite or terminating decimals.
- Non-Terminating decimals: The rational numbers with an infinite decimal part or for which the long division does not terminate even after an infinite number of steps are known as infinite or non-terminating decimals
- The decimal expansion of an irrational number is non terminating non recurring.

- All the rational numbers and irrational numbers taken together make a collection of real numbers.
- A real number is either rational or irrational.
- If r is rational and s is irrational then $r+s$, $r-s$, $r.s$ are always irrational numbers but $\frac{r}{s}$ may be rational or irrational.
- If n is a natural number other than a perfect square, then \sqrt{n} is a irrational number.
- Negative of an irrational number is an irrational number.
- There is a real number corresponding to every point on the number line. Also, corresponding to every real number there is a point on the number line.
- Every irrational number can be represented on a number line using Pythagoras theorem.
- For every positive real number x , \sqrt{x} can be represented by a point on the number line by using the following steps:

1. Obtain all positive real numbers x (say).
2. Draw a line and mark a point P on it.
3. Make a point Q on the line such that $PQ = x$ units.
4. From point Q mark a distance of 1 unit and mark the new point as R.
5. Find the mid-point of PR and mark the point as O.
6. Draw a circle with centre O and radius OR.
7. Draw a line perpendicular to PR passing through Q and intersecting the semi-circle at S. Length QS is equal to \sqrt{x} .

- Rationalization means to remove square root from the denominator.

$\frac{3+\sqrt{5}}{\sqrt{2}}$ to remove we will multiply both numerator & denominator by $\sqrt{2}$

$\frac{1}{a \pm \sqrt{b}}$ its rationalization factor $a \mp \sqrt{b}$