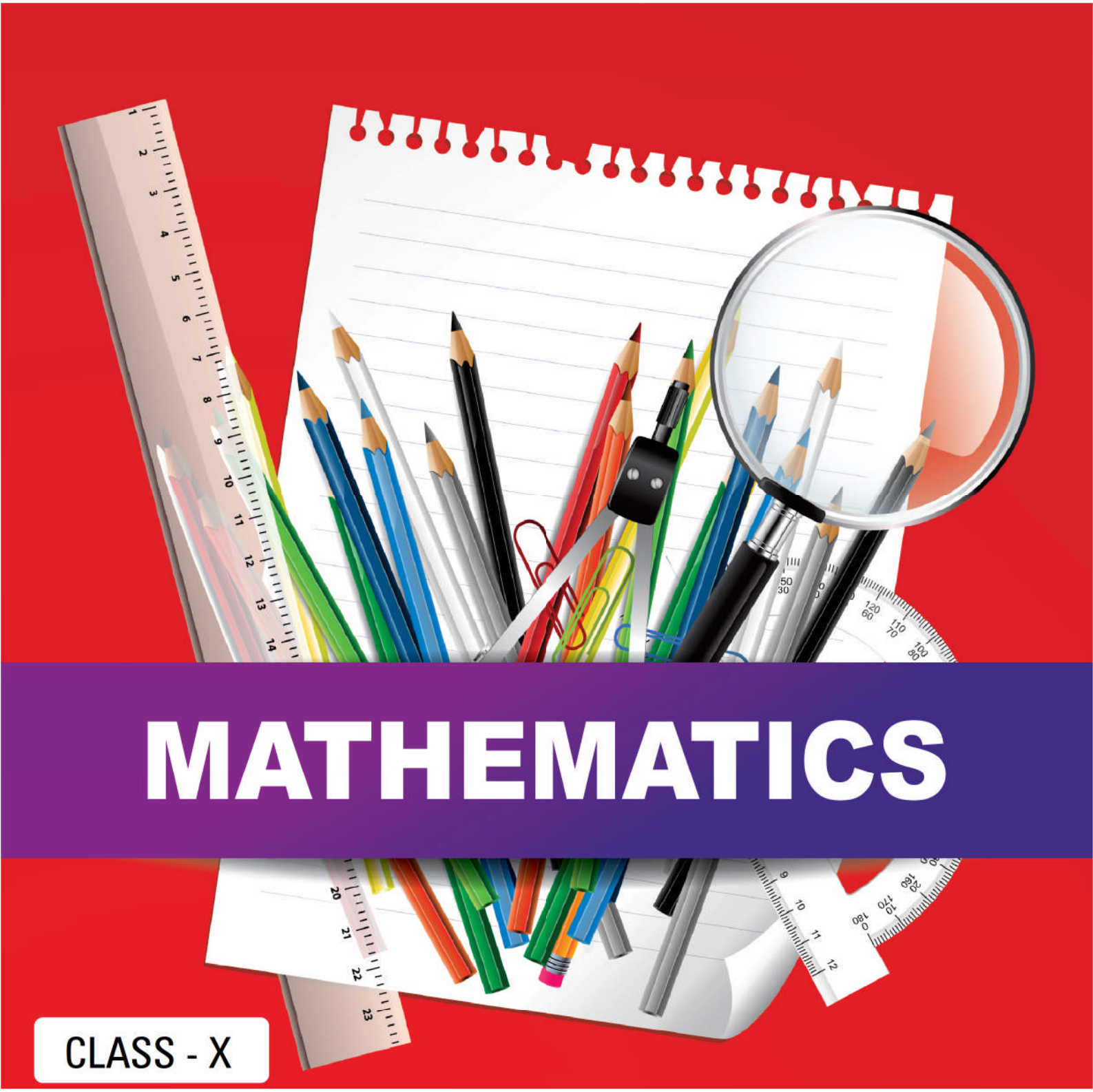

MATHEMATICS

CLASS - X

MODULE-1

– REAL NUMBERS
– PAIR OF LINEAR EQUATIONS IN TWO VARIABLES
– SIMILAR TRIANGLES
– POLYNOMIALS
– INTRODUCTION TO TRIGONOMETRY
– STATISTICS

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TOPIC NAME PAGE NO.

3. PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

4. INTRODUCTION TO TRIGONOMETRY

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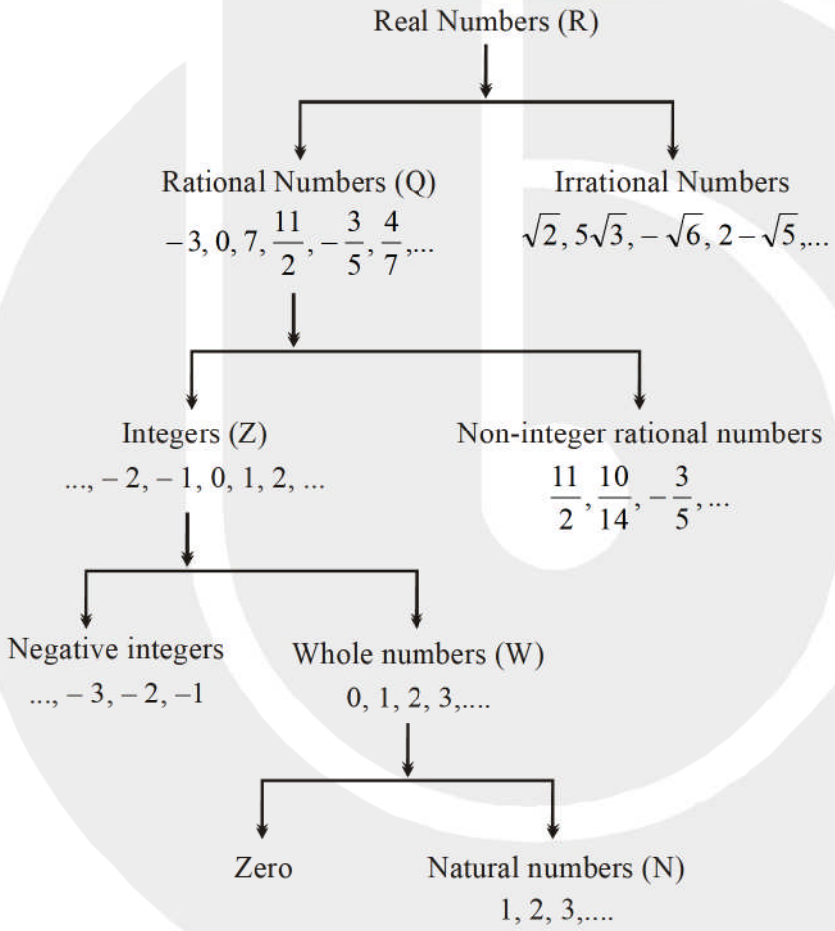
6. STATISTICS

1 REAL NUMBERS

THEORY

1.1 INTRODUCTION :

KEY CONCEPT



- **Natural numbers :** The counting numbers 1,2,3..... are called natural numbers. It is denoted by N.

  N = {1,2.3.....}

- **Whole numbers :** In the set of natural number if we include the number 0, the resulting set is known as the set of whole numbers.

  It is represented by W.

  W = {0,1,2.....}

- **Integers :** Natural numbers along with 0 and their negatives are called integers and the set of integers is denoted by I

$$I = \{.....-4, -3, -2, -1, 0, 1,2,3.....\}$$

- **Rational numbers :** A rational number is a number which can be expressed in the form of p/q, where p and q are integers and q is not zero.

- **Irrational numbers :** A number is called irrational if it can not be written in the form of p/q, where p and q are integers and $q \neq 0$

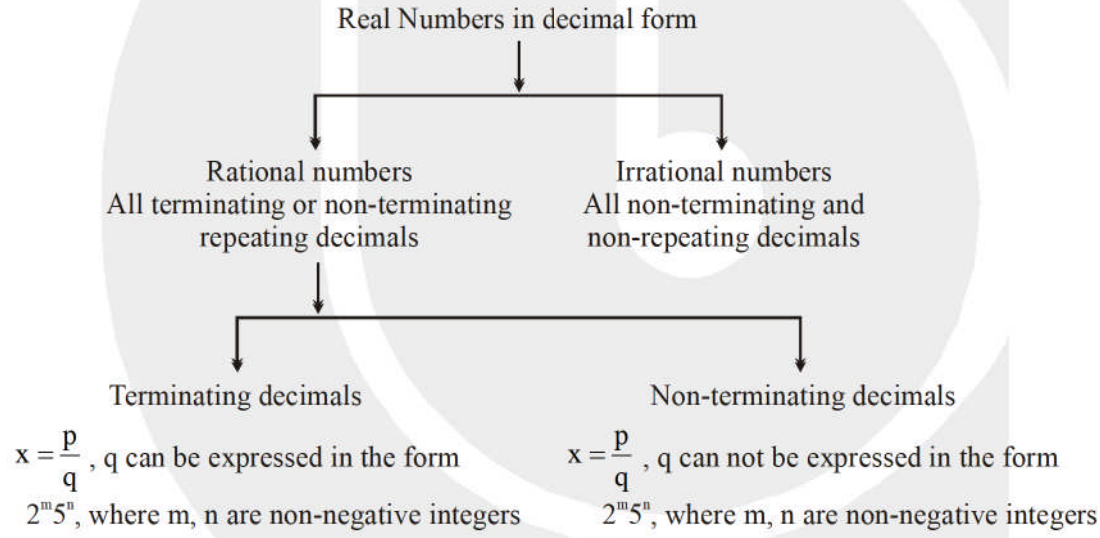
The system R of real numbers includes rational as well irrational numbers.

In this chapter we will begin with a brief recall of divisibility of integers as well state some important properties of integers.

1.2 RATIONAL NUMBERS

Decimal Representation of Rational Numbers :

KEY CONCEPT



(i) Finite or Terminating Decimal : Every fraction p/q can be expressed as a decimal, if the decimal expression of p/q terminates, i.e. comes to an end, then the decimal so obtained is called a terminating decimal.

e.g,. $1/4 = 0.25$, $5/8 = 0.625$, $2\frac{3}{5} = \frac{13}{5} = 2.6$

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

Important : A fraction p/q is a terminating decimal only, when prime factors of q are 2 and 5 only.

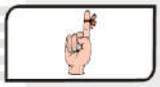
e.g. Each one of the fractions $\frac{1}{2}, \frac{3}{4}, \frac{7}{20}, \frac{13}{25}$ is a terminating decimal, since the denominator of each has no prime factor other than 2 and 5.

(ii) Repeating (or Recurring) Decimals: A decimal in which a digit or a set of digits repeats periodically, is called a repeating or a recurring decimal.

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) $\frac{2}{3} = 0.666\ldots\ldots = 0.\overline{6}$

(ii) $\frac{15}{7} = 2.142857142857\ldots\ldots = 2.\overline{142857}$



REMEMBER

Special Characteristics of Rational Numbers :

(i) Every rational number is expressible either as a terminating decimal or as a repeating decimal.
(ii) Every terminating decimal is a rational number.
(iii) Every repeating decimal is a rational number.

Fractions :

(a)	Common fraction	:	Fractions whose denominator is not 10.
(b)	Decimal fraction	:	Fractions whose denominator is 10 or any power of 10.
(c)	Proper fraction	:	Numerator < Denominator i.e. $\frac{2}{7}$
(d)	Improper fraction	:	Numerator > Denominator i.e. $\frac{7}{2}$
(e)	Mixed fraction	:	Consists of integral as well as fractional part i.e. $5\frac{2}{9}$
(f)	Compound fraction	:	Fraction whose numerator and denominator themselves are fractions. i.e. $\frac{4/5}{3/7}$.
(g)	Continued fraction	:	Fraction consists of the fractional denominators.

i.e., $1+\cfrac{1}{2-\cfrac{3}{5+\cfrac{4}{7}}}$