CHAPTER 01

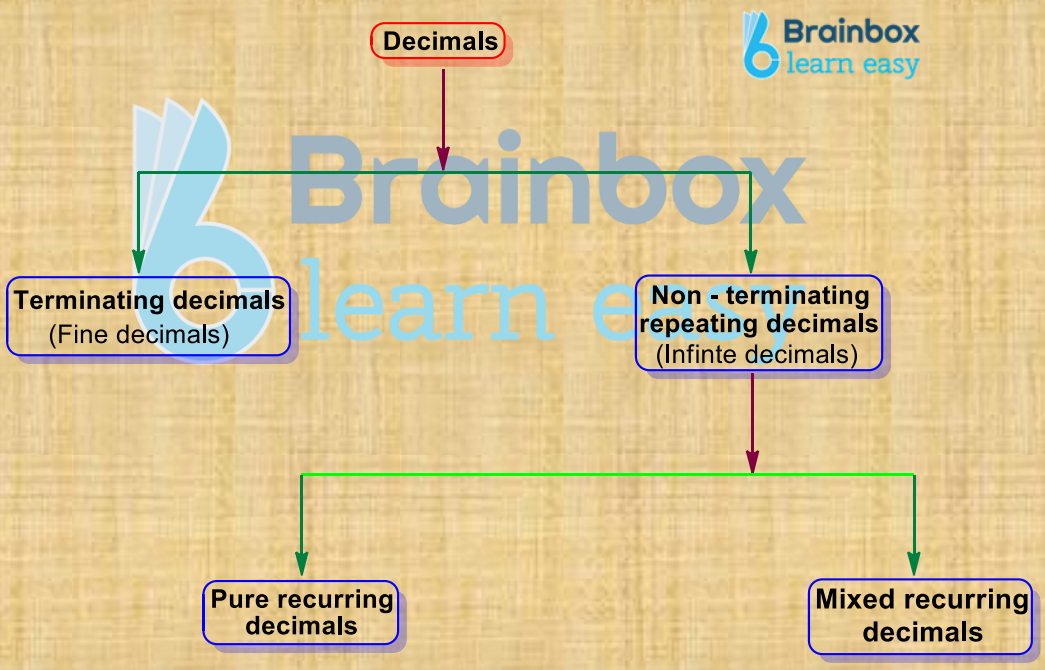
Number System

Real numbers:

A number that is either rational or irrational is a real number. It is denoted by 'R'.

Decimal expansion of rational numbers:

It has two types of decimals.



- The decimal expansions of rational numbers and irrational numbers have different pattern. Every rational number has decimal expansion, which is either terminating or recurring.

Terminating decimals (Finite decimals):

If the process of division terminates, then decimal expansion of a rational number is called terminating decimal.

Examples:

(i) $\frac{1}{2} = 0.5$ (ii) $\frac{5}{8} = 0.625$

Note:

A fraction $\frac{p}{q}$ is a terminating decimals, only if 'q' has prime factors of 2 and 5 only i.e. 'q' is of the form $2^m \times 5^n$.

Conversion of terminating decimals into the form $\left(\frac{p}{q}\right)$:

Step I:

Remove decimal point from the numerator and put as many zeros in denominator after one as the number of digits after the decimal point.

Step II:

Convert the rational number obtained into its lowest term by dividing the numerator and denominator by their common factor.

Example:

Convert the following decimal numbers into the form $\frac{p}{q}$.

(i) 0.36 (ii) 0.175 (iii) 0.0050

Sol.

(i) $0.36 = \frac{36}{100} = \frac{36 \div 4}{100 \div 4} = \frac{9}{25}$ (Dividing by the common factor 4)

(ii) $0.175 = \frac{175}{1000} = \frac{175 \div 25}{1000 \div 25} = \frac{7}{40}$ (Dividing by the common factor 25)

(iii) $0.0050 = \frac{50}{10000} = \frac{50 \div 50}{10000 \div 50} = \frac{1}{200}$ (Dividing by the common factor 50)

Pure recurring decimals:

A decimal number in which all the digits after the decimal point are repeated.

Examples:

$\overline{0.3}, \overline{0.675}$

Mixed recurring decimals:

A decimal number in which at least one digit after the decimal point is not repeated and others are repeated.

Example:

$0.5\overline{2}, 0.6\overline{45}, 2.12\overline{75}$ etc.