

Exercise 2.1

Q1. Compare the following fractions by using the symbol $>$ or $<$ or $=$;

(i) $\frac{7}{9}$ and $\frac{8}{13}$

(ii) $\frac{11}{9}$ and $\frac{5}{9}$

(iii) $\frac{37}{41}$ and $\frac{19}{30}$

(iv) $\frac{17}{15}$ and $\frac{119}{105}$

Solution:

(i) We have,

$$\frac{7}{9} \text{ and } \frac{8}{13}$$

Taking the LCM of 9 and 13, we get,

$$9 \times 13 = 117$$

Now, we convert the given fractions to equivalent fractions by making the denominators 117,

$$\frac{7 \times 13}{9 \times 13} \text{ and } \frac{8 \times 9}{13 \times 9} \quad \frac{91}{117} \text{ and } \frac{72}{117}$$

As we know, $91 > 72$

$$\text{Therefore, } \frac{91}{117} > \frac{72}{117}$$

$$\text{Hence, } \frac{7}{9} > \frac{8}{13}$$

(ii) We have, $\frac{11}{9}$ and $\frac{5}{9}$

The given fractions are equivalent fractions as the denominators are equal,

And we know that, $11 > 5$

$$\text{Therefore, } \frac{11}{9} > \frac{5}{9}$$

(iii) We have, $\frac{37}{41}$ and $\frac{19}{30}$

Taking the LCM of 41 and 30, we get,

$$41 \times 30 = 1230$$

Now, we convert the given fractions to equivalent fractions by making the denominators 1230,

$$\frac{37 \times 30}{41 \times 30} \text{ and } \frac{19 \times 41}{30 \times 41} \quad \frac{1110}{1230} \text{ and } \frac{779}{1230}$$

Now, we clearly know $1110 > 779$

$$\text{Therefore, } \frac{1110}{1230} > \frac{779}{1230}$$

$$\text{Hence, } \frac{37}{41} > \frac{19}{30}$$

(iv) $\frac{17}{15}$ and $\frac{119}{105}$

Taking the LCM of 15 and 105, we get,

$$5 \times 3 \times 7 = 105$$

Now, we convert the given fractions to equivalent fractions by making the denominators 105,

$$\begin{aligned} \frac{17 \times 7}{15 \times 7} \text{ and } \frac{119}{105} \\ = \frac{119}{105} \text{ and } \frac{119}{105} \end{aligned}$$

Now, we clearly know $119 = 119$

$$\text{Therefore, } \frac{119}{105} = \frac{119}{105}$$

$$\text{Hence, } \frac{17}{15} = \frac{119}{105}$$

Q2. Arrange the following fractions in ascending order:

(i) $\frac{3}{8}, \frac{5}{6}, \frac{6}{8}, \frac{2}{4}, \frac{1}{3}$

(ii) $\frac{4}{6}, \frac{3}{8}, \frac{6}{12}, \frac{5}{16}$

Solution:

(i) We have, $\frac{3}{8}, \frac{5}{6}, \frac{6}{8}, \frac{2}{4}, \frac{1}{3}$

Taking the LCM of 8, 6, 8, 4 and 3, we get,

$$2 \times 4 \times 3 = 24$$

Now, we convert the given fractions to equivalent fractions by making the denominators 24,

$$\frac{3 \times 3}{8 \times 3}, \frac{5 \times 4}{6 \times 4}, \frac{6 \times 3}{8 \times 3}, \frac{2 \times 6}{4 \times 6}, \frac{1 \times 8}{3 \times 8} \quad \frac{9}{24}, \frac{20}{24}, \frac{18}{24}, \frac{12}{24}, \frac{8}{24}$$

We know that, $8 < 9 < 12 < 18 < 20$

$$\text{Therefore, } \frac{8}{24} < \frac{9}{24} < \frac{12}{24} < \frac{18}{24} < \frac{20}{24}$$

$$\text{Hence, } \frac{1}{3} < \frac{3}{8} < \frac{2}{4} < \frac{6}{8} < \frac{5}{6}$$

(ii) We have, $\frac{4}{6}, \frac{3}{8}, \frac{6}{12}, \frac{5}{16}$

Taking the LCM of 6, 8, 12 and 16, we get,

$$2 \times 2 \times 2 \times 2 \times 3 = 48$$

Now, we convert the given fractions to equivalent fractions by making the denominators 48,

$$\frac{4 \times 8}{6 \times 8}, \frac{3 \times 6}{8 \times 6}, \frac{6 \times 2}{12 \times 2}, \frac{5 \times 3}{16 \times 3} \\ = \frac{32}{48}, \frac{18}{48}, \frac{12}{48}, \frac{15}{48}$$

We know that, $12 < 15 < 18 < 32$

Therefore,

$$\frac{12}{48} < \frac{15}{48} < \frac{18}{48} < \frac{32}{48},$$

$$\text{Hence, } \frac{6}{12} < \frac{5}{16} < \frac{3}{8} < \frac{4}{6}$$

Q3. Arrange the following fractions in descending order:

(i) $\frac{4}{5}, \frac{7}{10}, \frac{11}{15}, \frac{17}{20}$

(ii) $\frac{2}{7}, \frac{11}{35}, \frac{9}{14}, \frac{13}{28}$

Solution:

(i) We have, $\frac{4}{5}, \frac{7}{10}, \frac{11}{15}, \frac{17}{20}$

Taking the LCM of 5, 10, 15 and 20, we get,

$$5 \times 2 \times 2 \times 3 = 60$$

Now, we convert the given fractions to equivalent fractions by making the denominators 48

$$\frac{4 \times 12}{5 \times 12}, \frac{7 \times 6}{10 \times 6}, \frac{11 \times 4}{15 \times 4}, \frac{17 \times 3}{20 \times 3}$$

$$\frac{48}{60}, \frac{42}{60}, \frac{44}{60}, \frac{51}{60}$$

As we know $51 > 48 > 44 > 42$

Therefore, $\frac{51}{60} > \frac{48}{60} > \frac{44}{60} > \frac{42}{60}$

Hence, $\frac{17}{20} > \frac{4}{5} > \frac{11}{15} > \frac{7}{10}$

(ii) $\frac{2}{7}, \frac{11}{35}, \frac{9}{14}, \frac{13}{28}$

Taking the LCM of 7, 35, 14 and 28, we get,

$$7 \times 5 \times 2 \times 2 = 140$$

Now, we convert the given fractions to equivalent fractions by making the denominators 140

$$\frac{2 \times 20}{7 \times 20}, \frac{11 \times 4}{35 \times 4}, \frac{9 \times 10}{14 \times 10}, \frac{13 \times 5}{28 \times 5}$$

$$\frac{40}{140}, \frac{44}{140}, \frac{90}{140}, \frac{65}{140}$$

As we know $40 > 44 > 65 > 90$

Therefore, $\frac{90}{140} > \frac{65}{140} > \frac{44}{140} > \frac{40}{140}$

Hence, $\frac{9}{14} > \frac{13}{28} > \frac{11}{35} > \frac{2}{7}$

Q4. Write the equivalent fractions of $\frac{3}{5}$

Solution:

Multiplying or dividing both the numerator and denominator by the same number, so that the fraction keeps its value.

So the equivalent fractions of $\frac{3}{5}$ are

$$\frac{3 \times 2}{5 \times 2}, \frac{3 \times 3}{5 \times 3}, \frac{3 \times 4}{5 \times 4}, \frac{3 \times 5}{5 \times 5}, \frac{3 \times 6}{5 \times 6}$$

$$\frac{6}{10}, \frac{9}{15}, \frac{12}{20}, \frac{15}{25}, \frac{18}{30}$$

are the five equivalent fractions of $\frac{3}{5}$

Q5. Find the sum:

(i) $\frac{5}{8} + \frac{3}{10}$

(ii) $4\frac{3}{4} + 9\frac{2}{5}$

(iii) $\frac{5}{6} + 3 + \frac{3}{4}$

(iv) $2\frac{3}{5} + 4\frac{7}{10} + 2\frac{4}{15}$

Solution:

(i) We have, $\frac{5}{8} + \frac{3}{10}$

Taking the LCM of 8 and 10, we get,

$$2 \times 4 \times 5 = 40$$

Now, we convert the given fractions to equivalent fractions by making the denominators 40

$$\frac{5 \times 5}{8 \times 5} + \frac{3 \times 4}{10 \times 4}$$

$$\frac{25}{40} + \frac{12}{40}$$

$$\frac{25+12}{40}$$

$$\frac{37}{40}$$

(ii) We have, $4\frac{3}{4} + 9\frac{2}{5}$

$$= \frac{19}{4} + \frac{47}{5}$$

Taking out the LCM of 4 and 5, we get,

$$4 \times 5 = 20$$

Now, we convert the given fractions to equivalent fractions by making the denominators 20

$$= \frac{19 \times 5}{4 \times 5} + \frac{47 \times 4}{5 \times 4}$$

$$= \frac{95}{20} + \frac{188}{20}$$

$$= \frac{95+188}{20}$$

$$= \frac{283}{20}$$

(iii) We have, $\frac{5}{6} + 3 + \frac{3}{4}$

Taking out the LCM of 6 and 4, we get,

$$2 \times 2 \times 3 = 12$$

Now, we convert the given fractions to equivalent fractions by making the denominators 12

$$= \frac{5 \times 2}{6 \times 2} + \frac{3 \times 12}{12} + \frac{3 \times 3}{4 \times 3}$$

$$= \frac{10}{12} + \frac{36}{12} + \frac{9}{12}$$

$$= \frac{10+36+9}{12} = \frac{55}{12}$$

(iv) We have, $2\frac{3}{5} + 4\frac{7}{10} + 2\frac{4}{15}$

$$= \frac{13}{5} + \frac{47}{10} + \frac{34}{15}$$

Taking out the LCM of 5, 10 and 15, we get,

$$5 \times 2 \times 3 = 30$$

Now, we convert the given fractions to equivalent fractions by making the denominators 30

$$\frac{78}{30} + \frac{141}{30} + \frac{68}{30}$$

$$= \frac{287}{30}$$

Q6. Find the difference of

(i) $\frac{13}{24}$ and $\frac{7}{16}$

(ii) 6 and $\frac{23}{3}$

(iii) $\frac{21}{25}$ and $\frac{18}{20}$

(iv) $3\frac{3}{10}$ and $2\frac{7}{15}$

Solution:

(i) We have, $\frac{13}{24}$ and $\frac{7}{16}$

Taking out the LCM of 24 and 16, we get,

$$2 \times 2 \times 2 \times 2 \times 3 = 48$$

Now, we convert the given fractions to equivalent fractions by making the denominators 48

$$\frac{26}{48} - \frac{21}{48}$$

$$= \frac{26-21}{48}$$

$$= \frac{5}{48}$$

(ii) We have, 6 and $\frac{23}{3}$

The difference between 6 and $\frac{23}{3}$

$$= \frac{23}{3} - \frac{18}{3}$$

$$=$$

$$\frac{23-18}{3}$$

$$= \frac{5}{3}$$

(iii) We have, $\frac{21}{25}$ and $\frac{18}{20}$

Taking out the LCM of 25 and 20, we get,

$$5 \times 5 \times 4 = 100$$

Now, we convert the given fractions to equivalent fractions by making the denominators 100

$$\frac{21 \times 4}{25 \times 4} \text{ and } \frac{18 \times 5}{20 \times 5}$$

$$= \frac{84}{100} \text{ and } \frac{90}{100}$$

The difference between both the fractions are

$$= \frac{90 - 84}{100}$$

$$= \frac{6}{100}$$

$$= \frac{3}{50}$$

(iv) We have, $3\frac{3}{10}$ and $2\frac{7}{15}$

$$= \frac{33}{10} \text{ and } \frac{37}{15}$$

Taking out the LCM of 10 and 15, we get,

$$2 \times 3 \times 5 = 30$$

Now, we convert the given fractions to equivalent fractions by making the denominators 30

$$= \frac{33 \times 3}{10 \times 3} \text{ and } \frac{37 \times 2}{15 \times 2}$$

$$= \frac{99}{30} \text{ and } \frac{74}{30}$$

The difference between both the fractions are

$$= \frac{99 - 74}{30}$$

$$= \frac{25}{30}$$

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

Q7. Find the difference:

(i) $\frac{6}{7} - \frac{9}{11}$

(ii) $8 - \frac{5}{9}$

(iii) $9 - 5\frac{2}{3}$

(iv) $4\frac{3}{10} - 1\frac{2}{15}$

Solution:

(i) We have, $\frac{6}{7} - \frac{9}{11}$

Taking out the LCM of 7 and 11, we get,

$$7 \times 11 = 77$$

Now, we convert the given fractions to equivalent fractions by making the denominators 77

$$= \frac{6 \times 11}{7 \times 11} \text{ and } \frac{9 \times 7}{11 \times 7}$$

$$= \frac{66}{77} \text{ and } \frac{63}{77}$$

The difference between both the fractions are

$$= \frac{66-63}{77}$$

$$= \frac{3}{77}$$

(ii) We have, $8 - \frac{5}{9}$

=

$$\frac{8 \times 9 - 5}{9}$$

$$= \frac{72-5}{9}$$

$$= \frac{67}{9}$$

(iii) We have, $9 - 5\frac{2}{3}$

=

$$9 - \frac{17}{3}$$

$$= \frac{9 \times 3 - 17}{3}$$

$$= \frac{27 - 17}{3}$$

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

(iv) We have, $4\frac{3}{10} - 1\frac{2}{15}$

$$= \frac{43}{10} - \frac{17}{15}$$

Taking out the LCM of 10 and 15, we get,

$$2 \times 3 \times 5 = 30$$

Now, we convert the given fractions to equivalent fractions by making the denominators 30

=

$$\frac{43 \times 3}{10 \times 3} - \frac{17 \times 2}{15 \times 2}$$

$$= \frac{129}{30} - \frac{34}{30}$$

$$= \frac{129 - 34}{30}$$

$$= \frac{95}{30}$$

$$= \frac{19}{6}$$

Q8. Simplify:

(i) $\frac{2}{3} + \frac{1}{6} - \frac{2}{9}$

(ii) $12 - 3\frac{1}{2}$

(iii) $7\frac{5}{6} - 4\frac{3}{8} + 2\frac{7}{12}$

Solution:

(i) We have, $\frac{2}{3} + \frac{1}{6} - \frac{2}{9}$

Taking out the LCM of 3, 6 and 9, we get,

$$3 \times 3 \times 2 = 18$$

Now, we convert the given fractions to equivalent fractions by making the denominators 18, we get,

=

$$\frac{12}{18} + \frac{3}{18} - \frac{4}{18}$$

$$= \frac{12 + 3 - 4}{18}$$

$$= \frac{11}{18}$$

(ii) We have, $12 - 3\frac{1}{2}$

=

$$\begin{aligned} & 12 - \frac{7}{2} \\ &= \frac{12 \times 2 - 7}{2} \\ &= \frac{24 - 7}{2} \\ &= \frac{17}{2} \end{aligned}$$

(iii) We have, $7\frac{5}{6} - 4\frac{3}{8} + 2\frac{7}{12}$

=

$$\frac{47}{6} - \frac{35}{8} + \frac{31}{12}$$

Taking out the LCM of 6, 8 and 12, we get,

$$2 \times 2 \times 2 \times 3 = 48$$

Now, we convert the given fractions to equivalent fractions by making the denominators 48, we get,

$$\begin{aligned} & \frac{47 \times 8}{6 \times 8} - \frac{35 \times 6}{8 \times 6} + \frac{31 \times 4}{12 \times 4} \\ &= \frac{376}{48} - \frac{210}{48} + \frac{124}{48} \\ &= \frac{376 - 210 + 124}{48} \\ &= \frac{290}{48} \\ &= \frac{145}{24} \end{aligned}$$

Q9. What should be added to $5\frac{3}{7}$ to get 12?

Solution:

$$\text{We have, } 5\frac{3}{7} = \frac{38}{7}$$

Let x be the number added to $\frac{38}{7}$ to get 12

Therefore,

$$\begin{aligned} x + \frac{38}{7} &= 12 \\ \Rightarrow x &= 12 - \frac{38}{7} \\ \Rightarrow x &= \frac{12 \times 7 - 38}{7} \\ \Rightarrow x &= \frac{84 - 38}{7} \\ \Rightarrow x &= \frac{46}{7} \end{aligned}$$

Q10. What should be added to $5\frac{4}{15}$ to get $12\frac{3}{5}$?

Solution:

$$5\frac{4}{15} = \frac{79}{15}$$

$$12\frac{3}{5} = \frac{63}{5}$$

Let x be the number added to $\frac{79}{15}$ to get $\frac{63}{5}$

=

$$\frac{79}{15} + x = \frac{63}{5}$$

$$\Rightarrow x = \frac{63}{5} - \frac{79}{15}$$

Taking out the LCM of 5 and 15, we get,

$$3 \times 5 = 15$$

Now, we convert the given fractions to equivalent fractions by making the denominators 15, we get,

$$\Rightarrow x = \frac{63 \times 3}{5 \times 3} - \frac{79}{15}$$

$$\Rightarrow x = \frac{189}{15} - \frac{79}{15}$$

$$\Rightarrow x = \frac{189-79}{15}$$

$$\Rightarrow x = \frac{110}{15}$$

$$\Rightarrow x = \frac{22}{3}$$

Q11. Suman studies for $5\frac{2}{3}$ hours daily. She devotes $2\frac{4}{5}$ hours of her time for science and mathematics . How much time does she devote for other subjects?

Solution:

Given,

Suman studies for $5\frac{2}{3}$ i.e, $\frac{17}{3}$ hours daily.

She devotes $2\frac{4}{5}$ i.e, $\frac{14}{5}$ hours of her time for science and mathematics.

Let x be time she devotes for other subjects.

$$\frac{17}{3} = x + \frac{14}{5}$$

$$\Rightarrow x = \frac{17}{3} - \frac{14}{5}$$

Taking out the LCM of 3 and 5, we get,

$$3 \times 5 = 15$$

Now, we convert the given fractions to equivalent fractions by making the denominators 15, we get,

$$\Rightarrow x = \frac{17 \times 5}{3 \times 5} - \frac{14 \times 3}{5 \times 3}$$

$$\Rightarrow x = \frac{85}{15} - \frac{42}{15}$$

$$\Rightarrow x = \frac{85-42}{15} \text{ hours}$$

$$\Rightarrow x = \frac{43}{15} \text{ hours}$$

$$\Rightarrow x = 2\frac{13}{15} \text{ hours}$$

Q12. A piece of wire of length $12\frac{3}{4}$ m . If it is cut into two pieces in such a way that the length of one piece is $5\frac{1}{4}$ m, what is the length of the other piece?

Solution:

Given,

A piece of wire of length $12\frac{3}{4}$ m, one piece is $5\frac{1}{4}$ m

$$12\frac{3}{4} = \frac{51}{4}$$

$$\text{And } 5\frac{1}{4} = \frac{21}{4}$$

Let the length of other piece be x m.

$$\frac{51}{4} = x + \frac{21}{4}$$

$$\Rightarrow x = \frac{51}{4} - \frac{21}{4}$$

$$\Rightarrow x = \frac{51-21}{4}$$

$$\Rightarrow x = \frac{30}{4}$$

$$\Rightarrow x = \frac{15}{2}$$

$$\Rightarrow x = 7\frac{1}{2}$$

Q13. A rectangular piece of paper is $12\frac{1}{2}$ cm long and $10\frac{2}{3}$ cm wide. Find its perimeter?

Solution:

Given,

A rectangular piece of paper is $12\frac{1}{2}$ cm long and $10\frac{2}{3}$ cm wide

$$12\frac{1}{2} = \frac{25}{2}$$

$$\text{And } 10\frac{2}{3} = \frac{32}{3}$$

Perimeter = 2 (length + width)

$$\text{Perimeter} = 2 \left(\frac{25}{2} \text{ cm} + \frac{32}{3} \text{ cm} \right)$$

$$\text{Perimeter} = 2 \left(\frac{75}{6} + \frac{64}{6} \right) \text{ cm}$$

$$\text{Perimeter} = 2 \left(\frac{139}{6} \right) \text{ cm}$$

$$\text{Perimeter} = \frac{139}{3}$$

$$\text{Perimeter} = 46\frac{1}{3}$$

Q14. In a “magic square”, the sum of numbers in each row, in each column and along the diagonal is same. Is this a “magic square”?

$\frac{4}{11}$	$\frac{9}{11}$	$\frac{2}{11}$
$\frac{3}{11}$	$\frac{5}{11}$	$\frac{7}{11}$
$\frac{8}{11}$	$\frac{1}{11}$	$\frac{6}{11}$

Solution:

Given,

$\frac{4}{11}$	$\frac{9}{11}$	$\frac{2}{11}$
$\frac{3}{11}$	$\frac{5}{11}$	$\frac{7}{11}$
$\frac{8}{11}$	$\frac{1}{11}$	$\frac{6}{11}$

$$\text{Along the 1}^{\text{st}} \text{ column} = \frac{4}{11} + \frac{3}{11} + \frac{8}{11} = \frac{15}{11}$$

$$\text{Along the 2}^{\text{nd}} \text{ column} = \frac{9}{11} + \frac{5}{11} + \frac{1}{11} = \frac{15}{11}$$

$$\text{Along the 3}^{\text{rd}} \text{ column} = \frac{2}{11} + \frac{7}{11} + \frac{6}{11} = \frac{15}{11}$$

$$\text{Along the 1}^{\text{st}} \text{ row} = \frac{4}{11} + \frac{9}{11} + \frac{2}{11} = \frac{15}{11}$$

$$\text{Along the 2}^{\text{nd}} \text{ row} = \frac{3}{11} + \frac{5}{11} + \frac{7}{11} = \frac{15}{11}$$

$$\text{Along the 3}^{\text{rd}} \text{ row} = \frac{8}{11} + \frac{1}{11} + \frac{6}{11} = \frac{15}{11}$$

$$\text{Diagonally} = \frac{4}{11} + \frac{5}{11} + \frac{6}{11} = \frac{15}{11}$$

$$\text{And, } \frac{2}{11} + \frac{5}{11} + \frac{8}{11} = \frac{15}{11}$$

Therefore, the sum of numbers in each row, in each column and along the diagonal is same and the sum is $\frac{15}{11}$

Q15. The cost of Mathematics book is Rs $25\frac{3}{4}$ and that of science book is $20\frac{1}{2}$. Which costs more and by how much?

Solution:

Given,

The cost of mathematics book is Rs $25\frac{3}{4}$ and that of science book is $20\frac{1}{2}$.

We need to compare the cost of mathematics and science book,

$$25\frac{3}{4} = \frac{103}{4},$$

$$\text{And } 20\frac{1}{2} = \frac{41}{2}$$

Taking out the LCM of 4 and 2, we get,

$$2 \times 2 = 4$$

Now, we convert the given fractions to equivalent fractions by making the denominators 4, we get

$$\frac{103}{4}$$

$$\text{And, } \frac{41 \times 2}{2 \times 2} = \frac{82}{4}$$

As we know, $103 > 82$

$$\text{Therefore, } \frac{103}{4} > \frac{82}{4}$$

Hence, the cost of mathematics book is more than that of the cost of the science book.

Q16. Provide the number in the box \square and also give its simplest form in each of the following:

$$(i) \frac{2}{3} \times \square = \frac{10}{30}$$

$$(ii) \frac{3}{5} \times \square = \frac{24}{75}$$

Solution:

$$(i) \text{ Given, } \frac{2}{3} \times \square = \frac{10}{30}$$

$$= \frac{5}{10} \text{ is the answer}$$

$$(ii) \frac{3}{5} \times \square = \frac{24}{75}$$

$$= \frac{8}{15}$$

Exercise 2.2

Q1. Multiply

$$\frac{7}{11} \text{ by } \frac{3}{5}$$

$$\frac{3}{5} \text{ by } 25$$

$$3\frac{4}{15} \text{ by } 24$$

$$3\frac{1}{8} \text{ by } 4\frac{10}{11}$$

Solution:

$$\text{We have, } \frac{7}{11} \text{ by } \frac{3}{5}$$

=

$$\frac{7}{11} \times \frac{3}{5}$$

$$= \frac{21}{55}$$

$$\text{(ii) We have, } \frac{3}{5} \text{ by } 25$$

=

$$\frac{3}{5} \times 25$$

$$= 15$$

$$\text{(iii) We have, } 3\frac{4}{15} \text{ by } 24$$

=

$$3\frac{4}{15} \times 24$$

$$= \frac{49}{15} \times 24$$

$$= \frac{1176}{15}$$

$$= 78\frac{2}{5}$$

$$\text{(iv) We have, } 3\frac{1}{8} \text{ by } 4\frac{10}{11}$$

=

$$3\frac{1}{8} \text{ by } 4\frac{10}{11}$$

$$= \frac{25}{8} \times \frac{54}{11}$$

$$= \frac{25 \times 54}{88}$$

$$= 15\frac{15}{44}$$

Q2. Find the product:

$$\frac{4}{7} \times \frac{14}{25}$$

$$7\frac{1}{2} \times 2\frac{4}{15}$$

$$3\frac{6}{7} \times 4\frac{2}{3}$$

$$6\frac{11}{14} \times 3\frac{1}{2}$$

Solution:

We have,

$$\frac{4}{7} \times \frac{14}{25}$$

$$= \frac{4 \times 14}{7 \times 25}$$

$$= \frac{56}{175}$$

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

We have,

$$7\frac{1}{2} \times 2\frac{4}{15}$$

$$= \frac{15}{2} \times \frac{34}{15}$$

$$= \frac{15 \times 34}{2 \times 15}$$

$$= \frac{510}{30}$$

$$= 17$$

We have,

$$3\frac{6}{7} \times 4\frac{2}{3}$$

$$= \frac{27}{7} \times \frac{14}{3}$$

$$= 3 \times \frac{14}{3}$$

$$= 14$$

We have,

$$6\frac{11}{14} \times 3\frac{1}{2}$$

$$= \frac{95}{14} \times \frac{7}{2}$$

$$= \frac{95 \times 7}{28}$$

$$= \frac{665}{28}$$

$$= 23\frac{3}{4}$$

Q3. Simplify:

$$\frac{12}{25} \times \frac{15}{28} \times \frac{35}{36}$$

$$\frac{10}{27} \times \frac{39}{56} \times \frac{28}{65}$$

$$2\frac{2}{17} \times 7\frac{2}{9} \times 1\frac{33}{52}$$

Solution:

We have,

$$\frac{12}{25} \times \frac{15}{28} \times \frac{35}{36}$$

$$= \frac{12 \times 15 \times 35}{25 \times 28 \times 36}$$

$$= \frac{6300}{25200}$$

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

$$\frac{10}{27} \times \frac{39}{56} \times \frac{28}{65}$$

$$= \frac{10 \times 39 \times 28}{27 \times 56 \times 65}$$

$$= \frac{10920}{98280}$$

$$= \frac{1}{9}$$

We have,

$$2\frac{2}{17} \times 7\frac{2}{9} \times 1\frac{33}{52}$$

$$= \frac{36}{17} \times \frac{65}{9} \times \frac{85}{52}$$

$$= \frac{36 \times 65 \times 85}{17 \times 9 \times 52}$$

$$= \frac{198900}{7956}$$

$$= 25$$

Q4. Find:

$$\frac{1}{2} \text{ of } 4\frac{2}{9}$$

$$\frac{5}{8} \text{ of } 9\frac{2}{3}$$

$$\frac{2}{3} \text{ of } \frac{9}{16}$$

Solution:

We have,

$$\frac{1}{2} \text{ of } 4\frac{2}{9}$$

$$= \frac{1}{2} \times \frac{38}{9}$$

$$= \frac{38}{18}$$

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

$$\frac{5}{8} \text{ of } 9\frac{2}{3}$$

$$= \frac{5}{8} \times \frac{29}{3}$$

$$= \frac{5 \times 29}{8 \times 3}$$

$$= \frac{145}{24}$$

$$= 6\frac{1}{24}$$

We have,

$$\frac{2}{3} \text{ of } \frac{9}{16}$$

$$= \frac{2}{3} \times \frac{9}{16}$$

$$= \frac{2 \times 9}{3 \times 16}$$

$$= \frac{18}{48}$$

$$= \frac{3}{8}$$

Q5. Which is greater ? $\frac{1}{2}$ of $\frac{6}{7}$ or $\frac{2}{3}$ of $\frac{3}{7}$.

Solution:

Given,

$$\frac{1}{2} \text{ of } \frac{6}{7} \text{ or } \frac{2}{3} \text{ of } \frac{3}{7}$$

$$= \frac{1}{2} \times \frac{6}{7} \text{ or } \frac{2}{3} \times \frac{3}{7}$$

$$= \frac{1 \times 6}{2 \times 7} \times \frac{2 \times 3}{3 \times 7}$$

$$= \frac{6}{14} \text{ or } \frac{6}{21}$$

While comparing two fractions, when the numerators of both the fractions are same, then the denominator having higher value shows the fraction has lower value.

So, $\frac{6}{14}$ is greater.

Therefore, $\frac{1}{2}$ of $\frac{6}{7}$ is greater.

Q6. Find,

$$\frac{7}{11} \text{ of } 330$$

$$\frac{5}{9} \text{ of } 108 \text{ meters}$$

$$\frac{3}{7} \text{ of } 42 \text{ litres}$$

$$\frac{1}{12} \text{ of an hour}$$

$$\frac{5}{6} \text{ of an year}$$

$$\frac{3}{20} \text{ of a Kg}$$

$$\frac{7}{20} \text{ of a litres}$$

$$\frac{5}{6} \text{ of a day}$$

$$\frac{2}{7} \text{ of a week}$$

Solution:

We have,

$$\frac{7}{11} \text{ of } 330$$

$$= \frac{7}{11} \times 330$$

$$= 7 \times 30$$

$$= 210$$

We have,

$$\frac{5}{9} \text{ of } 108 \text{ meters}$$

$$= \frac{5}{9} \times 108 \text{ meters}$$

$$= 5 \times 12 \text{ meters}$$

$$= 60 \text{ meters}$$

We have,

$$\frac{3}{7} \text{ of } 42 \text{ litres}$$

$$= \frac{3}{7} \times 42 \text{ litres}$$

$$= 3 \times 6 \text{ litres}$$

$$= 18 \text{ litres}$$

We have, $\frac{1}{12}$ of an hour

An hour = 60 minutes

Therefore,

$$\frac{1}{12} \times 60 \text{ minutes}$$

$$= 5 \text{ minutes}$$

(v) We have, $\frac{5}{6}$ of an year

1 Year = 12 months

Therefore,

$$\frac{5}{6} \times 12 \text{ months}$$

$$= 5 \times 2 \text{ months}$$

$$= 10 \text{ months}$$

(vi) We have, $\frac{3}{20}$

1 Kg = 1000 gms

Therefore,

$$\frac{3}{20} \times 1000 \text{ gms}$$

$$= 3 \times 50 \text{ gms}$$

$$= 150 \text{ gms}$$

(vii) We have, $\frac{7}{20}$ of a litre

1 litre = 1000 ml

Therefore,

$$\frac{7}{20} \times 1000 \text{ ml}$$

$$= 7 \times 50 \text{ ml}$$

$$= 350 \text{ ml}$$

(viii) We have, $\frac{5}{6}$ of a day

1 day = 24 hours

Therefore,

$$\frac{5}{6} \times 24 \text{ hours}$$

$$= 5 \times 4 \text{ hours}$$

$$= 20 \text{ hours}$$

(ix) We have, $\frac{2}{7}$ of a week

1 week = 7 days

Therefore,

$$\frac{2}{7} \times 7 \text{ days}$$

$$= 2 \text{ days}$$

Q7. Shikha plans 5 saplings in a row in her garden. The distance between two adjacent saplings is $\frac{3}{4}$ m. Find the distance between first and last sapling.

Solution:

There are 4 adjacent spacing for 5 saplings.

Given, the distance between two adjacent saplings is $\frac{3}{4}$ m.

$$4 \text{ adjacent spacing for 5 saplings} = \frac{3}{4} \times 4 = 3 \text{ m}$$

Therefore, the distance between first and last sapling is 3 m.

Q8. Ravish reads $\frac{1}{3}$ part of a book in one hour. How much part of the book will he read in $2\frac{1}{5}$ hours?

Solution:

Let x be the full part of book.

Given, Ravish reads $\frac{1}{3}$ part of a book in one hour

$$1 \text{ hour} = \frac{1}{3} x$$

Part of the book will he read in $2\frac{1}{5}$ hours

$$2\frac{1}{5} = \frac{11}{5} \text{ hours} = \frac{1}{3} \times x \times \frac{11}{5}$$

$$\frac{11}{15} x = \frac{11}{15} \text{ part of book}$$

Q9. Lipika reads a book for $1\frac{3}{4}$ hours every day. She reads the entire book in 6 days. How many hours in all were required by her to read the book?

Solution:

Given,

$$\text{Time taken by Lipika to read a book per day} = 1\frac{3}{4} = \frac{7}{4} \text{ hours}$$

$$\text{Time taken by Lipika to read a book for 6 days} = \frac{7}{4} \times 6 = \frac{42}{4} = 10\frac{1}{2} \text{ hours.}$$

Q10. Find the area of a rectangular park which is $41\frac{2}{3}$ m long and $18\frac{3}{5}$ m broad.

Solution:

Given,

$$41\frac{2}{3} \text{ m} = \frac{125}{3} \text{ m}$$

$$\text{And, } 18\frac{3}{5} \text{ m} = \frac{93}{5} \text{ m}$$

Area of a rectangular park = (length \times breadth) =

$$\left(\frac{125}{3} \text{ m} \times \frac{93}{5} \text{ m}\right)$$

$$= \left(\frac{125 \times 93}{15}\right) \text{ m}^2$$

$$= \left(\frac{11625}{15}\right) \text{ m}^2$$

$$= 775 \text{ m}^2$$

Q11. If milk is available at Rs $17\frac{3}{4}$ per litre, find the cost of $7\frac{2}{5}$ litres of milk.

Solution:

Given,

$$Rs 17\frac{3}{4} = Rs \frac{71}{4}$$

$$And, 7\frac{2}{5} \text{ litres} = \frac{37}{5} \text{ litres}$$

$$\text{The cost of milk per litre} = Rs \frac{71}{4}$$

$$\text{The cost of milk per } \frac{37}{5} \text{ litres} = Rs$$

$$\frac{37}{5} \times \frac{71}{4}$$

$$= Rs \frac{2327}{20}$$

$$= Rs 131\frac{7}{20}$$

Q12. Sharda can walk $8\frac{1}{3}$ km in one hour. How much distance will she cover in $2\frac{2}{5}$ hours.

Solution:

Given,

$$8\frac{1}{3} \text{ km} = \frac{25}{3} \text{ km}$$

$$2\frac{2}{5} \text{ hours} = \frac{12}{5} \text{ hours}$$

$$\text{Distance covered by Sharda in one hour} = \frac{25}{3} \text{ km}$$

$$\text{Distance covered by Sharda in } \frac{12}{5} \text{ hours} = 2\frac{2}{5} \times \frac{25}{3} = 20 \text{ km}$$

Q13. A sugar bag contains 30 kg of sugar. After consuming $\frac{2}{3}$ of it, how much sugar is left in the bag

Solution:

Given, A sugar bag contains 30 kg of sugar.

After consuming $\frac{2}{3}$ of it, the amount of sugar left in the bag =

$$30 \text{ kg} - \frac{2}{3} \times 30 \text{ kg}$$

$$= 30 \text{ kg} - 20 \text{ kg}$$

$$= 10 \text{ kg}$$

Q14. Each side of a square is $6\frac{2}{3}$ m long. Find its area.

Solution:

Given,

$$\text{Each side} = 6\frac{2}{3}m = \frac{20}{3}m$$

$$\begin{aligned}\text{Area} &= \text{side}^2 = \left(\frac{20}{3}\right)^2 m^2 = \\ &\frac{400}{9} m^2\end{aligned}$$

$$= 44\frac{4}{9} m^2$$

Q15. There are 45 students in a class and $\frac{3}{5}$ of them are boys. How many girls are there in the class?

Solution:

Given,

There are 45 students in a class,

And $\frac{3}{5}$ of them are boys.

$$\text{Therefore, no of girls in the class} = 45 - \frac{3}{5} \times 45$$

$$= 45 - 27$$

$$= 18$$

Exercise 2.3

Q1. Find the reciprocal of each of the following fractions and classify them as proper, improper and whole numbers

(i) $\frac{3}{7}$

(ii) $\frac{5}{8}$

(iii) $\frac{9}{7}$

(iv) $\frac{6}{5}$

(v) $\frac{12}{7}$

(vi) $\frac{1}{8}$

Solution:

(i) $\frac{3}{7}$

$\frac{7}{3}$ = improper number

(ii) $\frac{5}{8}$

$\frac{8}{5}$ = improper number

(iii) $\frac{9}{7}$

$\frac{7}{9}$ = proper number

(iv) $\frac{6}{5}$

$\frac{5}{6}$ = proper number

(v) $\frac{12}{7}$

$\frac{7}{12}$ = proper number

(vi) $\frac{1}{8}$

8 = whole number

Q2. Divide:

(i) $\frac{3}{8}$ by $\frac{5}{9}$

(ii) $3\frac{1}{4}$ by $\frac{2}{3}$

(iii) $\frac{7}{8}$ by $4\frac{1}{2}$

(iv) $6\frac{1}{4}$ by $2\frac{3}{5}$

Solution:

(i) $\frac{3}{8}$ by $\frac{5}{9}$

=

$$\frac{\frac{3}{8}}{\frac{5}{9}}$$

$$= \frac{3 \times 9}{8 \times 5}$$

$$= \frac{27}{40}$$

(ii) $3\frac{1}{4}$ by $\frac{2}{3}$

=

$$\frac{3\frac{1}{4}}{\frac{2}{3}}$$

$$= \frac{\frac{13}{4}}{\frac{2}{3}}$$

$$= \frac{13 \times 3}{4 \times 2}$$

$$= \frac{39}{8}$$

$$= 4\frac{7}{8}$$

(iii) $\frac{7}{8}$ by $4\frac{1}{2}$

=

$$\frac{\frac{7}{8}}{4\frac{1}{2}}$$

$$= \frac{7 \times 2}{9 \times 8}$$

$$= \frac{14}{72}$$

$$= \frac{7}{36}$$

$$(iv) 6\frac{1}{4} \text{ by } 2\frac{3}{5}$$

=

$$\frac{6\frac{1}{4}}{2\frac{3}{5}}$$

$$= \frac{\frac{25}{4}}{\frac{13}{5}}$$

$$= \frac{25 \times 5}{4 \times 13}$$

$$= \frac{75}{52}$$

$$= 2\frac{21}{52}$$

Q3. Divide:

$$(i) \frac{3}{8} \text{ by } 4$$

$$(ii) \frac{9}{16} \text{ by } 6$$

$$(iii) 9 \text{ by } \frac{3}{16}$$

$$(iv) 10 \text{ by } \frac{100}{3}$$

Solution:

$$(i) \frac{3}{8} \text{ by } 4$$

=

$$\frac{\frac{3}{8}}{4}$$

$$= \frac{3}{8 \times 4}$$

$$= \frac{3}{32}$$

$$(ii) \frac{9}{16} \text{ by } 6$$

=

$$\frac{\frac{9}{16}}{6}$$

$$= \frac{9}{16 \times 6}$$

$$= \frac{9}{96}$$

$$= \frac{3}{32}$$

$$\text{(iii) } 9 \text{ by } \frac{3}{16}$$

=

$$\frac{\frac{9}{3}}{\frac{16}{16}}$$

$$= \frac{9 \times 16}{3}$$

$$= 3 \times 16$$

$$= 48$$

$$\text{(iv) } 10 \text{ by } \frac{100}{3}$$

=

$$\frac{\frac{10}{100}}{\frac{3}{3}}$$

$$= \frac{10 \times 3}{100}$$

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

Q4. Simplify:

$$\text{(i) } \frac{3}{10} \div \frac{10}{3}$$

$$\text{(ii) } 4\frac{3}{5} \div \frac{4}{5}$$

$$\text{(iii) } 5\frac{4}{7} \div 1\frac{3}{10}$$

(iv)

$$4 \div 2\frac{2}{5}$$

Solution:

(i)

$$\frac{3}{10} \div \frac{10}{3}$$

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

$$= \frac{9}{100}$$

(ii)

$$4\frac{3}{5} \div \frac{4}{5}$$

$$= \frac{23}{5} \div \frac{4}{5}$$

$$= \frac{23 \times 5}{5 \times 4}$$

$$= \frac{23}{4}$$

$$= 5\frac{3}{4}$$

(iii)

$$5\frac{4}{7} \div 1\frac{3}{10}$$

$$= \frac{39}{7} \div \frac{13}{10}$$

$$= \frac{39 \times 10}{7 \times 13}$$

$$= \frac{390}{91}$$

$$= 4\frac{2}{7}$$

(iv)

$$4 \div 2\frac{2}{5}$$

$$= 4 \div \frac{12}{5}$$

$$= \frac{4}{\frac{12}{5}}$$

$$= \frac{20}{12}$$

$$= 1\frac{2}{3}$$

Q5. A wire of length $12\frac{1}{2}$ m is cut into 10 pieces of equal length . Find the length of each piece.

Solution:

$$\text{Given, } 12\frac{1}{2}m = \frac{25}{2}m$$

$$10 \text{ pieces of wire} = \frac{25}{2}m$$

1 piece of wire =

$$\frac{\frac{25}{2}}{10}$$

$$= \frac{25}{20}$$

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

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

Q6. The length of a rectangular plot of area $65\frac{1}{3}m^2$ is $12\frac{1}{4}m$. What is the width of the plot?

Solution:

Given,

The length of a rectangular plot of area $65\frac{1}{3}m^2$ is $12\frac{1}{4}m$.

$$\text{Area} = 65\frac{1}{3} m^2 = \frac{196}{3} m^2$$

$$\text{Length} = 12\frac{1}{4} m$$

Now, Area = length x breadth

$$\therefore \frac{196}{3} m^2 = \frac{49}{4} m \times \text{breadth}$$

$$\text{Breadth} = \frac{4}{49} m \times \frac{196}{3} m^2$$

$$\text{Breadth} = \frac{196 \times 4}{49 \times 3}$$

$$\text{Breadth} = \frac{184}{147}$$

$$\text{Breadth} = 5\frac{3}{4}$$

Q7. By what number $6\frac{2}{9}$ be multiplied to get

$4\frac{4}{9}$?

Solution:

Given,

$$6\frac{2}{9} = \frac{56}{9},$$

$$\text{And, } 4\frac{4}{9} = \frac{40}{9}$$

Let x be the number which needs to be multiplied by $\frac{56}{9}$,

Now,

$$x \times \frac{56}{9} = \frac{40}{9}$$

$$x = \frac{40}{9} \times \frac{9}{56}$$

$$x = \frac{40}{56} = \frac{5}{7}$$

Q8. The product of two numbers is $25\frac{5}{6}$. If one of the numbers is $6\frac{2}{3}$, find the other?

Solution:

Given,

The product of two numbers is $25\frac{5}{6}$. If one of the numbers is $6\frac{2}{3}$

$$6\frac{2}{3} = \frac{20}{3}$$

$$\text{And, } 25\frac{5}{6} = \frac{155}{6}$$

Let the other number be x .

$$\frac{20}{3} \times x = \frac{155}{6}$$

$$x = \frac{3}{20} \times \frac{155}{6}$$

$$x = \frac{3 \times 155}{20 \times 6}$$

$$x = \frac{31}{8} = 3\frac{7}{8}$$

Q9. The cost of $6\frac{1}{4}$ kg of apples is Rs 400. At what rate per kg are the apples being sold?

Solution:

Given,

The cost of $6\frac{1}{4}$ kg of apples is Rs 400

$$6\frac{1}{4} = \frac{25}{4}$$

Cost of $\frac{25}{4}$ kg of apple = Rs 400

Cost of 1 kg of apple = Rs $\frac{4}{25} \times 400$ = Rs 64

Q10. By selling oranges at the rate of Rs $5\frac{1}{4}$ per orange, a fruit seller get Rs 630. How many dozens of oranges does he sell?

Solution:

Given,

Oranges at the rate of Rs $5\frac{1}{4}$ per orange, a fruit seller get Rs 630

$$5\frac{1}{4} = \frac{21}{4}$$

Number of oranges for Rs $\frac{21}{4}$ = 1

Number of oranges for Re 1 = $\frac{4}{21}$

Number of oranges for Rs 630 = $\frac{4}{21} \times 630$ = 120 apples

12 apples = 1 dozen

Therefore, 120 apples = 10 dozen

Q11. In mid-day meal scheme $\frac{3}{10}$ litre of milk is given to each student of a primary school. If 30 litres of milk is distributed everyday in the school, how many students are there in the school?

Solution:

Given,

$\frac{3}{10}$ litre of milk is given to each student of a primary school.

30 litres of milk is distributed everyday in the school

Number of students given $\frac{3}{10}$ litres of milk = 1

Number of students given 1 litre of milk = $\frac{10}{3}$

Number of students given 30 litres of milk = $\frac{10}{3} \times 30 = 100$ Students

Q12. In a charity show Rs 6496 were collected by selling some tickets. If the price of each ticket was Rs $50\frac{3}{4}$, how many tickets were sold?

Solution:

Given,

Rs 6496 were collected by selling some tickets.

The price of each ticket was Rs $50\frac{3}{4}$

$$50\frac{3}{4} = \frac{203}{4}$$

Number of tickets bought at Rs $\frac{203}{4} = 1$

Number of tickets bought at Re 1 = $\frac{4}{203}$

Number of tickets bought at Rs 6496 = $\frac{4}{203} \times 6496 = 4 \times 32 = 128$