

Ch-1 Number system

① Find three different irrational numbers between the rational numbers $\frac{5}{7}$ and $\frac{9}{11}$

Sol $\frac{5}{7} = 0.714285714285$
 $\frac{5}{7} = 0.714285$
 and $\frac{9}{11} = 0.818181 = 0.\overline{81}$ } using long division method

So, Three different irrational nos between $\frac{5}{7}$ & $\frac{9}{11}$ are

① $0.75075007500075 \dots$ (ii) $0.76076007600076 \dots$

(iii) $0.8080080008 \dots$

② Given that $\frac{1}{7} = 0.\overline{142857}$, write the decimal expansion of $\frac{2}{7}, \frac{3}{7}, \frac{4}{7}, \frac{5}{7}, \frac{6}{7}$, without actually doing the long division

Sol \rightarrow As $\frac{1}{7} = 0.\overline{142857} \therefore \frac{2}{7} = 2 \times \frac{1}{7} = 2 \times 0.\overline{142857} = 0.\overline{285714}$

$\frac{3}{7} = 3 \times \frac{1}{7} = 3 \times 0.\overline{142857} = 0.\overline{428571}$

$\frac{4}{7} = 4 \times \frac{1}{7} = 4 \times 0.\overline{142857} = 0.\overline{571428}$

$\frac{5}{7} = 5 \times \frac{1}{7} = 5 \times 0.\overline{142857} = 0.\overline{714285}$

$\frac{6}{7} = 6 \times \frac{1}{7} = 6 \times 0.\overline{142857} = 0.\overline{857142}$

③ Write $\frac{3}{13}$ in the decimal form and state what kind of

the decimal expansion does it have?

Sol

$\frac{3}{13}$

\downarrow

$$\begin{array}{r} 13 \overline{) 30} \\ \underline{26} \\ 40 \\ \underline{39} \\ 100 \\ \underline{91} \\ 90 \\ \underline{78} \\ 120 \\ \underline{117} \\ 30 \\ \underline{26} \\ 40 \\ \underline{39} \\ 100 \\ \underline{91} \\ 90 \\ \underline{78} \\ 120 \\ \underline{117} \\ 30 \end{array}$$

$\frac{3}{13} = 0.230769230769$

$\frac{3}{13} = 0.\overline{230769} \rightarrow$ It is non-terminating but repeating

④ Express 1.4191919 in $\frac{p}{q}$ form

Sol Let $x = 1.4191919 \dots$ (1)

Multiplying both sides by 10 (1) $\rightarrow 10x = 14.1919 \dots$ (2)

Again multiply by 100 we get $100x = 1419.1919 \dots$ (3)

Subtracting (2) from (3) we get $990x = 1405 \Rightarrow x = \frac{1405}{990} = \frac{281}{198}$

⑤ Solve → (i) $x^3 = 27$ (ii) $z^2 = 0.16$

Sol (i) $x^3 = 27 \Rightarrow x^3 = (3)^3 \Rightarrow x = 3$
(ii) $z^2 = 0.16 = \frac{16}{100}$

$$z^2 = \frac{16}{100} = \frac{4}{25} = \left(\frac{2}{5}\right)^2 \Rightarrow z = \frac{2}{5} \text{ Ans}$$

⑥ State whether the given statement is true or false
Every whole no. is a natural no.

Ans False, as whole no contains 0, but natural no. does not

⑦ Every integer is a rational number

Ans True, because every can be written in $\frac{p}{q}$, $q = 1$

⑧ Every rational number is an integer.

Ans False as $\frac{2}{5}$ is not an integer

⑨ Simplify → $\sqrt{125} \times \sqrt{5}$

Sol → $\sqrt{125} \times \sqrt{5} \Rightarrow (5^3)^{\frac{1}{2}} \times (5)^{\frac{1}{2}}$ As $\sqrt{5} = (5)^{\frac{1}{2}}$
 $\Rightarrow 5^{\frac{3}{2}} \times 5^{\frac{1}{2}}$ [$\because a^m \cdot a^n = a^{m+n}$]
 $\Rightarrow 5^{\frac{3}{2} + \frac{1}{2}} = 5^2 = 5 \times 5 = 25$

⑩ Simplify → $\sqrt{20} \times \sqrt{45}$

Sol $\sqrt{20} \times \sqrt{45} = \sqrt{20 \times 45} = \sqrt{900} = 30 \text{ Ans}$

H.O. W.O.

① Simplify → $(\sqrt{15} + \sqrt{3})(\sqrt{15} - \sqrt{3})$

② Find three rational numbers b/w $0.131331333\ldots$ and $0.2424424442\ldots$

③ Write ^{Two} irrational nos. b/w $\frac{2}{5}$ and $\frac{3}{4}$.

④ Express $23.\overline{43}$ in $\frac{p}{q}$ form where p and q are integers and $q \neq 0$

⑤ Find the sum of $0.\overline{3} + 0.\overline{4}$

⑥ Rationalise the denominator for $\frac{1}{\sqrt{7} + \sqrt{2}}$ ⑦ Rationalise → $\frac{1}{\sqrt{5} - \sqrt{3}}$

⑧ Solve → (i) $x^3 = 125$ (ii) $p^2 = 0.25$

⑨ Simplify → $\sqrt{8} \times \sqrt{2}$

⑩ Find the value of → $\frac{2^0 + 7^0}{5^0}$