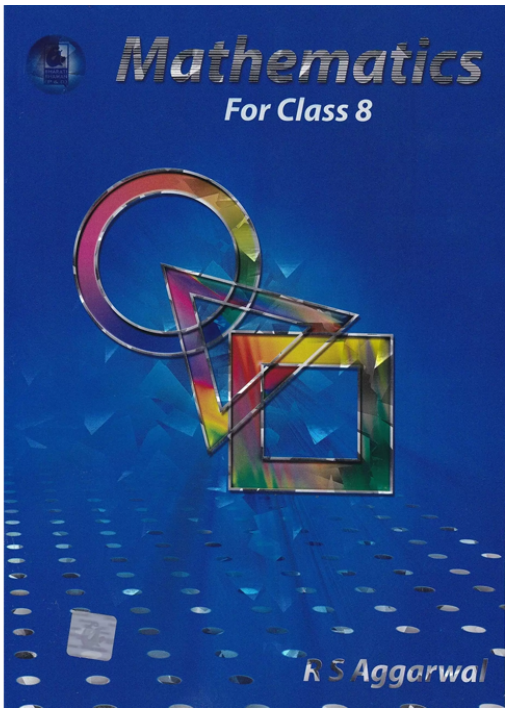
RS Aggarwal Solutions for Class 8 Maths Chapter 1–Rational Numbers

Class 8 - Chapter 1 Rational Numbers



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RS Aggarwal Solutions for Class 8 Maths Chapter 1–Rational Numbers

Class 8: Maths Chapter 1 solutions. Complete Class 8 Maths Chapter 1 Notes.

RS Aggarwal Solutions for Class 8 Maths Chapter 1–Rational Numbers

RS Aggarwal 8th Maths Chapter 1, Class 8 Maths Chapter 1 solutions

Ex 1A

Q1.

Answer :

If $\frac{a}{b}$ is a fraction and m is a non-zero integer, then $\frac{a}{b} = \frac{a \times m}{b \times m}$.

Now,

(i) $\frac{-3}{5} = \frac{-3 \times 4}{5 \times 4} = \frac{-12}{20}$

(ii) $\frac{-3}{5} = \frac{-3 \times -6}{5 \times -6} = \frac{18}{-30}$

(iii) $\frac{-3}{5} = \frac{-3 \times 7}{5 \times 7} = \frac{-21}{35}$

(iv) $\frac{-3}{5} = \frac{-3 \times -8}{5 \times -8} = \frac{24}{-40}$

Ex 1B

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Q3.

Answer :

(i) True
A negative number always lies to the left of 0 on the number line.

(ii) False
A negative number always lies to the left of 0 on the number line.

(iii) True
Negative and positive numbers always lie on the opposite sides of 0 on the number line.

(iv) False
The negative sign cancels off and the number becomes $\frac{18}{13}$; it lies to the right of 0 on the number line.

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,

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

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

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

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

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.

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

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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.

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(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 $\frac{-16}{5}$.

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

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

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

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

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

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

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

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

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

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

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

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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.

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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.

Ex 1D

Q1.

Answer :

(i)

$$\frac{3}{5} \times \frac{-7}{8}$$
$$= \frac{3 \times (-7)}{5 \times 8}$$
$$= -\frac{21}{40}$$

(ii)

$$\frac{-9}{2} \times \frac{5}{4}$$
$$= \frac{(-9) \times 5}{2 \times 4}$$
$$= \frac{-45}{8}$$

(iii)

$$\frac{-6}{11} \times \frac{-5}{3}$$
$$= \frac{(-6) \times (-5)}{11 \times 3}$$
$$= \frac{30}{33}$$

Simplifying the above rational number, we get:

$$\frac{30}{33} = \frac{30 \div 3}{33 \div 3} = \frac{10}{11}$$

(iv)

$$\frac{-2}{3} \times \frac{6}{7}$$
$$= \frac{(-2) \times 6}{3 \times 7}$$
$$= \frac{-12}{21}$$

Simplifying the above rational number, we get:

$$\frac{-12}{21} = \frac{-12 \div 3}{21 \div 3} = \frac{-4}{7}$$

(v)

$$\frac{-12}{5} \times \frac{10}{-3}$$
$$= \frac{(-12) \times 10}{5 \times (-3)}$$
$$= \frac{-120}{-15}$$
$$= \frac{120}{15}$$

Simplifying the above rational number, we get:

$$\frac{120}{15} = \frac{120 \div 3}{15 \div 3} = \frac{40}{5} = 8$$

(vi)

$$\frac{25}{-9} \times \frac{3}{-10}$$
$$= \frac{25 \times 3}{(-9) \times (-10)}$$
$$= \frac{75}{90}$$

Simplifying the above rational number, we get:

$$\frac{75}{90} = \frac{75 \div 15}{90 \div 15} = \frac{5}{6}$$

(vii)

$$\frac{5}{-18} \times \frac{-9}{20}$$
$$= \frac{5 \times (-9)}{-18 \times 20}$$
$$= \frac{-45}{-360}$$
$$= \frac{45}{360}$$

Simplifying the above rational number, we get:

$$\frac{45}{360} = \frac{45 \div 45}{360 \div 45} = \frac{1}{8}$$

(viii)

$$\frac{-13}{15} \times \frac{-25}{26}$$
$$= \frac{(-13) \times (-25)}{15 \times 26}$$
$$= \frac{325}{390}$$

Simplifying the above rational number, we get:

$$\frac{325}{390} = \frac{325 \div 5}{390 \div 5} = \frac{65}{78} = \frac{65 \div 13}{78 \div 13} = \frac{5}{6}$$

(ix)

$$\frac{16}{-21} \times \frac{14}{5}$$
$$= \frac{16 \times 14}{(-21) \times 5}$$
$$= \frac{224}{-105}$$

Simplifying the above rational number, we get:

$$\frac{224}{-105} = \frac{224 \div 7}{(-105) \div 7} = \frac{32}{-15} = \frac{32 \times -1}{-15 \times -1} = \frac{-32}{15}$$

(x)

$$\frac{-7}{6} \times 24$$
$$= \frac{(-7) \times 24}{6}$$
$$= \frac{-168}{6}$$

Simplifying the above rational number, we get:

$$\frac{-168}{6} = \frac{(-168) \div 2}{6 \div 2} = \frac{84}{3} = \frac{-84 \div 3}{3 \div 3} = -28$$

(xi)

$$\frac{7}{24} \times \left(-48\right)$$
$$= \frac{7 \times (-48)}{24} = -\frac{336}{24}$$

Simplifying the above rational number, we get:

$$\frac{-336}{24} = \frac{-336 \div 24}{24 \div 24} = -14$$

(xii)

$$\frac{-13}{5} \times \left(-10\right)$$
$$= \frac{(-13) \times (-10)}{5}$$
$$= \frac{130}{5}$$

Simplifying the above rational number, we get:

$$\frac{130}{5} = \frac{130 \div 5}{5 \div 5} = 26$$

Q2.

Answer :

(i)

$\frac{3}{7} \times \frac{-5}{9} = \frac{-5}{9} \times \frac{3}{7}$

$\text{LHS} = \frac{3 \times (-5)}{7 \times 9}$

$= -\frac{15}{63}$

Simplifying, we get:

$-\frac{15}{63} = -\frac{15 \div 3}{63 \div 3}$

$= -\frac{5}{21}$

$\text{RHS} = \frac{-5}{9} \times \frac{3}{7}$

$= \frac{(-5) \times 3}{9 \times 7}$

$= \frac{-15}{63}$

Simplifying, we get:

$= \frac{-15 \div 3}{63 \div 3}$

$= -\frac{5}{21}$

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LHS = RHS

(ii)

$\frac{-8}{7} \times \frac{13}{9} = \frac{13}{9} \times \frac{-8}{7}$

$\text{LHS} = \frac{-8}{7} \times \frac{13}{9} = \frac{(-8)\times 13}{7\times 9} = -\frac{104}{63}$ $\text{RHS} = \frac{13}{9} \times \frac{-8}{7} = \frac{13\times(-8)}{9\times 7} = -\frac{104}{63}$ $\text{LHS} = \text{RHS}$

(iii)

$\frac{-12}{5} \times \frac{7}{-36} = \frac{7}{-36} \times \frac{-12}{5}$

$\text{LHS} = \frac{-12}{5} \times \frac{7}{-36}$

$= \frac{(-12)\times 7}{5\times(-36)}$

$= \frac{84}{180}$

Simplifying, we get:

$= \frac{84 \div 12}{180 \div 12}$

$= \frac{7}{15}$

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$\text{RHS} = \frac{7}{-36} \times \frac{-12}{5}$

$= \frac{7 \times (-12)}{(-36) \times 5}$

$= \frac{84}{180}$

Simplifying, we get:

$= \frac{84 \div 12}{180 \div 12}$

$= \frac{7}{15}$

LHS = RHS

(iv)

$-8 \times \frac{-13}{12} = \frac{-13}{12} \times \left(-8\right)$

$\text{LHS} = -8 \times \frac{-13}{12}$

$= \frac{(-8) \times (-13)}{12}$

$= \frac{104}{12}$

Simplifying, we get:

$= \frac{104 \div 4}{12 \div 4}$

$= \frac{26}{3}$

$\text{RHS} = \frac{-13}{12} \times \left(-8\right)$

$= \frac{(-13)\times(-8)}{12}$

$= \frac{104}{12}$

Simplifying, we get:

$= \frac{104 \div 4}{12 \div 4}$

$= \frac{26}{3}$

LHS = RHS

Q3.

Answer :

(i)

$$\left(\frac{5}{7} \times \frac{12}{13}\right) \times \frac{7}{18} = \frac{5}{7} \times \left(\frac{12}{13} \times \frac{7}{18}\right)$$

$$\text{LHS} = \left(\frac{5}{7} \times \frac{12}{13}\right) \times \frac{7}{18}$$
$$= \frac{5 \times 12}{7 \times 13} \times \frac{7}{18}$$
$$= \frac{60}{91} \times \frac{7}{18}$$
$$= \frac{420}{1638}$$
$$= \frac{10}{39}$$

$$\text{RHS} = \frac{5}{7} \times \left(\frac{12}{13} \times \frac{7}{18}\right)$$
$$= \frac{5}{7} \times \frac{12 \times 7}{13 \times 18}$$
$$= \frac{5}{7} \times \frac{84}{234}$$
$$= \frac{420}{1638}$$
$$= \frac{10}{39}$$

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$\therefore \left(\frac{5}{7} \times \frac{12}{13}\right) \times \frac{7}{18} = \frac{5}{7} \times \left(\frac{12}{13} \times \frac{7}{18}\right)$

(ii)

$\frac{-13}{24} \times \left(\frac{-12}{5} \times \frac{35}{36}\right) = \left(\frac{-13}{24} \times \frac{-12}{5}\right) \times \frac{35}{36}$

$\text{LHS} = \frac{-13}{24} \times \left(\frac{-12}{5} \times \frac{35}{36}\right)$

$= \frac{-13}{24} \times \frac{(-12) \times 35}{5 \times 36}$

$= \frac{-13}{24} \times \frac{-420}{180}$

$= \frac{5460}{4320}$

$= \frac{91}{72}$

$\text{RHS} = \left(\frac{-13}{24} \times \frac{-12}{5}\right) \times \frac{35}{36}$

$= \frac{(-13) \times (-12)}{24 \times 5} \times \frac{35}{36}$

$= \frac{156}{120} \times \frac{35}{36}$

$= \frac{156 \times 35}{120 \times 36}$

$= \frac{5460}{4320}$

$= \frac{91}{72}$

$\therefore \frac{-13}{24} \times \left(\frac{-12}{5} \times \frac{35}{36}\right) = \left(\frac{-13}{24} \times \frac{-12}{5}\right) \times \frac{35}{36}$

(iii)

$\left(\frac{-9}{5} \times \frac{-10}{3}\right) \times \frac{21}{-4} = \frac{-9}{5} \times \left(\frac{-10}{3} \times \frac{21}{-4}\right)$

$\text{LHS} = \left(\frac{-9}{5} \times \frac{-10}{3}\right) \times \frac{21}{-4}$

$= \frac{(-9)\times(-10)}{5\times3} \times \frac{21}{-4}$

$= \frac{90}{15} \times \frac{21}{-4}$

$= \frac{90\times21}{15\times(-4)}$

$= -\frac{1890}{60}$

$= -\frac{63}{2}$

$\text{RHS} = \frac{-9}{5} \times \left(\frac{-10}{3} \times \frac{21}{-4}\right)$

$= \frac{-9}{5} \times \frac{(-10)\times21}{3\times(-4)}$

$= \frac{-9}{5} \times \frac{210}{12}$

$= \frac{(-9)\times210}{5\times12}$

$= -\frac{1890}{60}$

$= \frac{-63}{2}$

$\therefore \left(\frac{-9}{5} \times \frac{-10}{3}\right) \times \frac{21}{-4} = \frac{-9}{5} \times \left(\frac{-10}{3} \times \frac{21}{-4}\right)$

Q4.

https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-8-maths-chapter-1-rational-numbers/

Answer :

(i)

$$\frac{-23}{17} \times \frac{18}{35} = \frac{18}{35} \times \boxed{\frac{-23}{17}} \qquad \left(\because a \times b = b \times a\right)$$

(ii)

$$-38 \times \frac{-7}{9} = \frac{-7}{9} \times \boxed{-38} \qquad \left(\because a \times b = b \times a\right)$$

(iii)

$$\left(\frac{15}{7} \times \frac{-21}{10}\right) \times \frac{-5}{6} = \boxed{\frac{15}{7}} \times \left(\frac{-21}{10} \times \frac{-5}{6}\right) \quad \left[\because a \times \left(b \times c\right) = \left(a \times b\right) \times c\right]$$

(iv)

$$\frac{-12}{5} \times \left(\frac{4}{15} \times \frac{25}{-16}\right) = \left(\frac{-12}{5} \times \frac{4}{15}\right) \times \boxed{\frac{25}{-16}} \quad \left[\because a \times \left(b \times c\right) = \left(a \times b\right) \times c\right]$$

Q5.

Answer :

(i)

Reciprocal of $\frac{13}{25}$ is $\frac{25}{13}$.

(ii)

Reciprocal of $\frac{-17}{12}$ is $\frac{12}{-17}$, that is, $\frac{-12}{17}$.

(iii)

Reciprocal of $\frac{-7}{24}$ is $\frac{24}{-7}$, that is, $\frac{-24}{7}$.

(iv)

Reciprocal of 18 is $\frac{1}{18}$.

(v)

Reciprocal of -16 is $\frac{1}{-16}$, that is, $\frac{-1}{16}$.

(vi)

Reciprocal of $\frac{-3}{-5}$ is $\frac{-5}{-3}$, that is, $\frac{5}{3}$.

(vii)

Reciprocal of -1 is -1.

(viii)

Reciprocal of $\frac{0}{2}$ does not exist as $\frac{2}{0} = \infty$.

(ix)

Reciprocal of $\frac{2}{-5}$ is $\frac{-5}{2}$.

(x)

Reciprocal of $\frac{-1}{8}$ is -8.

Q6.

Answer :

We know that $a^{-1} = \frac{1}{a}$ or $a^{-1} \times a = 1$

(i)

$\left(\frac{5}{8}\right)^{-1} = \frac{8}{5}$

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

(ii)

$\left(\frac{-4}{9}\right)^{-1} = \frac{9}{-4} = \frac{-9}{4}$

$\because \frac{-4}{9} \times \left(\frac{-4}{9}\right)^{-1} = 1$

(iii)

$\left(-7\right)^{-1} = \frac{1}{-7} = \frac{-1}{7}$

$\because -7 \times \left(-7\right)^{-1} = 1$

(iv) $\left(-3\right)^{-1}$

$\left(-3\right)^{-1} = \frac{1}{-3} = \frac{-1}{3}$

$\because \left(-3\right)^{-1} \times (-3) = 1$

Q7.

Answer :

(i)

$$\text{LHS} = \frac{3}{7} \times \left(\frac{5}{6} + \frac{12}{13}\right)$$

$$= \frac{3}{7} \times \left(\frac{65 + 72}{78}\right)$$

$$= \frac{3}{7} \times \frac{137}{78}$$

$$= \frac{137}{182}$$

$$\text{RHS} = \left(\frac{3}{7} \times \frac{5}{6}\right) + \left(\frac{12}{13} \times \frac{3}{7}\right)$$

$$= \frac{3 \times 5}{7 \times 6} + \frac{12 \times 3}{13 \times 7}$$

$$= \frac{15}{42} + \frac{36}{91}$$

$$= \frac{195 + 216}{546}$$

$$= \frac{411}{546}$$

$$= \frac{137}{182}$$

$$\therefore \frac{3}{7} \times \left(\frac{5}{6} + \frac{12}{13}\right) = \left(\frac{3}{7} \times \frac{5}{6}\right) + \left(\frac{3}{7} \times \frac{12}{13}\right)$$

(ii)

$$\text{LHS} = \frac{-15}{4} \times \left(\frac{3}{7} + \frac{-12}{5}\right)$$

$$= \frac{-15}{4} \times \left(\frac{15-84}{35}\right)$$

$$= \frac{-15}{4} \times \frac{-69}{35}$$

$$= \frac{(-15)\times(-69)}{140}$$

$$= \frac{1035}{140}$$

$$= \frac{207}{28}$$

$$\text{RHS} = \left(\frac{-15}{4} \times \frac{3}{7}\right) + \left(\frac{-15}{4} \times \frac{-12}{5}\right)$$

$$= \frac{(-15)\times 3}{4\times 7} + \frac{(-15)\times(-12)}{4\times 5}$$

$$= \frac{-45}{28} + \frac{180}{20}$$

$$= \frac{-225+1260}{140}$$

$$= \frac{1035}{140}$$

$$= \frac{207}{28}$$

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$\therefore \ \frac{-15}{4} \times \left(\frac{3}{7} + \frac{-12}{5}\right) = \left(\frac{-15}{4} \times \frac{3}{7}\right) + \left(\frac{-15}{4} \times \frac{-12}{5}\right)$

(iii)

$\left(\frac{-8}{3} + \frac{-13}{12}\right) \times \frac{5}{6} = \left(\frac{-8}{3} \times \frac{5}{6}\right) + \left(\frac{-13}{12} \times \frac{5}{6}\right)$

$\text{LHS} = \left(\frac{-8}{3} + \frac{-13}{12}\right) \times \frac{5}{6}$

$= \frac{-32-13}{12} \times \frac{5}{6}$

$= \frac{-45}{12} \times \frac{5}{6}$

$= \frac{-45 \times 5}{12 \times 6}$

$= \frac{-225}{72}$

$= \frac{-225 \div 9}{72 \div 9}$

$= -\frac{25}{8}$

$\text{RHS} = \left(\frac{-8}{3} \times \frac{5}{6}\right) + \left(\frac{-13}{12} \times \frac{5}{6}\right)$

$= \frac{-8 \times 5}{3 \times 6} + \frac{(-13) \times 5}{12 \times 6}$

$= \frac{-40}{18} + \frac{-65}{72}$

$= \frac{-160-65}{72}$

$= \frac{-225}{72}$

$= \frac{-225 \div 9}{72 \div 9}$

$= \frac{-25}{8}$

$\therefore \left(\frac{-8}{3} + \frac{-13}{12}\right) \times \frac{5}{6} = \left(\frac{-8}{3} \times \frac{5}{6}\right) + \left(\frac{-13}{12} \times \frac{5}{6}\right)$

(iv)

$\frac{-16}{7} \times \left(\frac{-8}{9} + \frac{-7}{6}\right) = \left(\frac{-16}{7} \times \frac{-8}{9}\right) + \left(\frac{-16}{7} \times \frac{-7}{6}\right)$

$\text{LHS} = \frac{-16}{7} \times \left(\frac{-8}{9} + \frac{-7}{6}\right)$

$= \frac{-16}{7} \times \left(\frac{-16-21}{18}\right)$

$= \frac{-16}{7} \times \frac{-37}{18}$

$= \frac{592}{126}$

$= \frac{296}{63}$

$\text{RHS} = \left(\frac{-16}{7} \times \frac{-8}{9}\right) + \left(\frac{-16}{7} \times \frac{-7}{6}\right)$

$= \frac{128}{63} + \frac{112}{42}$

$= \frac{256+336}{126}$

$= \frac{592}{126}$

$= \frac{296}{63}$

$\therefore \frac{-16}{7} \times \left(\frac{-8}{9} + \frac{-7}{6}\right) = \left(\frac{-16}{7} \times \frac{-8}{9}\right) + \left(\frac{-16}{7} \times \frac{-7}{6}\right)$

Q8.

Answer :

Commutative property
Associative property
Distributive property
Property of multiplicative identity
Property of multiplicative inverse
Multiplicative property of 0

Q9.

Answer :

(i) 1
(ii) no
(iii) 1; -1
(iv) not
(v) 1a
(vi) a
(vii) positive
(viii) negative

Ex 1E

Q1.

Answer :

(i)

$\frac{4}{9} \div \frac{-5}{12}$

$= \frac{4}{9} \times \frac{12}{-5}$

$= \frac{4 \times 12}{9 \times -5}$

$= \frac{48}{-45}$

$= \frac{-48}{45}$

$= \frac{-16}{15}$

(ii)

$-8 \div \frac{-7}{16}$

$= -8 \times \frac{16}{-7}$

$= \frac{8 \times 16}{7}$

$= \frac{128}{7}$

(iii)

$\frac{-12}{7} \div (-18)$

$= \frac{-12}{7} \times \frac{1}{-18}$

$= \frac{12}{126}$

$= \frac{12 \div 3}{126 \div 3}$

$= \frac{4}{42}$

$= \frac{4 \div 2}{42 \div 2}$

$= \frac{2}{21}$

(iv)

$\frac{-1}{10} \div \frac{-8}{5}$

$= \frac{-1}{10} \times \frac{5}{-8}$

$= \frac{5}{80}$

$= \frac{5 \div 5}{80 \div 5}$

$= \frac{1}{16}$

(v)

$\frac{-16}{35} \div \frac{-15}{14}$

$= \frac{-16}{35} \times \frac{14}{-15}$

$= \frac{224}{525}$

(vi)

$\frac{-65}{14} \div \frac{13}{7}$

$= \frac{-65}{14} \times \frac{7}{13}$

$= \frac{-5}{2}$

Q2.

Answer :

(i)

$\frac{13}{5} \div \frac{26}{10} = \frac{26}{10} \div \frac{13}{5}$

LHS

$\frac{13}{5} \div \frac{26}{10}$

$= \frac{13}{5} \times \frac{10}{26}$

$= \frac{130}{130}$

$= 1$

RHS

$\frac{26}{10} \div \frac{13}{5}$

$= \frac{26}{10} \times \frac{5}{13}$

$= \frac{130}{130}$

$= 1$

TRUE

$(\mathrm{ii}) -9 \div \frac{3}{4} = \frac{3}{4} \div (-9) \mathrm{LHS} -9 \div \frac{3}{4} = -9 \times \frac{4}{3} = \frac{-36}{3} = -12 \mathrm{RHS} \frac{3}{4} \div (-9) = \frac{3}{4} \times \frac{1}{-9}$

$= \frac{3}{-36} = \frac{-1}{12}$ FALSE iii) $\frac{-8}{9} \div \frac{-4}{3} = \frac{-4}{3} \div \frac{-8}{9}$ LHS $\frac{-8}{9} \div \frac{-4}{3}$

$= \frac{-8}{9} \times \frac{3}{-4} = \frac{24}{36} = \frac{2}{3}$ RHS $\frac{-4}{3} \div \frac{-8}{9} = \frac{-4}{3} \times \frac{9}{-8} = \frac{36}{24}$

$= \frac{3}{2}$ FALSE $(\mathrm{iv}) \frac{-7}{24} \div \frac{3}{-16} = \frac{3}{-16} \div \frac{-7}{24}$ LHS $\frac{-7}{24} \times \frac{-16}{3}$

$= \frac{112}{72}$ RHS $\frac{3}{-16} \div \frac{-7}{24} = \frac{3}{-16} \times \frac{24}{-7} = \frac{72}{112}$ FALSE

Q3.

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Answer :

(i)

$\left(\frac{5}{9} \div \frac{1}{3}\right) \div \frac{5}{2}=\frac{5}{9} \div\left(\frac{1}{3} \div \frac{5}{2}\right)$

LHS

$\left(\frac{5}{9} \div \frac{1}{3}\right) \div \frac{5}{2}$

$=\left(\frac{5}{9} \times \frac{3}{1}\right) \times \frac{2}{5}$

$=\frac{5 \times 3 \times 2}{9 \times 1 \times 5}$

$=\frac{30}{45}$

$=\frac{2}{3}$

RHS

$\frac{5}{9} \div\left(\frac{1}{3} \div \frac{5}{2}\right)$

$=\frac{5}{9} \div\left(\frac{1}{3} \times \frac{2}{5}\right)$

$=\frac{5}{9} \div\left(\frac{2}{15}\right)$

$=\frac{5}{9} \times\left(\frac{15}{2}\right)=\frac{75}{18}$

$=\frac{25}{6}$

$\mathrm{LHS} \neq \mathrm{RHS}$

$= \frac{48}{4}$

$= 12$

LHS $\neq$ RHS

FALSE

(iii)

$\left(\frac{-3}{5} \div \frac{-12}{35}\right) \div \frac{1}{14} = \frac{-3}{5} \div \left(\frac{-12}{35} \div \frac{1}{4}\right)$

LHS

$= \left(\frac{-3}{5} \times \frac{35}{-12}\right) \times 14$

$= \frac{(-3) \times 35 \times 14}{5 \times (-12)}$

$= \frac{1470}{60}$

$= \frac{49}{2}$

RHS

$= \frac{-3}{5} \div \left(\frac{-12}{35} \div \frac{1}{4}\right)$

$= \frac{-3}{5} \div \left(\frac{-12}{35} \times \frac{4}{1}\right)$

$= \frac{-3}{5} \div \left(\frac{-12 \times 4}{35}\right)$

$= \frac{-3}{5} \div \left(\frac{-12 \times 4}{35}\right)$

$= \frac{-3}{5} \div \left(\frac{-48}{35}\right)$

$= \frac{-3}{5} \times \frac{35}{-48}$

$= \frac{3 \times 35}{5 \times 48}$

$= \frac{105}{240}$

$= \frac{7}{16}$

LHS $\neq$ RHS

FALSE

Q4.

Answer :

Let the number be x.
Now,

$$x \times \left(-12\right) = -9$$

$$\Rightarrow x = -9 \div \left(-12\right)$$

$$\Rightarrow x = \left(-9\right) \times \frac{1}{-12}$$

$$\Rightarrow x = \frac{-9}{-12}$$

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

Q5.

Answer :

Let the number be x.
Now,

$$x \times \frac{-4}{3} = \frac{-16}{9}$$

$$\Rightarrow x = \frac{-16}{9} \div \frac{-4}{3}$$

$$\Rightarrow x = \frac{-16}{9} \times \frac{3}{-4}$$

$$\Rightarrow x = \frac{-16 \times 3}{9 \times (-4)}$$

$$\Rightarrow x = \frac{48}{36}$$

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

Q6.

Answer :

Let the number be x.
Now,

$$x \times \frac{-15}{56} = \frac{-5}{7}$$
$$\Rightarrow x = \frac{-5}{7} \div \frac{-15}{56}$$
$$\Rightarrow x = \frac{-5}{7} \times \frac{56}{-15}$$
$$\Rightarrow x = \frac{280}{105}$$
$$\Rightarrow x = \frac{280 \div 5}{105 \div 5}$$
$$\Rightarrow x = \frac{56}{21}$$
$$\Rightarrow x = \frac{56 \div 7}{21 \div 7}$$
$$\Rightarrow x = \frac{8}{3}$$

Q7.

Answer :

Let the number be x.
Now,

$$x \times \frac{-8}{39} = \frac{1}{26}$$
$$\Rightarrow x = \frac{1}{26} \div \frac{-8}{39}$$
$$\Rightarrow x = \frac{1}{26} \times \frac{39}{-8}$$
$$\Rightarrow x = \frac{39}{-208}$$
$$\Rightarrow x = \frac{39 \times -1}{-208 \times -1}$$
$$\Rightarrow x = \frac{-39}{208}$$
$$\Rightarrow x = \frac{-39 \div 13}{208 \div 13}$$
$$\Rightarrow x = \frac{-3}{16}$$

Q8.

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Answer :

Let the number be x.
Now,

$$\frac{-33}{8} \div x = \frac{-11}{2}$$
$$\Rightarrow \frac{-33}{8} \times \frac{1}{x} = \frac{-11}{2}$$
$$\Rightarrow \frac{1}{x} = \frac{-11}{2} \div \frac{-33}{8}$$
$$\Rightarrow \frac{1}{x} = \frac{-11}{2} \times \frac{8}{-33}$$
$$\Rightarrow \frac{1}{x} = \frac{88}{66}$$
$$\Rightarrow \frac{1}{x} = \frac{4}{3}$$
$$\Rightarrow x = \frac{3}{4} \qquad \left(\text{Reciprocal of } \frac{4}{3}\right)$$

Q9.

Q10.

Answer :

$$\left(\frac{65}{12} + \frac{8}{3}\right) \div \left(\frac{65}{12} - \frac{8}{3}\right)$$
$$= \left(\frac{65}{12} + \frac{32}{12}\right) \div \left(\frac{65}{12} - \frac{32}{12}\right)$$
$$= \left(\frac{97}{12}\right) \div \left(\frac{33}{12}\right)$$
$$= \frac{97}{12} \times \frac{12}{33}$$
$$= \frac{97}{33}$$

Q11.

IndCareer

Answer :

(i)

Let $\frac{9}{8} \div x = \frac{-3}{2}$

$\Rightarrow \frac{9}{8} \times \frac{1}{x} = \frac{-3}{2}$

$\Rightarrow \frac{1}{x} = \frac{-3}{2} \div \frac{9}{8}$

$\Rightarrow \frac{1}{x} = \frac{-3}{2} \times \frac{8}{9}$

$\Rightarrow \frac{1}{x} = \frac{-24}{18}$

$\Rightarrow \frac{1}{x} = \frac{-4}{3}$

$\Rightarrow x = \frac{-3}{4}$ $\left[\text{Reciprocal of } \frac{-4}{3}\right]$

(ii)

Let $x \div \left(\frac{-7}{5}\right) = \frac{10}{19}$

$\Rightarrow x \times \left(\frac{5}{-7}\right) = \frac{10}{19}$

$\Rightarrow x = \left(\frac{10}{19}\right) \div \left(\frac{5}{-7}\right)$

$\Rightarrow x = \frac{10}{19} \times \frac{-7}{5}$

$\Rightarrow x = \frac{-14}{19}$

(iii)

Let $x \div (-3) = \frac{-4}{15}$

$\Rightarrow x \times \left(\frac{1}{-3}\right) = \frac{-4}{15}$

$\Rightarrow x = \frac{-4}{15} \times (-3)$

$\Rightarrow x = \frac{12}{15}$

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

(iv)

Let $(-12) \div x = \frac{-6}{5}$

$\Rightarrow (-12) \times \frac{1}{x} = \frac{-6}{5}$

$\Rightarrow \frac{1}{x} = \frac{-6}{5} \div (-12)$

$\Rightarrow \frac{1}{x} = \frac{-6}{5} \times \frac{1}{-12}$

$\Rightarrow \frac{1}{x} = \frac{1}{10}$

$\Rightarrow x = 10$

Q12.

Answer :

(i) No, rational numbers are not closed under division in general.

$\frac{a}{0} = \infty$; it is not a rational number.

(ii) No

$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$

Also,

$\frac{c}{d} \div \frac{a}{b} = \frac{c}{d} \times \frac{b}{a} = \frac{cb}{da}$ Thus, $\frac{a}{b} \div \frac{c}{d} \neq \frac{c}{d} \div \frac{a}{b}$

Therefore, division is not commutative.

(iii) No, rational numbers are not associative under division.

$\frac{a}{b} \div \left(\frac{c}{d} \div \frac{e}{f}\right) \neq \left(\frac{a}{b} \div \frac{c}{d}\right) \div \frac{e}{f}$

(iv) No, we cannot divide 1 by 0. The answer will be∞, which is not defined.

Ex 1F

Q1.

Answer :

$\text{Required number} = \frac{1}{2}\left(\frac{1}{4} + \frac{1}{3}\right)$

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

$= \left(\frac{1}{2} \times \frac{7}{12}\right)$

$= \frac{7}{24}$

Q2.

Answer :

$$\text{Required Number} = \frac{1}{2} \times \left(2+3\right)$$
$$= \frac{5}{2}$$

Q3.

Answer :

$$\text{Required number} = \frac{1}{2} \times \left(\frac{-1}{3} + \frac{1}{2}\right)$$
$$= \frac{1}{2} \times \left(\frac{-2+3}{6}\right)$$
$$= \frac{1}{2} \times \frac{1}{6}$$
$$= \frac{1}{12}$$

Q4.

Answer :

$$\text{Required number} = \frac{1}{2} \times (-3-2)$$
$$= \frac{1}{2}\left(-5\right)$$
$$= \frac{-5}{2}$$

We know :

$$-3 < \frac{-5}{2} < -2$$

Rational number between -3 and $\frac{-5}{2} = \frac{1}{2} \times \left(-3 - \frac{5}{2}\right)$

$$= \frac{1}{2}\left(\frac{-6-5}{2}\right)$$
$$= \frac{1}{2} \times \frac{-11}{2}$$
$$= \frac{-11}{4}$$

Thus, the required numbers are $\frac{-5}{2}$ and $\frac{-11}{4}$.

https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-8-maths-chapter-1-rational-numbers/

Q5.

Answer :

Rational number between 4 and 5 :

$\frac{1}{2}\left(4+5\right)$

$=\frac{9}{2}$

Rational number between 4 and $\frac{9}{2}$:

$\frac{1}{2}\left(4+\frac{9}{2}\right)$

$=\frac{1}{2}\left(\frac{8+9}{2}\right)$

$=\frac{1}{2}\left(\frac{17}{2}\right)$

$=\frac{17}{4}$

Rational number between $\frac{9}{2}$ and 5 :

$\frac{1}{2}\left(\frac{9}{2}+5\right)$

$=\frac{1}{2}\left(\frac{9+10}{2}\right)$

$=\frac{19}{4}$

We know :

$4<\frac{17}{4}<\frac{9}{2}<\frac{19}{4}<5$

Q6.

Answer :

Rational number between $\frac{2}{3}$ and $\frac{3}{4}$:

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

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

$=\frac{17}{24}$

We know :

$\frac{2}{3}<\frac{17}{24}<\frac{3}{4}$

Rational number between $\frac{2}{3}$ and $\frac{17}{24}$:

$\frac{1}{2}\left(\frac{2}{3}+\frac{17}{24}\right)$

$=\frac{1}{2}\left(\frac{16+17}{24}\right)$

$=\frac{1}{2}\left(\frac{33}{24}\right)$

$=\frac{33}{48}=\frac{33\div 3}{48\div 3}=\frac{11}{16}$

Rational number between $\frac{17}{24}$ and $\frac{3}{4}$:

$\frac{1}{2}\left(\frac{17}{24}+\frac{3}{4}\right)$

$=\frac{1}{2}\left(\frac{17+18}{24}\right)$

$=\frac{1}{2}\left(\frac{35}{24}\right)$

$=\frac{35}{48}$

We know :

$\frac{2}{3}<\frac{11}{16}<\frac{17}{24}<\frac{35}{48}<\frac{3}{4}$

Thus, the three rational numbers are $\frac{11}{16}$, $\frac{17}{24}$ and $\frac{35}{48}$.

Q8.

Answer :

We may write :

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

and

$2 = \frac{20}{10}$

Rational numbers between -1 and 2 :

$\frac{-9}{10}, \frac{-8}{10}, \frac{-7}{10}, \frac{-6}{10}, \frac{-5}{10}, \frac{-4}{10}, \ldots, \frac{14}{10}, \frac{15}{10}, \frac{16}{10}, \frac{17}{10}, \frac{18}{10}$ and $\frac{19}{10}$

We can take any 12 numbers out of these.

Ex 1G

Q1.

Answer :

Length of the rope when two pieces of lengths $2\frac{3}{5}$ m and $3\frac{3}{10}$ m are cut off = Total length of the rope - Length of the two cut off pieces

$\therefore 11-\left(2\frac{3}{5}+3\frac{3}{10}\right)$

Now,

$$2\frac{3}{5}+3\frac{3}{10} \Rightarrow \left(2+\frac{3}{5}\right)+\left(3+\frac{3}{10}\right)$$
$$=\frac{13}{5}+\frac{33}{10}$$

LCM of 5 and 10 is 10, i.e., $(5\times 1\times 2)$.

We have :

$$\frac{(13\times 2)+(33\times 1)}{10}$$
$$=\frac{26+33}{10}$$
$$=\frac{59}{10}$$

$\therefore 2\frac{3}{5}+3\frac{3}{10}=\frac{59}{10}$

Length of the remaining rope $=11-\frac{59}{10}$

$$=\frac{110-59}{10}$$
$$=\frac{51}{10}$$
$$=5\frac{1}{10}\ \text{m}$$

Therefore, the length of the remaining rope is $5\frac{1}{10}$ m.

Q2.

Answer :

Weight of rice in the drum = Weight of the drum full of rice - Weight of the empty drum

$$
\begin{aligned}
&= 40\tfrac{1}{6} - 13\tfrac{3}{4} \\
&= \left(40 + \tfrac{1}{6}\right) - \left(13 + \tfrac{3}{4}\right) \\
&= \tfrac{241}{6} - \tfrac{55}{4} \\
&= \tfrac{241}{6} + \left(\text{Additive inverse of } \tfrac{55}{4}\right) \\
&= \tfrac{482-165}{12} \\
&= \tfrac{317}{12} \\
&= 26\tfrac{5}{12} \text{ kg}
\end{aligned}
$$

Therefore, the weight of rice in the drum is $26\frac{5}{12}$ kg.

Q3.

Answer :

Weight of pears in the basket = Weight of the basket containing three types of fruits - (Weight of apples + Weight of oranges)

$=19\frac{1}{3}-\left(8\frac{1}{9}+3\frac{1}{6}\right)$

Now,

$$\left(8\frac{1}{9}+3\frac{1}{6}\right)\Rightarrow\left(8+\frac{1}{9}\right)+\left(3+\frac{1}{6}\right)$$
$$=\frac{73}{9}+\frac{19}{6}$$

LCM of 9 and 6 is 18, that is, $(3\times3\times2)$.

We have :

$\frac{(73\times2)+(19\times3)}{18}$

$=\frac{146+57}{18}$

$=\frac{203}{18}$

$\therefore 8\frac{1}{9}+3\frac{1}{6}=\frac{203}{18}$

Weight of pears in the basket = $19\frac{1}{3}-\frac{203}{18}$

$$=\left(19+\frac{1}{3}\right)-\frac{203}{18}$$
$$=\frac{58}{3}-\frac{203}{18}$$
$$=\frac{58}{3}+\left(\text{Additive inverse of }\frac{203}{18}\right)$$
$$=\frac{348-203}{18}$$
$$=\frac{145}{18}$$
$$=8\frac{1}{18}\text{ kg}$$

Therefore, the weight of the pears in the basket is $8\frac{1}{18}$ kg.

Q4.

Answer :

Money saved by the rickshaw puller = Total money earned - (Earnings spent on tea and snacks + Earnings spent on food + Earnings spent on repairs)

$$= 80 - \left(13\frac{3}{5} + 25\frac{1}{2} + 4\frac{2}{5}\right)$$
$$= 80 - \left(\left(13 + \frac{3}{5}\right) + \left(25 + \frac{1}{2}\right) + \left(4 + \frac{2}{5}\right)\right)$$
$$= 80 - \left(\frac{68}{5} + \frac{51}{2} + \frac{22}{5}\right)$$

Now,

$$\frac{68}{5} + \frac{51}{2} + \frac{22}{5} = \frac{(68\times2)+(51\times5)+(22\times2)}{10}$$
$$= \frac{136+255+44}{10}$$
$$= \frac{435}{10}$$
$$= \frac{87}{2}$$

$$\therefore \frac{68}{5} + \frac{51}{2} + \frac{22}{5} = \frac{87}{2}$$

Money saved by the rickshaw puller $= 80 - \frac{87}{2}$

$$= 80 + \left(\text{Additive inverse of } \frac{87}{2}\right)$$
$$= \frac{160-87}{2}$$
$$= \frac{73}{2}$$
$$= \text{Rs } 36\frac{1}{2}$$

Therefore, the amount of money saved by the rickshaw puller is Rs $36\frac{1}{2}$.

Q5.

Answer :

Cost of $3\frac{2}{5}$ m cloth = $3\frac{2}{5} \times 36\frac{3}{4}$

$$= \left(3+\frac{2}{5}\right) \times \left(36+\frac{3}{4}\right)$$
$$= \frac{17}{5} \times \frac{147}{4}$$
$$= \frac{17\times147}{5\times4}$$
$$= \frac{2499}{20}$$
$$= \text{Rs } 124\frac{19}{20}$$

Therefore, the cost of $3\frac{2}{5}$ m cloth is Rs $124\frac{19}{20}$.

Q6.

Answer :

Distance covered by the car in $7\frac{1}{2}$ hours = $7\frac{1}{2} \times 40\frac{2}{5}$ [Distance = Speed × Time]

$$= \left(7+\frac{1}{2}\right) \times \left(40+\frac{2}{5}\right)$$
$$= \frac{15}{2} \times \frac{202}{5}$$
$$= \frac{15\times202}{10}$$
$$= \frac{3030}{10}$$
$$= 303 \text{ km}$$

Therefore, distance covered by the car is 303 km.

Q7.

Answer :

Area of the rectangular park = Length of the park × Breadth of the park (∵ Area of rectangle = Length × Breadth)

$$= 36\frac{3}{5} \times 16\frac{2}{3}$$
$$= \left(36 + \frac{3}{5}\right) \times \left(16 + \frac{2}{3}\right)$$
$$= \frac{183}{5} \times \frac{50}{3}$$
$$= \frac{183 \times 50}{5 \times 3}$$
$$= \frac{9150}{15}$$
$$= 610\ \mathrm{m}^2$$

Therefore, the area of the rectangular park is $610\ \mathrm{m}^2$.

Q8.

Answer :

Area of the square plot = Side × Side = $(\mathrm{Side})^2$ = a^2 (Because the area of the square is a^2, where a is the side of the square)

$$= 8\frac{1}{2} \times 8\frac{1}{2}$$
$$= \left(8 + \frac{1}{2}\right) \times \left(8 + \frac{1}{2}\right)$$
$$= \frac{17}{2} \times \frac{17}{2}$$
$$= \frac{17 \times 17}{2 \times 2}$$
$$= \frac{289}{4}$$
$$= 72\frac{1}{4}\ \mathrm{m}^2$$

Therefore, the area of the square plot is $72\frac{1}{4}\ \mathrm{m}^2$.

Q10.

Answer :

Distance covered by the aeroplane in $4\frac{1}{6}$ hours = $4\frac{1}{6} \times 1020$

$$= \left(4 + \frac{1}{6}\right) \times 1020$$
$$= \frac{25}{6} \times 1020$$
$$= \frac{25}{6} \times \frac{1020}{1}$$
$$= \frac{25 \times 1020}{6 \times 1}$$
$$= \frac{25500}{6}$$
$$= 4250 \text{ km}$$

Therefore, the distance covered by the aeroplane is 4250 km.

Q11.

Answer :

Cost of one metre of cloth = $57\frac{3}{4} \div 3\frac{1}{2}$

$$= \left(57 + \frac{3}{4}\right) \div \left(3 + \frac{1}{2}\right)$$
$$= \frac{231}{4} \div \frac{7}{2}$$
$$= \frac{231}{4} \times \frac{2}{7}$$
$$= \frac{231 \times 2}{4 \times 7}$$
$$= \frac{462}{28}$$
$$= 16\frac{14}{28}$$
$$= \text{Rs } 16\frac{1}{2}$$

Therefore, the cost of one metre of cloth is Rs $16\frac{1}{2}$.

Q12.

Answer :

Length of each piece of the cord = $71\frac{1}{2} \div 26$

$$= \left(71 + \frac{1}{2}\right) \div 26$$
$$= \frac{143}{2} \div 26$$
$$= \frac{143}{2} \div \frac{26}{1}$$
$$= \frac{143}{2} \times \frac{1}{26}$$
$$= \frac{143 \times 1}{2 \times 26}$$
$$= \frac{143}{52}$$
$$= \frac{9}{4}$$
$$= 2\frac{3}{4}\ \text{m}$$

Hence, the length of each piece of the cord is $2\frac{3}{4}$ **metres**.

Q13.

Answer :

Area of a room = Length × Breadth

Thus, we have:

$$65\frac{1}{4} = \text{Length} \times 5\frac{7}{16}$$
$$\text{Length} = 65\frac{1}{4} \div 5\frac{7}{16}$$
$$= \left(65 + \frac{1}{4}\right) \div \left(5 + \frac{7}{16}\right)$$
$$= \frac{261}{4} \div \frac{87}{16}$$
$$= \frac{261}{4} \times \frac{16}{87}$$
$$= \frac{261 \times 16}{4 \times 87}$$
$$= \frac{4176}{348}$$
$$= 12\ \text{m}$$

Hence, the length of the room is 12 metres.

Q14.

Answer :

Let the other fraction be *x*.

Now, we have:

$$9\frac{3}{7} \times x = 9\frac{3}{5}$$
$$\Rightarrow x = 9\frac{3}{5} \div 9\frac{3}{7}$$
$$= \left(9 + \frac{3}{5}\right) \div \left(9 + \frac{3}{7}\right)$$
$$= \frac{48}{5} \div \frac{66}{7}$$
$$= \frac{48}{5} \times \frac{7}{66}$$
$$= \frac{48 \times 7}{5 \times 66}$$
$$= \frac{336}{330}$$
$$= \frac{56}{55}$$
$$= 1\frac{1}{55}$$

Hence, the other fraction is $1\frac{1}{55}$.

Q15.

Answer :

If $\frac{5}{8}$ of the students are boys, then the ratio of girls is $1-\frac{5}{8}$, that is, $\frac{3}{8}$.

Now, let x be the total number of students.

Thus, we have:

$$\frac{3}{8}x = 240$$
$$\Rightarrow x = 240 \div \frac{3}{8}$$
$$= 240 \times \frac{8}{3}$$
$$= \frac{240}{1} \times \frac{8}{3}$$
$$= \frac{240 \times 8}{1 \times 3}$$
$$= \frac{1920}{3}$$
$$= 640$$

Hence, the total number of students is 640.

Now,

Number of boys = Total number of students - Number of girls

$$= 640 - 240$$
$$= 400$$

Q16.

Q17.

Answer :

Amount of money spent on notebooks = $300 \times \frac{1}{3}$

$$= \frac{300}{1} \times \frac{1}{3}$$
$$= \frac{300}{3}$$
$$= 100$$

$\therefore$ Money left after spending on notebooks = $300 - 100$
$$= 200$$

Amount of money spent on stationery items from the remainder = $200 \times \frac{1}{4}$
$$= \frac{200}{1} \times \frac{1}{4}$$
$$= \frac{200}{4}$$
$$= 50$$

$\therefore$ Amount of money left with Rita = $200 - 50$
$$= \mathbf{Rs}\ 150$$

Q18.

Answer :

Total amount of money Amit earns = Rs 16000

Amount of money spent on food $= 16000 \times \frac{1}{4}$

$= \frac{16000}{1} \times \frac{1}{4}$

$= \frac{16000}{4}$

$= \text{Rs } 4000$

$\therefore$ Amount of money left after spending on food $= 16000 - 4000$

$= \text{Rs } 12000$

Amount of money spent on house rent from the remainder $= 12000 \times \frac{3}{10}$

$= \frac{12000}{1} \times \frac{3}{10}$

$= \frac{12000 \times 3}{1 \times 10}$

$= \frac{36000}{10}$

$= \text{Rs } 3600$

$\therefore$ Amount of money left after spending on food and house rent $= 12000 - 3600$

$= \text{Rs } 8400$

Amount of money spent on children's education from the remainder $= 8400 \times \frac{5}{21}$

$= \frac{8400}{1} \times \frac{5}{21}$

$= \frac{42000}{21}$

$= \text{Rs } 2000$

$\therefore$ Amount of money left $= 8400 - 2000$

$= \text{Rs } 6400$

Hence, the amount of money left with Amit is Rs 6400.

Q19.

Answer :

Let x be the required number.

We know that $\frac{3}{5}$ of the number exceeds its $\frac{2}{7}$ by 44.

That is,

$$\frac{3}{5} \times x = \frac{2}{7} \times x + 44$$
$$\frac{3}{5} \times x - \frac{2}{7} \times x = 44$$
$$\left(\frac{3}{5} - \frac{2}{7}\right) \times x = 44$$
$$\left(\frac{3}{5} + \text{Additive inverse of } \frac{2}{7}\right) \times x = 44$$
$$\left(\frac{21-10}{35}\right) \times x = 44$$
$$\frac{11}{35} \times x = 44$$
$$x = 44 \div \frac{11}{35}$$
$$= 44 \times \frac{35}{11}$$
$$= \frac{44}{1} \times \frac{35}{11}$$
$$= \frac{44 \times 35}{1 \times 11}$$
$$= \frac{1540}{11}$$
$$= 140$$

Q20.

Answer :

Ratio of spectators in the open $= 1 - \frac{2}{7}$

$= \frac{5}{7}$

Total number of spectators in the open = x

Then, $\frac{5}{7} \times x = 15000$

$\Rightarrow x = 15000 \div \frac{5}{7}$

$= 15000 \times \frac{7}{5}$

$= \frac{15000}{1} \times \frac{7}{5}$

$= \frac{15000 \times 7}{1 \times 5}$

$= \frac{10500}{5}$

$= 21000$

Hence, the total number of spectators is 21,000

Ex 1H

Q2.

Answer :

(b) $\frac{-28}{15}$

$\frac{8}{-15} = \frac{-8}{15}$ and $\frac{4}{-3} = \frac{-4}{3}$

Now, we have:

$\left(\frac{8}{-15} + \frac{4}{-3}\right) = \left(\frac{-8}{15} + \frac{-4}{3}\right)$

LCM of 15 and 3 is $(3 \times 5 \times 1)$, that is, 15

$\frac{-8}{15} + \frac{-4}{3} = \frac{1 \times (-8) + 5 \times (-4)}{15}$

$= \frac{(-8) + (-20)}{15}$

$= \frac{-28}{15}$

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Q3.

Answer :

$\frac{7}{-26} = \frac{-7}{26}$

Now, we have:

$\left(\frac{7}{-26} + \frac{16}{39}\right) = \left(\frac{-7}{26} + \frac{16}{39}\right)$

LCM of 26 and 39 is 1014, that is, $(29 \times 1 \times 36)$.

(a) $\frac{11}{78}$

$$\left(\frac{-7}{26} + \frac{16}{39}\right) = \frac{39\times(-7)+26\times16}{1014}$$
$$= \frac{(-273)+416}{1014}$$
$$= \frac{143}{1014}$$
$$= \frac{11}{78}$$

Q4.

Answer :

(b) $\frac{16}{7}$

$3 = \frac{3}{1}$ and $\frac{5}{-7} = \frac{-5}{7}$

Now, we have:

$$\left(3 + \frac{5}{-7}\right) = \left(\frac{3}{1} + \frac{-5}{7}\right)$$

LCM of 1 and 7 is 7

$$\begin{aligned}\left(\frac{3}{1} + \frac{-5}{7}\right) &= \frac{7\times3+1\times(-5)}{7} \\ &= \frac{21+(-5)}{7} \\ &= \frac{16}{7}\end{aligned}$$

Q5.

Answer :

(d) $\frac{-67}{8}$

$\frac{31}{-4} = \frac{-31}{4}$

We have:

$$\left(\frac{31}{-4} + \frac{-5}{8}\right) = \left(\frac{-31}{4} + \frac{-5}{8}\right)$$

LCM of 4 and 8 is 8, that is, $(4 \times 1 \times 2)$.

$$\begin{aligned}\left(\frac{-31}{4} + \frac{-5}{8}\right) &= \frac{2\times(-31)+1\times(-5)}{8} \\ &= \frac{(-62)+(-5)}{8} \\ &= \frac{-67}{8}\end{aligned}$$

Q6.

Answer :

(b) $\frac{-17}{20}$

Let the required number be *x*.

Now,

$$\frac{7}{12} + x = \frac{-4}{15}$$

$$\Rightarrow x = \left(\frac{-4}{15} + \frac{-7}{12}\right)$$

$$= \frac{4\times(-4)+5\times(-7)}{60}$$

$$= \frac{(-16)+(-35)}{60}$$

$$= \frac{-51}{60}$$

$$= \frac{-17}{20}$$

Q7.

Answer :

(c) $\frac{-13}{60}$

Using the commutative and associative laws, we can arrange the terms in any suitable manner. Using this rearrangement property, we have:

$$\frac{2}{3}+\frac{-4}{5}+\frac{7}{15}+\frac{-11}{20}=\left(\frac{2}{3}+\frac{7}{15}\right)+\left(\frac{-4}{5}+\frac{-11}{20}\right)$$

$$=\frac{(10+7)}{15}+\frac{[(-16)+(-11)]}{20}$$

$$=\left(\frac{17}{15}+\frac{-27}{20}\right)$$

$$=\frac{[68+(-81)]}{60}$$

$$=\frac{-13}{60}$$

Q8.

Answer :

(b) $\frac{11}{3}$

Let the other number be *x*.

Now,

$$x+(-5)=\frac{-4}{3}$$

$$\Rightarrow x=\frac{-4}{3}+(\text{Additive inverse of } -5)$$

$$\Rightarrow x=\frac{-4}{3}+5$$

$$=\frac{-4}{3}+\frac{5}{1}$$

$$=\frac{(-4)+15}{3}$$

$$=\frac{11}{3}$$

Q9.

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Answer :

(c) $\frac{1}{21}$

Let the required number be *x*.

Now,

$$\frac{-5}{7}+x=\frac{-2}{3}$$
$$\Rightarrow x=\frac{-2}{3}+\left(\text{Additive inverse of } \frac{-5}{7}\right)$$
$$\Rightarrow x=\left(\frac{-2}{3}+\frac{5}{7}\right)$$
$$=\frac{(-14)+15}{21}$$
$$=\frac{1}{21}$$

Q10.

Answer :

(d) $\frac{-5}{2}$

Let the required number be *x*.

Now,

$$\frac{-5}{3}-x=\frac{5}{6}$$
$$\Rightarrow x=\left(\frac{-5}{3}-\frac{5}{6}\right)$$
$$=\frac{-10-5}{6}$$
$$=\frac{-15}{6}$$
$$=\frac{-5}{2}$$

Thus, the required number is $\frac{-5}{2}$

Q11.

IndCareer

Answer :

(b) $\frac{-7}{3}$

$\left(-\frac{3}{7}\right)^{-1} \Rightarrow \text{Reciprocal of} \frac{-3}{7}$

The reciprocal of $\frac{-3}{7}$ is $\frac{7}{-3}$, i.e., $\frac{-7}{3}$

Q12.

Answer :

(a) $\frac{-2}{3}$

Let the other number be *x*.

Now,

$x \times \frac{14}{27} = \frac{-28}{81}$

$\Rightarrow x = \frac{-28}{81} \div \frac{14}{27}$

$= \frac{-28}{81} \times \frac{27}{14}$

$= \frac{(-28) \times 27}{81 \times 14}$

$= \frac{-(28 \times 27)}{81 \times 14}$

$= \frac{-(2 \times 3)}{9 \times 1}$

$= \frac{-6}{9}$

$= \frac{-2}{3}$

Thus, the other number is $\frac{-2}{3}$

Q13.

Answer :

(c) $\frac{32}{75}$

Let the other number be *x*.

Now,

$$x \times \frac{-15}{4} = \frac{-16}{35}$$
$$\Rightarrow x = \frac{-16}{35} \div \frac{-15}{14}$$
$$= \frac{-16}{35} \times \frac{14}{-15}$$
$$= \frac{-(16 \times 14)}{-(35 \times 15)}$$
$$= \frac{16 \times 14}{35 \times 15} = \frac{224}{525} = \frac{32}{75}$$

Thus, the other number is $\frac{32}{75}$

Q14.

Answer :

(d) $\frac{7}{5}$

Let the required number be *x*.

Now,

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

Thus, the required number is $\frac{7}{5}$

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Q15.

Answer :

(c) $\frac{1}{3}$

Let the other number be *x*.

Now,

$$x + \left(-\frac{10}{3}\right) = -3$$

$$\Rightarrow x = -3 + \left(\text{Additive inverse of } -\frac{10}{3}\right)$$

$$\Rightarrow x = \left(-3 + \frac{10}{3}\right)$$

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

$$= \frac{(-9+10)}{3}$$

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

Thus, the other number is $\frac{1}{3}$

Q16.

Answer :

(b) $\frac{-49}{71}$ and (c) $\frac{-9}{16}$

The numbers $\frac{-49}{71}$ and $\frac{-9}{16}$ are in the standard form because they have no common divisor other than 1 and their denominators are positive.

Q17.

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Answer :

(a) $\frac{-3}{10}$

$$\left(\frac{-9}{16} \times \frac{8}{15}\right) = \frac{-9 \times 8}{16 \times 15}$$

$$= \frac{-72}{240}$$

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

Q18.

Answer :

(d) $\frac{-5}{6}$

$$\frac{-5}{9} \div \frac{2}{3} = \frac{-5}{9} \times \frac{3}{2}$$

$$= \frac{-5 \times 3}{9 \times 2}$$

$$= \frac{-15}{18}$$

$$= \frac{-5}{6}$$

Q19.

Answer :

(d) $\frac{-5}{6}$

Let $\frac{4}{9} \div \frac{a}{b} = \frac{-8}{15}$

Now,

$\frac{4}{9} \times \frac{b}{a} = \frac{-8}{15}$

$\Rightarrow \frac{b}{a} = \frac{-8}{15} \times \frac{9}{4}$

$= \frac{-6}{5}$

$\Rightarrow \frac{a}{b} = \frac{5}{-6}$

$= \frac{-5}{6}$

Hence, the missing number is $\frac{-5}{6}$.

Q20.

Answer :

(c) $\frac{5}{9}$

Additive inverse of $\frac{-5}{9}$ is $\frac{5}{9}$.

Q21.

Answer :

(c) $\frac{-4}{3}$

Reciprocal of $\frac{-3}{4}$ is $\frac{4}{-3}$, i.e., $\frac{-4}{3}$.

Q22.

Answer :

(d) $\frac{-5}{24}$

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

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

$= \frac{1}{2} \times \frac{-5}{12}$

$= \frac{-5}{24}$

Q23.

Answer :

(b) is a negative rational number

The reciprocal of a negative rational number is a negative rational number.

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He was born on January 2, 1946 in a village of Delhi. He graduated from Kirori Mal College, University of Delhi. After completing his M.Sc. in Mathematics in 1969, he joined N.A.S. College, Meerut, as a lecturer. In 1976, he was awarded a fellowship for 3 years and joined the University of Delhi for his Ph.D. Thereafter, he was promoted as a reader in N.A.S. College, Meerut. In 1999, he joined M.M.H. College, Ghaziabad, as a reader and took voluntary retirement in 2003. He has authored more than 75 titles ranging from Nursery to M. Sc. He has also written books for competitive examinations right from the clerical grade to the I.A.S. level.

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