

IX Homework - 1

- 1) Every rational number is (a) a natural number (b) an integer (c) a real number (d) a whole number.
- 2) Between two rational numbers (a) there is no rational number (b) there is exactly one rational number (c) there are infinitely many rational numbers (d) there are only rational numbers and no irrational numbers.
- 3) Decimal representation of a rational number cannot be (a) terminating (b) non-terminating (c) non-terminating/repeating (d) non-terminating/non-repeating.
- 4) A rational number between $\sqrt{2}$ and $\sqrt{3}$ is (a) $\sqrt{2} + \sqrt{3}$ (b) $\sqrt{2} - \sqrt{3}$ (c) 1.5 (d) 1.8
- 5) The value of $1.99\bar{9}$ in the form $\frac{p}{q}$ where p and q are integers and is (a) $\frac{19}{10}$ (b) $\frac{1999}{1000}$ (c) 2 (d) $\frac{1}{9}$.
- 6) Insert three rational numbers between $-\frac{1}{3}$ and $-\frac{2}{3}$
- 7) Express the rational number $2.\bar{9}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
- 8) Express the decimal number $2.2\bar{8}$ in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
- 9) Give two rational numbers whose
 - (i) difference is a rational number
 - (ii) sum is a rational number
 - (iii) product is a rational number
 - (iv) division is a rational number.
- 10) Express $1.3\bar{2} + 0.3\bar{5}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
- 11) Find any two irrational numbers between 0.5 and 0.55
- 12) Is the product of two irrational numbers always an irrational number?
- 13) Simplify: $(\sqrt{2} + \sqrt{5})^2$
- 14) Which of the following is irrational?
(a) $\frac{\sqrt{4}}{9}$ (b) $\frac{\sqrt{12}}{\sqrt{3}}$ (c) $\sqrt{7}$ (d) $\sqrt{81}$.

IX Homework-1 (Answers)

- 1) a real number (c)
- 2) there are infinitely many rational numbers (c)
- 3) non-terminating non-repeating (d)

$$4) \sqrt{2} = 1.414$$

$$\sqrt{3} = 1.732$$

$$1.5 (c)$$

$$5) \text{ let } x = 1.\overline{999} \dots \rightarrow (1)$$

$$10x = 19.\overline{999} \dots \rightarrow (2)$$

$$(2) - (1), 9x = 18$$

$$x = 2 (c)$$

$$6) \quad -\frac{1 \times 4}{3 \times 4} \quad -\frac{2 \times 4}{3 \times 4}$$

$$-\frac{4}{12} \quad -\frac{8}{12}$$

\therefore Three rational numbers between $-\frac{1}{3}$ and $-\frac{2}{3}$ are

$$-\frac{5}{12}, -\frac{6}{12}, -\frac{7}{12} = -\frac{5}{12}, -\frac{1}{2}, -\frac{7}{12} //$$

$$7) \text{ let } x = 2.\overline{999} \dots \rightarrow (1)$$

$$10x = 29.\overline{999} \dots \rightarrow (2)$$

$$(2) - (1), 9x = 27$$

$$x = 3$$

$$\therefore 2.\overline{9} = \frac{3}{1} //$$

$$8) \text{ let } x = 2.\overline{2181818} \dots$$

$$10x = 22.\overline{181818} \dots \rightarrow (1)$$

$$1000x = 2218.\overline{181818} \dots \rightarrow (2)$$

$$(2) - (1), 990x = 2196$$

$$x = \frac{2196}{990} = \frac{732 \cdot 3}{330 \cdot 3} = \frac{244}{110} = \frac{122}{55}$$

$$\therefore 2.\overline{218} = \frac{122}{55} //$$

9) (i) $\frac{5}{7} - \frac{3}{7} = \frac{2}{7}$, which is a rational number.

(ii) $\frac{5}{7} + \frac{3}{7} = \frac{8}{7}$, which is a rational number.

(iii) $\frac{2}{7} \times \frac{3}{7} = \frac{6}{49}$, which is a rational number.

(iv) $\frac{5}{7} \div \frac{3}{7} = \frac{5}{7} \times \frac{7}{3} = \frac{5}{3}$, which is a rational number.

10) Let $x = 1.\overline{3222}\dots$

$10x = 13.\overline{222}\dots \rightarrow (1)$

$100x = 132.\overline{222}\dots \rightarrow (2)$

(2) - (1), $90x = 119$

$x = \frac{119}{90}$

Let $y = 0.\overline{353535}\dots \rightarrow (1)$

$100y = 35.\overline{353535}\dots \rightarrow (2)$

(2) - (1), $99y = 35$

$y = \frac{35}{99}$

$\therefore 1.\overline{32} + 0.\overline{35} = \frac{119 \times 11}{90 \times 11} + \frac{35 \times 10}{99 \times 10} = \frac{1309 + 350}{990} = \frac{1659}{990} = \frac{553}{330}$

11) Two irrational numbers between 0.5 and 0.55 are

$0.51511511151111\dots$

$0.54544544454444\dots$

12) No, product of two irrational numbers can also be a rational number.

eg :- $\sqrt{3} \times \sqrt{3} = 3$, a rational number

$\sqrt{2} \times \sqrt{8} = \sqrt{16} = 4$, a rational number

13) $(\sqrt{2} + \sqrt{5})^2 = (\sqrt{2})^2 + (\sqrt{5})^2 + 2\sqrt{5} \times \sqrt{2}$ $[(a+b)^2 = a^2 + b^2 + 2ab]$
 $= 2 + 5 + 2\sqrt{10}$
 $= 7 + 2\sqrt{10}$

14) (a) $\frac{\sqrt{4}}{9} = \frac{2}{9}$, rational

(c) $\sqrt{7}$, irrational

(b) $\frac{\sqrt{12}}{\sqrt{3}} = \sqrt{\frac{12}{3}} = \sqrt{4} = 2$, rational

(d) $\sqrt{81} = 9$, rational.