

Rational Numbers

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,

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

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

We have :

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

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

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

$$\begin{aligned} &= \frac{110 - 59}{10} \\ &= \frac{51}{10} \\ &= 5\frac{1}{10} \text{ m} \end{aligned}$$

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

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

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,

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

LCM of 9 and 6 is 18, that is, $(3 \times 3 \times 2)$.

We have :

$$\begin{aligned} &\frac{(73 \times 2) + (19 \times 3)}{18} \\ &= \frac{146 + 57}{18} \\ &= \frac{203}{18} \end{aligned}$$

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

$$\begin{aligned} \text{Weight of pears in the basket} &= 19\frac{1}{3} - \frac{203}{18} \\ &= \left(19 + \frac{1}{3}\right) - \frac{203}{18} \\ &= \frac{58}{3} - \frac{203}{18} \\ &= \frac{58}{3} + \left(\text{Additive inverse of } \frac{203}{18}\right) \\ &= \frac{348-203}{18} \\ &= \frac{145}{18} \\ &= 8\frac{1}{18} \text{ kg} \end{aligned}$$

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)

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

Now,

$$\begin{aligned} \frac{68}{5} + \frac{51}{2} + \frac{22}{5} &= \frac{(68 \times 2) + (51 \times 5) + (22 \times 2)}{10} \\ &= \frac{136 + 255 + 44}{10} \\ &= \frac{435}{10} \\ &= \frac{87}{2} \end{aligned}$$

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

$$\begin{aligned}
 \text{Money saved by the rickshaw puller} &= 80 - \frac{87}{2} \\
 &= 80 + \left(\text{Additive inverse of } \frac{87}{2}\right) \\
 &= \frac{160-87}{2} \\
 &= \frac{73}{2} \\
 &= \text{Rs } 36\frac{1}{2}
 \end{aligned}$$

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

Q5.

Answer :

$$\begin{aligned}
 \text{Cost of } 3\frac{2}{5} \text{ m cloth} &= 3\frac{2}{5} \times 36\frac{3}{4} \\
 &= \left(3 + \frac{2}{5}\right) \times \left(36 + \frac{3}{4}\right) \\
 &= \frac{17}{5} \times \frac{147}{4} \\
 &= \frac{17 \times 147}{5 \times 4} \\
 &= \frac{2499}{20} \\
 &= \text{Rs } 124\frac{19}{20}
 \end{aligned}$$

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 \times Time]

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

Therefore, distance covered by the car is 303 km.

Q7.

Answer :

Area of the rectangular park = Length of the park \times Breadth of the park (\because Area of rectangle = Length \times Breadth)

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

Therefore, the area of the rectangular park is 610 m^2 .

Q8.

Answer :

Area of the square plot = Side \times Side = (Side)² = a² (Because the area of the square is a², where a is the side of the square)

$$\begin{aligned} &= 8\frac{1}{2} \times 8\frac{1}{2} \\ &= \left(8 + \frac{1}{2}\right) \times \left(8 + \frac{1}{2}\right) \\ &= \frac{17}{2} \times \frac{17}{2} \\ &= \frac{17 \times 17}{2 \times 2} \\ &= \frac{289}{4} \\ &= 72\frac{1}{4} \text{ m}^2 \end{aligned}$$

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

Q10.

Answer :

$$\begin{aligned} \text{Distance covered by the aeroplane in } 4\frac{1}{6} \text{ hours} &= 4\frac{1}{6} \times 1020 \\ &= \left(4 + \frac{1}{6}\right) \times 1020 \\ &= \frac{25}{6} \times 1020 \\ &= \frac{25}{6} \times \frac{1020}{1} \\ &= \frac{25 \times 1020}{6 \times 1} \\ &= \frac{25500}{6} \\ &= 4250 \text{ km} \end{aligned}$$

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

Q11.

Answer :

$$\begin{aligned} \text{Cost of one metre of cloth} &= 57\frac{3}{4} \div 3\frac{1}{2} \\ &= \left(57 + \frac{3}{4}\right) \div \left(3 + \frac{1}{2}\right) \\ &= \frac{231}{4} \div \frac{7}{2} \\ &= \frac{231}{4} \times \frac{2}{7} \\ &= \frac{231 \times 2}{4 \times 7} \\ &= \frac{462}{28} \\ &= 16\frac{14}{28} \\ &= \text{Rs } 16\frac{1}{2} \end{aligned}$$

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

Q12.

Answer :

$$\begin{aligned} \text{Length of each piece of the cord} &= 71\frac{1}{2} \div 26 \\ &= \left(71 + \frac{1}{2}\right) \div 26 \\ &= \frac{143}{2} \div 26 \\ &= \frac{143}{2} \div \frac{26}{1} \\ &= \frac{143}{2} \times \frac{1}{26} \\ &= \frac{143 \times 1}{2 \times 26} \\ &= \frac{143}{52} \\ &= \frac{9}{4} \\ &= 2\frac{3}{4} \text{ m} \end{aligned}$$

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

Q13.

Answer :

Area of a room = Length \times Breadth

Thus, we have:

$$65\frac{1}{4} = \text{Length} \times 5\frac{7}{16}$$

$$\text{Length} = 65\frac{1}{4} \div 5\frac{7}{16}$$

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

Hence, the length of the room is 12 metres.

Q14.

Answer :

Let the other fraction be x .

Now, we have:

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

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:

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

Hence, the total number of students is 640.

Now,

$$\begin{aligned} \text{Number of boys} &= \text{Total number of students} - \text{Number of girls} \\ &= 640 - 240 \\ &= 400 \end{aligned}$$

Q16.

Answer :

$$\text{Ratio of the read book} = \frac{7}{9}$$

$$\text{Ratio of the unread book} = 1 - \frac{7}{9}$$

$$= \frac{2}{9}$$

Let x be the total number of pages in the book.

Thus, we have:

$$\frac{2}{9} \times x = 40$$

$$\Rightarrow x = 40 \div \frac{2}{9}$$

$$= 40 \times \frac{9}{2}$$

$$= \frac{40}{1} \times \frac{9}{2}$$

$$= \frac{40 \times 9}{1 \times 2}$$

$$= \frac{360}{2}$$

$$= 180$$

Hence, the total number of pages in the book is 180.

Q17.

Answer :

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

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

$$= \frac{300}{3}$$

$$= 100$$

$$\begin{aligned} \therefore \text{Money left after spending on notebooks} &= 300 - 100 \\ &= 200 \end{aligned}$$

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

$$= \frac{200}{1} \times \frac{1}{4}$$

$$= \frac{200}{4}$$

$$= 50$$

$$\begin{aligned} \therefore \text{Amount of money left with Rita} &= 200 - 50 \\ &= \text{Rs } 150 \end{aligned}$$

Q18.

Answer :

$$\text{Total amount of money Amit earns} = \text{Rs } 16000$$

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

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

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

$$= \text{Rs } 4000$$

$$\begin{aligned} \therefore \text{Amount of money left after spending on food} &= 16000 - 4000 \\ &= \text{Rs } 12000 \end{aligned}$$

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

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

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

$$= \frac{36000}{10}$$

$$= \text{Rs } 3600$$

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

$$= \text{Rs } 8400$$

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

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

$$= \frac{42000}{21}$$

$$= \text{Rs } 2000$$

$$\therefore \text{Amount of money left} = 8400 - 2000$$

$$= \text{Rs } 6400$$

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

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

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

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

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

$$= \frac{105000}{5}$$

$$= 21000$$

Hence, the total number of spectators is 21,000