

Rational Numbers

Ex 1H

Q2.

Answer :

$$(b) \frac{-28}{15}$$
$$\frac{8}{-15} = \frac{-8}{15} \text{ and } \frac{4}{-3} = \frac{-4}{3}$$

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

$$\begin{aligned} \frac{-8}{15} + \frac{-4}{3} &= \frac{1 \times (-8) + 5 \times (-4)}{15} \\ &= \frac{(-8) + (-20)}{15} \\ &= \frac{-28}{15} \end{aligned}$$

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, $(29 \times 1 \times 36)$.

$$(a) \frac{11}{78}$$
$$\begin{aligned} \left(\frac{-7}{26} + \frac{16}{39} \right) &= \frac{39 \times (-7) + 26 \times 16}{1014} \\ &= \frac{(-273) + 416}{1014} \\ &= \frac{143}{1014} \\ &= \frac{11}{78} \end{aligned}$$

Q4.

Answer :

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

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

Now, we have:

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

LCM of 1 and 7 is 7

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

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,

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

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

$$\begin{aligned} &= \frac{4 \times (-4) + 5 \times (-7)}{60} \\ &= \frac{(-16) + (-35)}{60} \\ &= \frac{-51}{60} \\ &= \frac{-17}{20} \end{aligned}$$

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:

$$\begin{aligned}\frac{2}{3} + \frac{-4}{5} + \frac{7}{15} + \frac{-11}{20} &= \left(\frac{2}{3} + \frac{7}{15}\right) + \left(\frac{-4}{5} + \frac{-11}{20}\right) \\ &= \frac{(10+7)}{15} + \frac{[(-16)+(-11)]}{20} \\ &= \left(\frac{17}{15} + \frac{-27}{20}\right) \\ &= \frac{[68+(-81)]}{60} \\ &= \frac{-13}{60}\end{aligned}$$

Q8.

Answer :

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

Let the other number be x .

Now,

$$\begin{aligned}x + (-5) &= \frac{-4}{3} \\ \Rightarrow x &= \frac{-4}{3} + (\text{Additive inverse of } -5) \\ \Rightarrow x &= \frac{-4}{3} + 5 \\ &= \frac{-4}{3} + \frac{5}{1} \\ &= \frac{(-4)+15}{3} \\ &= \frac{11}{3}\end{aligned}$$

Q9.

Answer :

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

Let the required number be x .

Now,

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

Q10.

Answer :

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

Let the required number be x .

Now,

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

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

Q11.

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 $\frac{7}{5}$

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.

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.