TEXT BOOK EXERCISE 1.4

Q. 1. Divide :

(i) $\dfrac{2}{5}$ by $\dfrac{3}{4}$ (ii) $\left(\dfrac{-3}{8}\right)$ by $\left(\dfrac{-2}{3}\right)$

(iii) $\left(\dfrac{-5}{6}\right)$ by $\dfrac{3}{4}$ (iv) $\left(\dfrac{-5}{8}\right)$ by (-3)

(v) $\left(\dfrac{-3}{4}\right)$ by (-6) (vi) $\left(\dfrac{-2}{3}\right)$ by $\left(\dfrac{-7}{12}\right)$

(vii) $\left(-\dfrac{16}{21}\right)$ by $\left(\dfrac{-4}{9}\right)$ (viii) $\dfrac{10}{9}$ by $\left(\dfrac{-25}{12}\right)$

Solution.

(i) $\dfrac{2}{5} \div \dfrac{3}{4} = \dfrac{2}{5} \times \left(\text{Reciprocal of } \dfrac{3}{4}\right)$

$= \dfrac{2}{5} \times \dfrac{4}{3} = \dfrac{2 \times 4}{5 \times 3} = \dfrac{8}{15}$ Ans.

(ii) $\left(\dfrac{-3}{8}\right) \div \left(\dfrac{-2}{3}\right) = \left(\dfrac{-3}{8}\right)$

$\times \left(\text{Reciprocal of } \dfrac{-2}{3}\right) = \left(\dfrac{-3}{8}\right) \times \left(\dfrac{3}{-2}\right)$

$= \dfrac{(-3) \times (3)}{8 \times (-2)} = \dfrac{-9}{-16} = \dfrac{9}{16}$ Ans.

(iii) $\left(\dfrac{-5}{6}\right) \div \dfrac{3}{4} = \left(\dfrac{-5}{6}\right) \times \left(\text{Reciprocal of } \dfrac{3}{4}\right)$

$= \left(\dfrac{-5}{6}\right) \times \left(\dfrac{4}{3}\right) = \dfrac{(-5) \times (\overset{2}{\cancel{4}})}{\underset{3}{\cancel{6}} \times 3}$

$= \dfrac{-10}{9}$ Ans.

(iv) $\left(\dfrac{-5}{8}\right) \div (-3) = \left(\dfrac{-5}{8}\right) \times (\text{Reciprocal of } -3)$

$= \left(\dfrac{-5}{8}\right) \times \left(\dfrac{1}{-3}\right) = \dfrac{(-5) \times 1}{8 \times (-3)} = \dfrac{5}{24}$

Ans.

(v) $\left(\dfrac{-3}{4}\right) \div 6 = \left(\dfrac{-3}{4}\right) \times (\text{Reciprocal of } -6)$

$= \left(\dfrac{-3}{4}\right) \times \left(\dfrac{1}{-6}\right) = \dfrac{(-\overset{1}{\cancel{3}}) \times (1)}{4 \times (-\underset{2}{\cancel{6}})} = \dfrac{1}{8}$ Ans.

(vi) $\left(\dfrac{-2}{3}\right) \div \left(\dfrac{-7}{12}\right)$

$= \left(\dfrac{-2}{3}\right) \times \left(\text{Reciprocal of } \dfrac{-7}{12}\right)$

$= \left(\dfrac{-2}{3}\right) \times \left(\dfrac{12}{-7}\right) = \dfrac{(-2) \times \overset{4}{\cancel{12}}}{\underset{1}{\cancel{3}} \times -7}$

$= \dfrac{8}{7}$ Ans.

(vii) $\left(\dfrac{-16}{21}\right) \div \left(\dfrac{-4}{9}\right)$

$= \left(\dfrac{-16}{21}\right) \times \left(\text{Reciprocal of } \dfrac{-4}{9}\right)$

$= \left(\dfrac{-16}{21}\right) \times \left(\dfrac{9}{-4}\right) = \dfrac{-\overset{4}{\cancel{16}} \times \overset{3}{\cancel{9}}}{\underset{7}{\cancel{21}} \times \underset{1}{(-\cancel{4})}}$

$= \dfrac{-12}{-7} = \dfrac{12}{7}$ **Ans.**

(viii) $\dfrac{10}{9} \div \left(\dfrac{-25}{12}\right) = \dfrac{10}{9} \times \left(\text{Reciprocal of } \dfrac{-25}{12}\right)$

$= \dfrac{10}{9} \times \left(\dfrac{12}{-25}\right) = \dfrac{\overset{2}{\cancel{10}} \times \overset{4}{\cancel{12}}}{\underset{3}{\cancel{9}} \times (-\underset{5}{\cancel{25}})}$

$= \dfrac{8}{-15} = \dfrac{-8}{15}$ **Ans.**

Q. 2. Verify $x \div y \neq x \div y$, when :

(i) $x = \dfrac{5}{7}, y = \dfrac{-3}{4}$

(ii) $x = \dfrac{-7}{10}, y = \dfrac{-5}{12}$

(iii) $x = \dfrac{-3}{4}, y = \dfrac{-9}{16}$

Solution. (i) L.H.S. $= x \div y = \dfrac{5}{7} \div \left(\dfrac{-3}{4}\right)$

$= \dfrac{5}{7} \times \left(\dfrac{4}{-3}\right) = \dfrac{5 \times 4}{7 \times (-3)}$

$= \dfrac{20}{-21} = \dfrac{-20}{21}$

R.H.S. $= y \div x = \left(\dfrac{-3}{4}\right) \div \dfrac{5}{7}$

$= \left(\dfrac{-3}{4}\right) \times \dfrac{7}{5} = \dfrac{(-3) \times 7}{4 \times 5}$

$= \dfrac{-21}{20}$

$\therefore$ L.H.S. $=$ R.H.S.
Thus, $x \div y \neq y \div x$

(ii) L.H.S. $= x \div y = \left(\dfrac{-7}{10}\right) \div \left(\dfrac{-5}{12}\right)$

$= \left(\dfrac{-7}{10}\right) \times \left(\dfrac{12}{-5}\right) = \dfrac{(-7) \times \overset{6}{\cancel{12}}}{\underset{5}{\cancel{10}} \times (-5)}$

$= \dfrac{-42}{-25} = \dfrac{42}{25}$

R.H.S. $= y \div x = \left(\dfrac{-5}{12}\right) \div \left(\dfrac{-7}{10}\right)$

$= \left(\dfrac{-5}{12}\right) \times \left(\dfrac{10}{-7}\right) = \dfrac{(-5) \times \overset{5}{\cancel{10}}}{\underset{6}{\cancel{12}} \times (-7)}$

$= \dfrac{-25}{-42} = \dfrac{25}{42}$

$\therefore$ L.H.S. $\neq$ R.H.S.
Thus, $x \div y \neq y \div x$

(iii) L.H.S. $= x \div y = \left(\dfrac{-3}{4}\right) \div \left(\dfrac{-9}{16}\right)$

$= \dfrac{-3}{4} \times \left(\dfrac{16}{-9}\right) = \dfrac{-\overset{1}{\cancel{3}} \times \overset{4}{\cancel{16}}}{\underset{1}{\cancel{4}} \times (-\underset{3}{\cancel{9}})}$

$= \dfrac{-4}{-3} = \dfrac{4}{3}$

R.H.S. $= y \div x = \left(\dfrac{-9}{16}\right) \div \left(\dfrac{-3}{4}\right)$

$= \left(\dfrac{-9}{16}\right) \times \left(\dfrac{4}{-3}\right)$

$= \dfrac{(-\overset{3}{\cancel{9}}) \times \overset{1}{\cancel{4}}}{\underset{4}{\cancel{16}} \times (-\underset{1}{\cancel{3}})} = \dfrac{3}{4}$

$\therefore$ L.H.S. $\neq$ R.H.S.
Thus, $x \div y = y \div x$

Q. 3. Verify $x \div (y \div z) \neq (x \div y) \div z$, when :

(i) $x = \dfrac{-3}{15}, y = \dfrac{-2}{3}, z = 2$

(ii) $x = \dfrac{-1}{4}, y = \dfrac{-3}{2}, z = \dfrac{-5}{6}$

Solution. (i) L.H.S. $= x \div (y \div z)$

$$= \frac{-3}{15} \div \left[\left(\frac{-2}{3}\right) \div 2\right]$$

$$= \frac{-3}{15} \div \left[\left(\frac{-2}{3}\right) \times \frac{1}{2}\right]$$

$$= \frac{-3}{15} \div \left[\frac{(-\cancel{2}) \times 1}{3 \times \cancel{2}_1}\right]$$

$$= \frac{-3}{15} \div \frac{-1}{3} = \frac{-3}{\cancel{15}_5} \times \frac{\cancel{3}^1}{-1}$$

$$= \frac{-3}{-5} = \frac{3}{5}$$

R.H.S. $= (x \div y) \div z$

$$= \left[\left(\frac{-3}{15}\right) \div \left(\frac{-2}{3}\right)\right] \div 2$$

$$= \left[\left(\frac{-3}{5}\right) \times \left(\frac{3}{-2}\right)\right] \div 2$$

$$= \left[\frac{(-3) \times 3}{5 \times (-2)}\right] \div 2$$

$$= \left[\frac{-9}{-10}\right] \div 2 = \frac{9}{10} \times \frac{1}{2} = \frac{9}{20}$$

$\therefore$ L.H.S. $\neq$ R.H.S.

Thus, $x \div (y \div z) \neq (x \div y) \div z$

(ii) L.H.S. $= x \div (y \div z)$

$$= \frac{-1}{4} \div \left[\left(\frac{-3}{2}\right) \div \left(\frac{-5}{6}\right)\right]$$

$$= \frac{-1}{4} \div \left[\left(\frac{-3}{2}\right) \times \left(\frac{6}{-5}\right)\right]$$

$$= \frac{-1}{4} \div \left[\frac{(-3) \times \cancel{6}^3}{\cancel{2}_1 \times (-5)}\right]$$

$$= \frac{-1}{4} \div \left(\frac{-9}{-5}\right) = \frac{-1}{4} \times \frac{-5}{-9}$$

$$= \frac{-5}{36}$$

R.H.S. $= (x \div y) \div z$

$$= \left[\left(\frac{-1}{4}\right) \div \left(\frac{-3}{2}\right)\right] \div \left(\frac{-5}{6}\right)$$

$$= \left[\left(\frac{-1}{4}\right) \times \frac{2}{(-3)}\right] \div \left(\frac{-5}{6}\right)$$

$$= \left[\frac{(-1) \times \cancel{2}^1}{\cancel{4}_2 \times (-3)}\right] \div \left(\frac{-5}{6}\right)$$

$$= \left(\frac{-1}{-6}\right) \div \left(\frac{-5}{6}\right) = \frac{1}{6} \times \left(\frac{6}{-5}\right)$$

$$= \frac{1 \times \cancel{6}^1}{\cancel{6}_1 \times (-5)} = \frac{1}{-5} = \frac{-1}{5}$$

$\therefore$ L.H.S. $\neq$ R.H.S.

Thus $x \div (y \div z) \neq (x \div y) \div z$.

Q. 4. The product of two rational numbers is $\dfrac{-8}{9}$. If one of the number is $\dfrac{-2}{5}$, find the other.

Solution. Let the other number be x then According to the question :

$$\left(\frac{-2}{5}\right) \times x = \left(\frac{-8}{9}\right)$$

$\therefore \qquad x = \left(\frac{-8}{9}\right) \div \left(\frac{-2}{5}\right)$

$$= \left(\frac{-8}{9}\right) \times \left(\frac{5}{-2}\right) = \frac{(-\cancel{8}^1) \times 5}{9 \times (-\cancel{2}^1)}$$

$$= \frac{-20}{-9} = \frac{20}{9} \text{ Ans.}$$

Q. 5. The product of two rational numbers is – 10. If one of the number is 15, find the other.

Solution. Let the other number be x then : According to the question

$$15 \times x = -10$$

$$\therefore \quad x = -10 \div 15 = -10 \times \frac{1}{15}$$

$$= \frac{-\cancel{10}^2 \times 1}{\cancel{15}_3} = \frac{-2}{3} \text{ Ans.}$$

Q. 6. By what number should $\frac{-3}{4}$ be multiplied so that the product is $\frac{15}{16}$?

Solution. Let the required number be x then :

$$x \times \left(\frac{-3}{4}\right) = \frac{15}{16}$$

$$\therefore \quad x = \frac{15}{16} \div \left(\frac{-3}{4}\right)$$

$$= \frac{15}{16} \times \frac{4}{-3} = \frac{\cancel{15}^5 \times \cancel{4}^1}{\cancel{16}_4 \times (-\cancel{3}^1)}$$

$$= \frac{5}{-4} = \frac{-5}{4} \text{ Ans.}$$

Objective Type Questions

1. Multiple Choice Questions :

(i) If $\frac{a}{b} + \frac{c}{d} = 0$, then $\frac{c}{d}$ is ...... of $\frac{a}{b}$.

    (a) Additive inverse
    (b) Multiplicative inverse
    (c) Additive identity
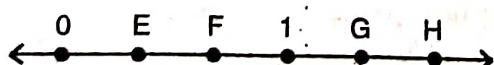   (d) Multiplicative identity.

Ans. (a) Additive inverse.

(ii) Which of the following statement is not true ?

    (a) $a + b = b + a$ (b) $a \times b = b \times a$
    (c) $a - b = b - a$ (d) All are true.

Ans. (c) $a - b = b - a$.

(iii) Which of the following letters on the given number line represents $\frac{5}{3}$?

    (a) E   (b) F
    (c) G   (d) H.

Ans. (d) H.

(iv) $\frac{5}{7} + \left(\frac{3}{14} \times \frac{6}{21}\right) =$ ....

    (a) $\frac{5}{7}$ (b) $\frac{6}{49}$

    (c) $\frac{5}{49}$ (d) $\frac{40}{49}$.

Ans. (d) $\frac{40}{49}$.

(v) Find additive inverse of $\frac{-7}{19}$.

    (a) $\frac{7}{19}$ (b) $\frac{-19}{7}$

    (c) $\frac{19}{7}$ (d) 1.

Ans. (a) $\frac{7}{19}$.

(vi) Fill in the blank $\frac{-4}{5} \times 1 =$ .... $\times \frac{-4}{5}$

    (a) – 1   (b) 1

    (c) $\frac{-4}{5}$ (d) 0.

Ans. (b) 1.

(vii) Which of the following rational number is reciprocal of itself ?

(a) 1 (b) − 10
(c) 2 (d) 0.

Ans. (a) 1.

(viii) How many rational numbers are there in between $\dfrac{5}{6}$ and $\dfrac{7}{6}$?

(a) 2 (b) 1
(c) Limited (d) Infinite.

Ans. (d) Infinite.

(ix) Multiplicative inverse of $\dfrac{-2}{5}$ is :

(a) $\dfrac{-2}{5}$ (b) $\dfrac{-5}{2}$

(c) $\dfrac{3}{5}$ (d) $\dfrac{4}{5}$.

Ans. (b) $\dfrac{-5}{2}$.

2. Choose True/False for the following questions :

(i) The additive inverse of $\dfrac{-5}{9}$ is $\dfrac{5}{9}$.

(True/False)

Ans. True.

(ii) Multiplicative inverse of $\dfrac{-13}{19}$ is $\dfrac{13}{19}$.

(True/False)

Ans. False.

(iii) $\dfrac{8}{9}$ is the multiplicative inverse of $-1\dfrac{1}{8}$.

(True/False)

Ans. False.

(iv) Zero has no reciprocal. (True/False)

Ans. True.

(v) Reciprocal of 1 is the inverse of itself.

(True/False)

Ans. True.

3. Fill in the blanks :

(i) The reciprocal of 0.3 is ....

Ans. $3\dfrac{1}{3}$.

(ii) The reciprocal of − 5 is ....

Ans. $\dfrac{-1}{5}$.

(iii) Reciprocal of $\dfrac{1}{x}$, where $x \neq 0$ is ....

Ans. x.

(iv) The product of two rational numbers is always a ....

Ans. rational number.

(v) The reciprocal of a positive rational number is ....

Ans. rational number.