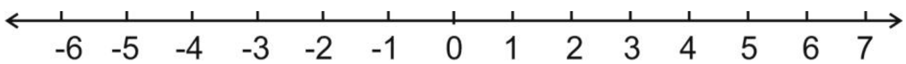
Chapter - 1 (Term-I)

(Number System)

Key Concepts



* 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 p/q, $q \neq 0$ are called rational numbers where p and q are integers.
* Irrational numbers - A number s is called irrational, if it cannot be written in the form 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.
* The decimal expansion of a irrational number is non terminating non recurring.
* All the rational numbers and irrational numbers taken together.
* Make a collection of real number.
* A real no 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 r/s may be rational or irrational.
* Every irrational number can be represented on a number line using Pythagoras theorem.
* 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 $a \mp \sqrt{b}$

Section - A

Q.1 Is zero a rational number? Can you write in the form p/q, where p and q are integer and $q \neq 0$?

Q.2 Find five rational numbers between $\frac{3}{5} and \frac{4}{5}$?

Q.3 State whether the following statements are true or false give reasons for your answers.

(i) Every natural no. is whole number.

(ii) Every integer is a whole number.

(iii) Every rational number is a whole number.

(iv) Every irrational number is a real number.

(v) Every real number is an irrational number.

(vi) Every point on the number line is of the form $\sqrt{m}$ where m is a natural no's.

Q.4 Show how $\sqrt{5}$ can be represented on the number line?

Section - B

Q.5 Find the decimal expansion of $\frac{10}{3}, \frac{7}{8}\ and \frac{1}{7}$? What kind of decimal expansion each has.

Q.6 Show that 1.272727 = $1.\overline{27}$ can be expressed in the form p/q, where p and q are integers and $q \neq 0$.

Q.7 Write three numbers whose decimal expressions are non-terminating & non recurring?

Q.8 Find three different rational between 3/5 and 4/7.

Q.9 Classify the following numbers as rational or irrational.

(a) $\sqrt{23}$ (b) $\sqrt{225}$ (c) 0.6796

(d) 1.101001000100001….

Section - C

Q.10 Visualize 3.765 on the number line using successive magnification.

Q.11 Visualize $4.\overline{26}$ on the number line upto 4 decimal places.

Q.12 simplify the following expressions.

(i) $\left(5+\sqrt{7}\right)(2+\sqrt{5})$

(ii) $\left(5+\sqrt{5}\right)(5-\sqrt{5})$

(iii) $\left(\sqrt{3}+\ \sqrt{7}\right)^2$

(iv) $\left(\sqrt{11}-\sqrt{7}\right)\ (\sqrt{11}+\sqrt{7})$

Q.13 Rationalize the denominator of $\frac{5}{\sqrt{3}-\sqrt{5}}$.

Section - D

Q.1 Represent $\sqrt{9.3}$ on number line.

Q.2 Recall, π is defined as the ratio of the circumference (say c) of a circle to its diameter (say d). That is$\pi = c/d$. This seems to contradict the fact that π is irrational. How will you resolve this contradiction?

Q.3 Simplify

(i) $2^{2/3}.2^{1/5}$

(ii) $\left(\frac{1}{3^7}\right)^7$

(iii) $(16)^{\frac{3}{4}}$

(iv) $7^{1/2}8^{1/2}$

Self Evaluation

Q.1 Write the value of

$\left(\frac{x^a}{x^b}\right)^{a+b} \times \left(\frac{x^b}{x^c}\right)^{b+c} \times \left(\frac{x^c}{x^a}\right)^{c+a}$

Q.2 $\left\{5\left(8^{\frac{1}{3}}+27^{\frac{1}{3}}\right)^3\right\}^{\frac{1}{4}}$

Q.3 If a & b are rational number, find the value of a & b in each of the following equalities.

(a) $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$ (ii) $\frac{3+\sqrt{7}}{3-\sqrt{7}} = a + b\sqrt{7}$

Q.4 Prove that $\sqrt{2}$ is an irrational number using long division method?