Q4

Answer :

1.

LHS $= \left\{\left(\frac{3}{4} + \frac{-2}{5}\right) + \frac{-7}{10}\right\}$

$\left\{\left(\frac{15-8}{20}\right) + \frac{-7}{10}\right\} = \left(\frac{7}{20} + \frac{-7}{10}\right) = \left(\frac{7}{20} + \frac{-14}{20}\right) = \left(\frac{7+(-14)}{20}\right) = \frac{-7}{20}$

RHS $= \left\{\frac{3}{4} + \left(\frac{-2}{5} + \frac{-7}{10}\right)\right\}$

$\left\{\frac{3}{4} + \left(\frac{-4}{10} + \frac{-7}{10}\right)\right\} = \left\{\frac{3}{4} + \left(\frac{-4-7}{10}\right)\right\} = \left\{\frac{3}{4} + \left(\frac{-11}{10}\right)\right\} = \left(\frac{3}{4} + \frac{-11}{10}\right)$

$= \left(\frac{15}{20} + \frac{-22}{20}\right) = \left(\frac{15-22}{20}\right) = \frac{-7}{20}$

$\therefore \left(\frac{3}{4} + \frac{-2}{5}\right) + \frac{-7}{10} = \frac{3}{4} + \left(\frac{-2}{5} + \frac{-7}{10}\right)$

2.

LHS $= \left\{\left(\frac{-7}{11} + \frac{2}{-5}\right) + \frac{-13}{22}\right\}$

We will first make the denominator positive.

$\left\{\left(\frac{-7}{11} + \frac{2 \times (-1)}{-5 \times (-1)}\right) + \frac{-13}{22}\right\} = \left\{\left(\frac{-7}{11} + \frac{-2}{5}\right) + \frac{-13}{22}\right\}$

$\left\{\left(\frac{-7}{11} + \frac{-2}{5}\right) + \frac{-13}{22}\right\} = \left\{\left(\frac{-35}{55} + \frac{-22}{55}\right) + \frac{-13}{22}\right\} = \left\{\left(\frac{-35-22}{55}\right) + \frac{-13}{22}\right\}$

$= \left(\frac{-57}{55} + \frac{-13}{22}\right) = \frac{-114}{110} + \frac{-65}{110} = \frac{-114-65}{110} = \frac{-179}{110}$

RHS $= \left\{\frac{-7}{11} + \left(\frac{2}{-5} + \frac{-13}{22}\right)\right\}$

We will first make the denominator positive.

$$\left\{\frac{-7}{11} + \left(\frac{2 \times (-1)}{-5 \times (-1)} + \frac{-13}{22}\right)\right\} = \left\{\frac{-7}{11} + \left(\frac{-2}{5} + \frac{-13}{22}\right)\right\}$$

$$\left\{\frac{-7}{11} + \left(\frac{-2}{5} + \frac{-13}{22}\right)\right\} = \left\{\frac{-7}{11} + \left(\frac{-44}{110} + \frac{-65}{110}\right)\right\} = \left\{\frac{-7}{11} + \left(\frac{-44+(-65)}{110}\right)\right\}$$

$$= \frac{-7}{11} + \frac{-109}{110} = \frac{-70}{110} + \frac{-109}{110} = \frac{-70-109}{110} = \frac{-179}{110}$$

$$\therefore \left(\frac{-7}{11} + \frac{2}{-5}\right) + \frac{-13}{22} = \frac{-7}{11} + \left(\frac{2}{-5} + \frac{-13}{22}\right)$$

3.

LHS $= -1 + \left(\frac{-2}{3} + \frac{-3}{4}\right)$

$$\left\{\frac{-1}{1} + \left(\frac{-2}{3} + \frac{-3}{4}\right)\right\} = \left\{\frac{-1}{1} + \left(\frac{-8}{12} + \frac{-9}{12}\right)\right\} = \left\{\frac{-1}{1} + \left(\frac{-8-9}{12}\right)\right\}$$

$$= \left\{\frac{-1}{1} + \left(\frac{-17}{12}\right)\right\} = \left(\frac{-1}{1} + \frac{-17}{12}\right) = \left(\frac{-1 \times 12}{1 \times 12} + \frac{-17 \times 1}{12 \times 1}\right) = \left(\frac{-12+(-17)}{12}\right)$$

$$= \left(\frac{-12-17}{12}\right) = \frac{-29}{12}$$

RHS $= \left\{\left(-1 + \frac{-2}{3}\right) + \frac{-3}{4}\right\}$

RHS $= \left\{\left(-1 + \frac{-2}{3}\right) + \frac{-3}{4}\right\}$

$$\left\{\left(\frac{-1}{1} + \frac{-2}{3}\right) + \frac{-3}{4}\right\} = \left\{\left(\frac{-3}{3} + \frac{-2}{3}\right) + \frac{-3}{4}\right\} = \left\{\left(\frac{-3-2}{3}\right) + \frac{-3}{4}\right\}$$

$$= \left\{\left(\frac{-5}{3}\right) + \frac{-3}{4}\right\} = \left(\frac{-5}{3} + \frac{-3}{4}\right) = \left(\frac{-20}{12} + \frac{-9}{12}\right) = \left(\frac{-20-9}{12}\right) = \frac{-29}{12}$$

$$\therefore -1 + \left(\frac{-2}{3} + \frac{-3}{4}\right) = \left(-1 + \frac{-2}{3}\right) + \frac{-3}{4}$$

Q5

Answer :

(i) Addition is commutative, that is, $a + b = b + a$.

Hence, the required solution is $\left(\dfrac{-3}{17}\right) + \left(\dfrac{-12}{5}\right) = \left(\dfrac{-12}{5}\right) + \boxed{\left(\dfrac{-3}{7}\right)}$.

(ii) Addition is commutative, that is, $a + b = b + a$.

Hence, the required solution is $-9 + \dfrac{-21}{8} = \dfrac{-21}{8} + \boxed{-9}$.

(iii) Addition is associative, that is, $(a + b) + c = a + (b + c)$.

Hence, the required solution is $\left(\dfrac{-8}{13} + \dfrac{3}{7}\right) + \left(\dfrac{-13}{4}\right) = \boxed{\left(\dfrac{-8}{13}\right)} + \left[\dfrac{3}{7} + \left(\dfrac{-13}{4}\right)\right]$

(iv) Addition is associative, that is, $(a + b) + c = a + (b + c)$.

Hence, the required solution is $-12 + \left(\dfrac{7}{12} + \dfrac{-9}{11}\right) = \left(-12 + \dfrac{7}{12}\right) + \dfrac{-9}{11}$.

(iv) Addition is associative, that is, $(a + b) + c = a + (b + c)$.

Hence, the required solution is $-12 + \left(\dfrac{7}{12} + \dfrac{-9}{11}\right) = \left(-12 + \dfrac{7}{12}\right) + \dfrac{-9}{11}$.

(v) Addition is associative, that is, $(a + b) + c = a + (b + c)$.

Hence, the required solution is $\dfrac{19}{-5} + \left(\dfrac{-3}{11} + \dfrac{-7}{8}\right) = \left\{\dfrac{19}{-5} + \boxed{\left(\dfrac{-3}{11}\right)}\right\} + \dfrac{-7}{8}$.

(vi) 0 is the additive identity, that is, $0 + a = a$.

Hence, the required solution is $\dfrac{-16}{7} + \boxed{0} = \boxed{0} + \dfrac{-16}{7} = \dfrac{-16}{7}$.

Q6

Answer :

The additive inverse of $\frac{a}{b}$ is $\frac{-a}{b}$. Therefore, $\frac{a}{b} + \left(\frac{-a}{b}\right) = 0$

(i) Additive inverse of $\frac{1}{3}$ is $\frac{-1}{3}$.

(ii) Additive inverse of $\frac{23}{9}$ is $\frac{-23}{9}$.

(iii) Additive inverse of -18 is 18.

(iv) Additive inverse of $\frac{-17}{8}$ is $\frac{17}{8}$.

(v) In the standard form, we write $\frac{15}{-4}$ as $\frac{-15}{4}$.

Hence, its additive inverse is $\frac{15}{4}$.

(vi) We can write:

$$\frac{-16}{-5} = \frac{-16 \times (-1)}{-5 \times (-1)} = \frac{16}{5}$$

Hence, its additive inverse is $\frac{-16}{5}$.

(vii) Additive inverse of $\frac{-3}{11}$ is $\frac{3}{11}$.

(viii) Additive inverse of 0 is 0.

(ix) In the standard form, we write $\frac{19}{-6}$ as $\frac{-19}{6}$.

Hence, its additive inverse is $\frac{19}{6}$.

(x) We can write:

$$\frac{-8}{-7} = \frac{-8 \times (-1)}{-7 \times (-1)} = \frac{8}{7}$$

Hence, its additive inverse is $\frac{-8}{7}$.

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