

**Q1 :**

**Using appropriate properties find:**

$$(i) \quad -\frac{2}{3} \times \frac{3}{5} + \frac{5}{2} - \frac{3}{5} \times \frac{1}{6}$$

$$(ii) \quad \frac{2}{5} \times \left(-\frac{3}{7}\right) - \frac{1}{6} \times \frac{3}{2} + \frac{1}{14} \times \frac{2}{5}$$

**Answer :**

(i)

$$-\frac{2}{3} \times \frac{3}{5} + \frac{5}{2} - \frac{3}{5} \times \frac{1}{6} = -\frac{2}{3} \times \frac{3}{5} - \frac{3}{5} \times \frac{1}{6} + \frac{5}{2}$$

(Using commutativity of rational numbers)

$$= \left(-\frac{3}{5}\right) \times \left(\frac{2}{3} + \frac{1}{6}\right) + \frac{5}{2} \quad (\text{Distributivity})$$

$$= \left(-\frac{3}{5}\right) \times \left(\frac{2 \times 2 + 1}{6}\right) + \frac{5}{2} = \left(-\frac{3}{5}\right) \times \left(\frac{5}{6}\right) + \frac{5}{2}$$

$$= \left(-\frac{3}{6}\right) + \frac{5}{2} = \left(\frac{-3 + 5 \times 3}{6}\right) = \left(\frac{-3 + 15}{6}\right)$$

$$= \frac{12}{6} = 2$$

(ii)

$$\frac{2}{5} \times \left(-\frac{3}{7}\right) - \frac{1}{6} \times \frac{3}{2} + \frac{1}{14} \times \frac{2}{5} = \frac{2}{5} \times \left(-\frac{3}{7}\right) + \frac{1}{14} \times \frac{2}{5} - \frac{1}{6} \times \frac{3}{2} \quad (\text{By commutativity})$$

$$\begin{aligned}
&= \frac{2}{5} \times \left( -\frac{3}{7} + \frac{1}{14} \right) - \frac{1}{4} && \text{(By distributivity)} \\
&= \frac{2}{5} \times \left( \frac{-3 \times 2 + 1}{14} \right) - \frac{1}{4} \\
&= \frac{2}{5} \times \left( \frac{-5}{14} \right) - \frac{1}{4} \\
&= -\frac{1}{7} - \frac{1}{4} \\
&= \frac{-4 - 7}{28} = \frac{-11}{28}
\end{aligned}$$

**Q2 :**

**Write the additive inverse of each of the following:**

$$\text{(i) } \frac{2}{8} \quad \text{(ii) } \frac{-5}{9} \quad \text{(iii) } \frac{-6}{-5} \quad \text{(iv) } \frac{2}{-9} \quad \text{(v) } \frac{19}{-6}$$

**Answer :**

$$\text{(i) } \frac{2}{8}$$

$$\text{Additive inverse} = \frac{-2}{8}$$

$$\text{(ii) } \frac{-5}{9}$$

$$\text{Additive inverse} = \frac{5}{9}$$

$$\text{(iii) } \frac{-6}{-5} = \frac{6}{5}$$

$$\text{Additive inverse} = \frac{-6}{5}$$

$$(iv) \frac{2}{-9} = \frac{-2}{9}$$

$$\text{Additive inverse} = \frac{2}{9}$$

$$(v) \frac{19}{-6} = \frac{-19}{6}$$

$$\text{Additive inverse} = \frac{19}{6}$$

**Q3 :**

**Verify that  $-(-x) = x$  for.**

$$(i) x = \frac{11}{15} \quad (ii) x = -\frac{13}{17}$$

**Answer :**

$$(i) x = \frac{11}{15}$$

The additive inverse of  $x = \frac{11}{15}$  is  $-x = -\frac{11}{15}$  as  $\frac{11}{15} + \left(-\frac{11}{15}\right) = 0$

This equality  $\frac{11}{15} + \left(-\frac{11}{15}\right) = 0$  represents that the additive inverse of  $-\frac{11}{15}$  is  $\frac{11}{15}$  or it can be said

that  $-\left(-\frac{11}{15}\right) = \frac{11}{15}$  i.e.,  $-(-x) = x$

$$(ii) x = -\frac{13}{17}$$

The additive inverse of  $x = -\frac{13}{17}$  is  $-x = \frac{13}{17}$  as  $-\frac{13}{17} + \frac{13}{17} = 0$

This equality  $-\frac{13}{17} + \frac{13}{17} = 0$  represents that the additive inverse of  $\frac{13}{17}$  is  $-\frac{13}{17}$  i.e.,  $-(-x) = x$

**Q4 :**

**Find the multiplicative inverse of the following.**

(i)  $-13$  (ii)  $\frac{-13}{19}$  (iii)  $\frac{1}{5}$

(iv)  $\frac{-5}{8} \times \frac{-3}{7}$  (v)  $-1 \times \frac{-2}{5}$  (vi)  $-1$

**Answer :**

(i)  $-13$

Multiplicative inverse =  $-\frac{1}{13}$

(ii)  $-\frac{13}{19}$

Multiplicative inverse =  $-\frac{19}{13}$

(iii)  $\frac{1}{5}$

Multiplicative inverse =  $5$

(iv)  $-\frac{5}{8} \times -\frac{3}{7} = \frac{15}{56}$

Multiplicative inverse =  $\frac{56}{15}$

(v)  $-1 \times -\frac{2}{5} = \frac{2}{5}$

Multiplicative inverse  $= \frac{5}{2}$

(vi) - 1

Multiplicative inverse = - 1

**Q5 :**

**Name the property under multiplication used in each of the following:**

(i)  $\frac{-4}{5} \times 1 = 1 \times \frac{-4}{5} = -\frac{4}{5}$

(ii)  $-\frac{13}{17} \times \frac{-2}{7} = \frac{-2}{7} \times \frac{-13}{17}$

(iii)  $\frac{-19}{29} \times \frac{29}{-19} = 1$

**Answer :**

(i)  $-\frac{4}{5} \times 1 = 1 \times -\frac{4}{5} = -\frac{4}{5}$

1 is the multiplicative identity.

(ii) Commutativity

(iii) Multiplicative inverse

**Q6 :**

Multiply  $\frac{6}{13}$  by the reciprocal of  $\frac{-7}{16}$ .

**Answer :**

$$\frac{6}{13} \times \left( \text{Reciprocal of } -\frac{7}{16} \right) = \frac{6}{13} \times -\frac{16}{7} = -\frac{96}{91}$$

Q7 :

Tell what property allows you to compute  $\frac{1}{3} \times \left(6 \times \frac{4}{3}\right)$  as  $\left(\frac{1}{3} \times 6\right) \times \frac{4}{3}$ .

Answer :

Associativity

Q8 :

Is  $\frac{8}{9}$  the multiplicative inverse of  $-1\frac{1}{8}$ ? Why or why not?

Answer :

If it is the multiplicative inverse, then the product should be 1.

However, here, the product is not 1 as

$$\frac{8}{9} \times \left(-1\frac{1}{8}\right) = \frac{8}{9} \times \left(-\frac{9}{8}\right) = -1 \neq 1$$

Q9 :

Is 0.3 the multiplicative inverse of  $3\frac{1}{3}$ ? Why or why not?

Answer :

$$3\frac{1}{3} = \frac{10}{3}$$

$$0.3 \times 3\frac{1}{3} = 0.3 \times \frac{10}{3} = \frac{3}{10} \times \frac{10}{3} = 1$$

Here, the product is 1. Hence, 0.3 is the multiplicative inverse of  $3\frac{1}{3}$ .

**Q10 :**

**Write:**

- (i) The rational number that does not have a reciprocal.
- (ii) The rational numbers that are equal to their reciprocals.
- (iii) The rational number that is equal to its negative.

**Answer :**

- (i) 0 is a rational number but its reciprocal is not defined.
- (ii) 1 and -1 are the rational numbers that are equal to their reciprocals.
- (iii) 0 is the rational number that is equal to its negative.

**Q11 :**

**Fill in the blanks.**

- (i) Zero has \_\_\_\_\_ reciprocal.
- (ii) The numbers \_\_\_\_\_ and \_\_\_\_\_ are their own reciprocals
- (iii) The reciprocal of - 5 is \_\_\_\_\_.
- (iv) Reciprocal of  $\frac{1}{x}$ , where  $x \neq 0$  is \_\_\_\_\_.
- (v) The product of two rational numbers is always a \_\_\_\_\_.
- (vi) The reciprocal of a positive rational number is \_\_\_\_\_.

**Answer :**

- (i) No
- (ii) 1, - 1

(iii)  $-\frac{1}{5}$

(iv)  $x$

(v) Rational number

(vi) Positive rational number