Exercise 1C

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 $\left(\frac{-3}{17}\right)+\left(\frac{-12}{5}\right)=\left(\frac{-12}{5}\right)+\boxed{\left(\frac{-3}{7}\right)}$.

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

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

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

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

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

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

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

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

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

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

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

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

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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