Rational Numbers
Ex 1C

Q1.

Answer :

1. $\frac{-2}{5}+\frac{4}{5}=\frac{-2+4}{5}=\frac{2}{5}$

2. $\frac{-6}{11}+\frac{-4}{11}=\frac{-6+(-4)}{11}=\frac{-6-4}{11}=\frac{-10}{11}$

3. $\frac{-11}{8}+\frac{5}{8}=\frac{-11+5}{8}=\frac{-6}{8}=\frac{-3\times2}{4\times2}=\frac{-3}{4}$

4. $\frac{-7}{3}+\frac{1}{3}=\frac{-7+1}{3}=\frac{-6}{3}=\frac{-3\times2}{3}=-2$

5. $\frac{5}{6}+\frac{-1}{6}=\frac{5+(-1)}{6}=\frac{4}{6}=\frac{2\times2}{3\times2}=\frac{2}{3}$

6. $\frac{-17}{15}+\frac{-1}{15}=\frac{-17+(-1)}{15}=\frac{-17-1}{15}=\frac{-18}{15}=\frac{-6\times3}{5\times3}=\frac{-6}{5}$

Q2.

Answer :

1. The denominators of the given rational numbers are 4 and 5.

LCM of 4 and 5 is 20.

Now,

$\frac{3}{4}=\frac{3\times5}{4\times5}=\frac{15}{20}$ and $\frac{-3}{5}=\frac{-3\times4}{5\times4}=\frac{-12}{20}$

$\therefore \frac{3}{4}+\frac{-3}{5}=\frac{15}{20}+\frac{-12}{20}=\frac{15+(-12)}{20}=\frac{15-12}{20}=\frac{3}{20}$

2. The denominators of the given rational numbers are 8 and 12.

LCM of 8 and 12 is 24.

Now,

$\frac{5}{8}=\frac{5\times3}{8\times3}=\frac{15}{24}$ and $\frac{-7}{12}=\frac{-7\times2}{12\times2}=\frac{-14}{24}$

$\therefore \frac{5}{8}+\frac{-7}{12}=\frac{15}{24}+\frac{-14}{24}=\frac{15+(-14)}{24}=\frac{15-14}{24}=\frac{1}{24}$

3. The denominators of the given rational numbers are 9 and 6.

LCM of 9 and 6 is 18.

Now,

$\frac{-8}{9}=\frac{-8\times2}{9\times2}=\frac{-16}{18}$ and $\frac{11}{6}=\frac{11\times3}{6\times3}=\frac{33}{18}$

$\therefore \frac{-8}{9}+\frac{11}{6}=\frac{-16}{18}+\frac{33}{18}=\frac{-16+33}{18}=\frac{-16+33}{18}=\frac{17}{18}$

4. The denominators of the given rational numbers are 16 and 24.

LCM of 16 and 24 is 48.

Now,

$\frac{-5}{16}=\frac{-5\times3}{16\times3}=\frac{-15}{48}$ and $\frac{7}{24}=\frac{7\times2}{24\times2}=\frac{14}{48}$

$\therefore \frac{-5}{16}+\frac{7}{24}=\frac{-15}{48}+\frac{14}{48}=\frac{-15+14}{48}=\frac{-1}{48}$

5. We will first write each of the given numbers with positive denominators.

$\frac{7}{-18}=\frac{7\times(-1)}{-18\times(-1)}=\frac{-7}{18}$

The denominators of the given rational numbers are 18 and 27.

LCM of 18 and 27 is 54.

Now,

$\frac{-7}{18}=\frac{-7\times3}{18\times3}=\frac{-21}{54}$ and $\frac{8}{27}=\frac{8\times2}{27\times2}=\frac{16}{54}$

$\therefore \frac{7}{-18}+\frac{8}{27}=\frac{-21}{54}+\frac{16}{54}=\frac{-21+16}{54}=\frac{-5}{54}$

6. We will first write each of the given numbers with positive denominators.

$\frac{1}{-12}=\frac{1\times(-1)}{-12\times(-1)}=\frac{-1}{12}$ and $\frac{2}{-15}=\frac{2\times(-1)}{-15\times(-1)}=\frac{-2}{15}$

The denominators of the given rational numbers are 12 and 15.

LCM of 12 and 15 is 60.

Now,

$\frac{-1}{12} = \frac{-1\times5}{12\times5} = \frac{-5}{60}$ and $\frac{-2}{15} = \frac{-2\times4}{15\times4} = \frac{-8}{60}$

$\therefore \frac{1}{-12} + \frac{2}{-15} = \frac{-5}{60} + \frac{-8}{60} = \frac{-5+(-8)}{60} = \frac{-5-8}{60} = \frac{-13}{60}$

7. We can write -1 as $\frac{-1}{1}$.

The denominators of the given rational numbers are 1 and 4.

LCM of 1 and 4 is 4.

Now,

$\frac{-1}{1} = \frac{-1\times4}{1\times4} = \frac{-4}{4}$ and $\frac{3}{4} = \frac{3\times1}{4\times1} = \frac{3}{4}$

$\therefore -1 + \frac{3}{4} = \frac{-4}{4} + \frac{3}{4} = \frac{-4+3}{4} = \frac{-1}{4}$

8. We can write 2 as $\frac{2}{1}$.

The denominators of the given rational numbers are 1 and 4.

LCM of 1 and 4 is 4.

Now,

$\frac{2}{1} = \frac{2\times4}{1\times4} = \frac{8}{4}$ and $\frac{-5}{4} = \frac{-5\times1}{4\times1} = \frac{-5}{4}$

$\therefore 2 + \frac{(-5)}{4} = \frac{8}{4} + \frac{(-5)}{4} = \frac{8+(-5)}{4} = \frac{8-5}{4} = \frac{3}{4}$

9. We can write 0 as $\frac{0}{1}$.

The denominators of the given rational numbers are 1 and 5.

LCM of 1 and 5 is 5, that is, (1 × 5).

Now,

$\frac{0}{1} = \frac{0\times5}{1\times5} = \frac{0}{5} = 0$ and $\frac{-2}{5} = \frac{-2\times1}{5\times1} = \frac{-2}{5}$

$\therefore 0 + \frac{(-2)}{5} = \frac{0}{5} + \frac{(-2)}{5} = \frac{0+(-2)}{5} = \frac{0-2}{5} = \frac{-2}{5}$

Q3.

Answer :

1. LHS = $\frac{-12}{5} + \frac{2}{7}$

LCM of 5 and 7 is 35.

$\frac{-12\times7}{5\times7} + \frac{2\times5}{7\times5} = \frac{-84}{35} + \frac{10}{35} = \frac{-84+10}{35} = \frac{-74}{35}$

RHS = $\frac{2}{7} + \frac{-12}{5}$

LCM of 5 and 7 is 35.

$\frac{2\times5}{7\times5} + \frac{-12\times7}{5\times7} = \frac{10}{35} + \frac{-84}{35} = \frac{10-84}{35} = \frac{-74}{35}$

$\therefore \frac{-12}{5} + \frac{2}{7} = \frac{2}{7} + \frac{-12}{5}$

2. LHS = $\frac{-5}{8} + \frac{-9}{13}$

LCM of 8 and 13 is 104.

$\frac{-5\times13}{8\times13} + \frac{-9\times8}{13\times8} = \frac{-65}{104} + \frac{-72}{104} = \frac{-65+(-72)}{104} = \frac{-65-72}{104} = \frac{-137}{104}$

RHS = $\frac{-9}{13} + \frac{-5}{8}$

LCM of 13 and 8 is 104.

$\frac{-9\times8}{13\times8} + \frac{-5\times13}{8\times13} = \frac{-72}{104} + \frac{-65}{104} = \frac{-72-65}{104} = \frac{-137}{104}$

$\therefore \frac{-5}{8} + \frac{-9}{13} = \frac{-9}{13} + \frac{-5}{8}$

3. LHS = $\frac{3}{1} + \frac{-7}{12}$

LCM of 1 and 12 is 12.

$\frac{3\times12}{1\times12} + \frac{-7\times1}{12\times1} = \frac{36}{12} + \frac{-7}{12} = \frac{36+(-7)}{12} = \frac{36-7}{12} = \frac{29}{12}$

RHS = $\frac{-7}{12} + \frac{3}{1}$

LCM of 12 and 1 is 12.

$\frac{-7\times1}{12\times1} + \frac{3\times12}{1\times12} = \frac{-7}{12} + \frac{36}{12} = \frac{-7+36}{12} = \frac{29}{12}$

$\therefore 3 + \frac{-7}{12} = \frac{-7}{12} + 3$

4. LHS = $\frac{2}{-7}+\frac{12}{-35}$

We will write the given numbers with positive denominators.

$\frac{2}{-7}=\frac{2\times(-1)}{-7\times(-1)}=\frac{-2}{7}$ and $\frac{12}{-35}=\frac{12\times(-1)}{-35\times(-1)}=\frac{-12}{35}$

LCM of 7 and 35 is 35.

$\frac{-2\times5}{7\times5}+\frac{-12\times1}{35\times1}=\frac{-10}{35}+\frac{-12}{35}=\frac{-10+(-12)}{35}=\frac{-10-12}{35}=\frac{-22}{35}$

RHS = $\frac{12}{-35}+\frac{2}{-7}$

We will write the given numbers with positive denominators.

$\frac{12}{-35}=\frac{12\times(-1)}{-35\times(-1)}=\frac{-12}{35}$ and $\frac{2}{-7}=\frac{2\times(-1)}{-7\times(-1)}=\frac{-2}{7}$

LCM of 35 and 7 is 35.

$\frac{-2\times5}{7\times5}+\frac{-12\times1}{35\times1}=\frac{-10}{35}+\frac{-12}{35}=\frac{-10+(-12)}{35}=\frac{-10-12}{35}=\frac{-22}{35}$

$\therefore \frac{2}{-7}+\frac{12}{-35}=\frac{12}{-35}+\frac{2}{-7}$

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

$$\left\{\frac{-1}{1}+\left(\frac{-2}{3}+\frac{-3}{4}\right)\right\}=\left\{\frac{-1}{1}+\left(\frac{-8}{12}+\frac{-9}{12}\right)\right\}=\left\{\frac{-1}{1}+\left(\frac{-8-9}{12}\right)\right\}$$
$$=\left\{\frac{-1}{1}+\left(\frac{-17}{12}\right)\right\}=\left(\frac{-1}{1}+\frac{-17}{12}\right)=\left(\frac{-1\times12}{1\times12}+\frac{-17\times1}{12\times1}\right)=\left(\frac{-12+(-17)}{12}\right)$$
$$=\left(\frac{-12-17}{12}\right)=\frac{-29}{12}$$

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 $\frac{-8}{7}$.

Q7.

Answer :

(i) $\left(\frac{1}{3}-\frac{3}{4}\right)=\frac{1}{3}+\left(\text{Additive inverse of}\ \frac{3}{4}\right)$

$$=\left(\frac{1}{3}+\frac{-3}{4}\right)=\left(\frac{4}{12}+\frac{-9}{12}\right)=\left(\frac{4-9}{12}\right)=\frac{-5}{12}$$

(ii) $\left(\frac{1}{3}-\frac{-5}{6}\right)=\frac{1}{3}+\left(\text{Additive inverse of}\ \frac{-5}{6}\right)$

$$=\left(\frac{1}{3}+\frac{5}{6}\right)\ \text{(Because the additive inverse of}\ \frac{-5}{6}\ \text{is}\ \frac{5}{6})$$

$$=\left(\frac{2}{6}+\frac{5}{6}\right)=\left(\frac{2+5}{6}\right)=\frac{7}{6}$$

(iii) $\left(\frac{-3}{5}-\frac{-8}{9}\right)=\frac{-3}{5}+\left(\text{Additive inverse of}\ \frac{-8}{9}\right)$

$$=\left(\frac{-3}{5}+\frac{8}{9}\right)\ \text{(Because the additive inverse of}\ \frac{-8}{9}\ \text{is}\ \frac{8}{9})$$

$$=\left(\frac{-27}{45}+\frac{40}{45}\right)=\left(\frac{-27+40}{45}\right)=\frac{13}{45}$$

(iv) $\left(-1-\frac{-9}{7}\right)=-1+\left(\text{Additive inverse of}\ \frac{-9}{7}\right)$

$$=\left(\frac{-1}{1}+\frac{9}{7}\right)\ \text{(Because the additive inverse of}\ \frac{-9}{7}\ \text{is}\ \frac{9}{7})$$

$$=\left(\frac{-7}{7}+\frac{9}{7}\right)=\left(\frac{-7+9}{7}\right)=\frac{2}{7}$$

(v) $\left(1-\frac{-18}{11}\right)=1+\left(\text{Additive inverse of}\ \frac{-18}{11}\right)$

$$=\left(\frac{1}{1}+\frac{18}{11}\right)\ \text{(Because the additive inverse of}\ \frac{-18}{11}\ \text{is}\ \frac{18}{11})$$

$$=\left(\frac{11}{11}+\frac{18}{11}\right)=\left(\frac{11+18}{11}\right)=\frac{29}{11}$$

(vi) $\left(0-\frac{-13}{9}\right)=0+\left(\text{Additive inverse of}\frac{-13}{9}\right)$

$=\left(0+\frac{13}{9}\right)$ (Because the additive inverse of $\frac{-13}{9}$ is $\frac{13}{9}$)

$=\frac{13}{9}$

(vii) $\left(\frac{-6}{5}-\frac{-32}{13}\right)=\frac{-6}{5}+\left(\text{Additive inverse of}\frac{-32}{13}\right)$

$=\left(\frac{-6}{5}+\frac{32}{13}\right)$ (Because the additive inverse of $\frac{-32}{13}$ is $\frac{32}{13}$)

$=\left(\frac{-78}{65}+\frac{160}{65}\right)=\left(\frac{-78+160}{65}\right)=\frac{82}{65}$

(vi) $\left(0-\frac{-13}{9}\right)=0+\left(\text{Additive inverse of}\frac{-13}{9}\right)$

$=\left(0+\frac{13}{9}\right)$ (Because the additive inverse of $\frac{-13}{9}$ is $\frac{13}{9}$)

$=\frac{13}{9}$

(vii) $\left(\frac{-6}{5}-\frac{-32}{13}\right)=\frac{-6}{5}+\left(\text{Additive inverse of}\frac{-32}{13}\right)$

$=\left(\frac{-6}{5}+\frac{32}{13}\right)$ (Because the additive inverse of $\frac{-32}{13}$ is $\frac{32}{13}$)

$=\left(\frac{-78}{65}+\frac{160}{65}\right)=\left(\frac{-78+160}{65}\right)=\frac{82}{65}$

Q8.

Answer :

(i)

$\left(\frac{4}{3}+\frac{-2}{3}\right)+\left(\frac{3}{5}+\frac{-11}{5}\right)$

$=\left(\frac{4-2}{3}\right)+\left(\frac{3-11}{5}\right)$

$=\left(\frac{2}{3}+\frac{-8}{5}\right)$

$=\left(\frac{10}{15}+\frac{-24}{15}\right)$

$=\left(\frac{10-24}{15}\right)$

$=\frac{-14}{15}$

(ii)

$\left(\frac{-8}{3}+\frac{-11}{6}\right)+\left(\frac{-1}{4}+\frac{3}{8}\right)$

$=\left(\frac{-16}{6}+\frac{-11}{6}\right)+\left(\frac{-2}{8}+\frac{3}{8}\right)$

$=\left(\frac{-16-11}{6}\right)+\left(\frac{-2+3}{8}\right)$

$=\left(\frac{-27}{6}+\frac{1}{8}\right)$

$=\left(\frac{-108}{24}+\frac{3}{24}\right)$

$=\frac{-105}{24}$

$=\frac{35}{8}$

(iii)

$\left(\frac{-13}{20}+\frac{7}{10}\right)+\left(\frac{11}{14}+\frac{-5}{7}\right)$

$=\left(\frac{-13}{20}+\frac{14}{20}\right)+\left(\frac{11}{14}+\frac{-10}{14}\right)$

$=\left(\frac{-13+14}{20}\right)+\left(\frac{11-10}{14}\right)$

$=\left(\frac{1}{20}+\frac{1}{14}\right)$

$=\left(\frac{7}{140}+\frac{10}{140}\right)$

$=\left(\frac{7+10}{140}\right)$

$=\left(\frac{17}{140}\right)$

$=\frac{17}{140}$

(iv)

$\left(\frac{-6}{7}+\frac{-15}{7}\right)+\left(\frac{-5}{6}+\frac{-4}{9}\right)$

$=\left(\frac{-6}{7}+\frac{-15}{7}\right)+\left(\frac{-15}{18}+\frac{-8}{18}\right)$

$=\left(\frac{-6-15}{7}\right)+\left(\frac{-15-8}{18}\right)$

$=\left(\frac{-21}{7}+\frac{-23}{18}\right)$

$=\left(\frac{-3}{1}+\frac{-23}{18}\right)$

$=\left(\frac{-54}{18}+\frac{-23}{18}\right)$

$=\left(\frac{-54-23}{18}\right)$

Q9.

Answer :

Let the other number be x.
Now,

$\Rightarrow x+\frac{-14}{5}=-2$

$\Rightarrow x-\frac{14}{5}=-2$

$\Rightarrow x=-2+\frac{14}{5}$

$\Rightarrow x=\frac{(-2)\times 5+14}{5}$

$\Rightarrow x=\frac{-10+14}{5}$

$\Rightarrow x=\frac{4}{5}$

Q10.

Answer :

Let the other number be x.
Now,

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

$\Rightarrow x = -\frac{1}{2} - \frac{5}{6}$

$\Rightarrow x = \frac{-3-5}{6}$

$\Rightarrow x = \frac{-8}{6}$

$\Rightarrow x = \frac{-4}{3}$

Q11.

Answer :

Let the required number be *x*.

Now,

$\frac{-5}{8} + x = \frac{-3}{2}$

$\Rightarrow \frac{-5}{8} + x + \frac{5}{8} = \frac{-3}{2} + \frac{5}{8}$ (Adding $\frac{5}{8}$ to both the sides)

$\Rightarrow x = \left(\frac{-3}{2} + \frac{5}{8}\right)$

$\Rightarrow x = \left(\frac{-12}{8} + \frac{5}{8}\right)$

$\Rightarrow x = \left(\frac{-12+5}{8}\right)$

$\Rightarrow x = \frac{-7}{8}$

Hence, the required number is $\frac{-7}{8}$.

Q12.

Answer :

Let the required number be *x*.

Now,

$-1 + x = \frac{5}{7}$

$\Rightarrow -1 + x + 1 = \frac{5}{7} + 1$ (Adding 1 to both the sides)

$\Rightarrow x = \left(\frac{5+7}{7}\right)$

$\Rightarrow x = \frac{12}{7}$

Hence, the required number is $\frac{12}{7}$.

Q13.

Answer :

Let the required number be *x*.

Now,

$\frac{-2}{3} - x = \frac{-1}{6}$
$\Rightarrow \frac{-2}{3} - x + x = \frac{-1}{6} + x$ (Adding x to both the sides)
$\Rightarrow \frac{-2}{3} = \frac{-1}{6} + x$
$\Rightarrow \frac{-2}{3} + \frac{1}{6} = \frac{-1}{6} + x + \frac{1}{6}$ (Adding $\frac{1}{6}$ to both the sides)
$\Rightarrow \left(\frac{-4}{6} + \frac{1}{6}\right) = x$
$\Rightarrow \left(\frac{-4+1}{6}\right) = x$
$\Rightarrow \frac{-3}{6} = x$
$\Rightarrow \frac{-1\times3}{2\times3} = x$
$\Rightarrow \frac{-1}{2} = x$

Hence, the required number is $\frac{-1}{2}$.

Q14.

Answer :

1. Zero is a rational number that is its own additive inverse.

2. Yes
Consider ab-cd (with a, b, c and d as integers), where b and d are not equal to 0.

ab-cd implies adbd-bcbd implies ad-bcbd
Since ad, bc and bd are integers since integers are closed under the operation of multiplication and ad-bc is an integer since integers are closed under the operation of subtraction, then ad-bcbd
since it is in the form of one integer divided by another and the denominator is not equal to 0
Since, *b* and *d* were not equal to 0

Thus, ab-cd is a rational number.

3. Yes, rational numbers are commutative under addition. If *a* and *b* are rational numbers, then the commutative law under addition is a+b=b+a.

4. Yes, rational numbers are associative under addition. If *a, b* and *c* are rational numbers, then the associative law under addition is a+(b+c)=(a+b)+c.

5. No, subtraction is not commutative on rational numbers. In general, for any two rational numbers, $(a-b) \neq (b-a)$.

6. Rational numbers are not associative under subtraction. Therefore,
$a-(b-c) \neq (a-b)-c$.

7. Negative of a negative rational number is a positive rational number.