

IMPORTANT POINTS

Fractions

I. FRACTION :

A fraction is a quantity which expresses a part of the whole.

$$\text{FRACTION} = \frac{\text{Numerator}}{\text{Denominator}}$$

Type of Fractions :

1. **Proper Fraction** : A fraction, whose numerator is less than its denominator, is called a proper fraction. e.g., $\frac{3}{5}, \frac{4}{6}$ etc.

2. **Improper Fraction** : A fraction, whose numerator is greater than or equal to its denominator, is called an improper fraction. e.g., $\frac{8}{6}, \frac{24}{13}, \frac{2}{2}, \frac{3}{3}, \frac{6}{6}$ etc.

3. **Mixed Fraction** : A mixed fraction consists of two parts:

(i) an integer and (ii) a proper fraction

e.g., $5\frac{2}{3}$ is a mixed fraction, consisting of an integer (5) and a proper fraction $\left(\frac{2}{3}\right)$.

4. **Like and Unlike Fractions** : Fraction having the same denominator but different numerators are called like fractions e.g., $\frac{2}{5}, \frac{1}{5}, \frac{3}{5}, \frac{7}{5}$ etc. are like fractions.

If denominator of the given fractions are not same, the fractions are called unlike fractions

e.g., $\frac{1}{4}, \frac{3}{8}, \frac{6}{9}, \frac{7}{10}$ etc.

5. **Equivalent Fractions** : If two or more fractions have the same value, they are called equivalent or equal fractions.

e.g., $\frac{1}{2}, \frac{2}{4}, \frac{6}{12}, \frac{8}{16}$ etc. are equivalent fractions as $\frac{1}{2} = \frac{2}{4} = \frac{6}{12} = \frac{8}{16}$.

CONVERSION OF FRACTIONS :

(i) **Mixed Fraction into an Improper Fraction** :— Multiply the integral part by the denominator

and to this product add the numerator e.g., $2\frac{5}{15}$

$$\text{the required improper fraction} = \frac{2 \times 15 + 5}{15} = \frac{35}{15}$$

(ii) **Improper Fraction into Mixed Fraction** :— Divide numerator by the denominator. The quotient of this division is the integral part and the remainder obtained is numerator of the required mixed fraction.

For example : $\frac{23}{3} = \text{Quotient} \frac{\text{Remainder}}{\text{Numerator}} = 7\frac{2}{3}$

(iii) **Unlike Fraction into Like Fractions:**

- (1) Find L.C.M. of the denominators of all given fractions.
- (2) Divide L.C.M. by the denominator and multiply the quotient to numerator and denominator of fraction.

e.g., $\frac{2}{7}$, $\frac{3}{5}$ and $\frac{1}{3}$

L.C.M. of denominator 7, 5, 3 = 105

Now, in $\frac{2}{7}$ dividing L.C.M. by 7 Quotient = 15

$$\therefore \frac{2 \times 15}{7 \times 15} = \frac{30}{105}$$

$\frac{3}{5}$ dividing L.C.M. by 5 Quotient = 21

$$\therefore \frac{3 \times 21}{5 \times 21} = \frac{63}{105}$$

$\frac{1}{3}$ dividing L.C.M. by 3 Quotient = 35

$$\therefore \frac{1 \times 35}{3 \times 35} = \frac{35}{105}$$

$$\therefore \frac{2}{7}, \frac{3}{5} \text{ and } \frac{1}{3} = \frac{30}{105}, \frac{63}{105} \text{ and } \frac{35}{105}$$

EXERCISE 14(A)

Question 1.

For each expression, given below, write a fraction :

- (i) 2 out of 7 =
- (ii) 5 out of 17 =
- (iii) three-fifths =

Solution:

(i) 2 out of 7 = $\frac{2}{7}$

(ii) 5 out of 17 = $\frac{5}{17}$

(iii) three-fifths = $\frac{3}{5}$

Question 2.

Fill in the blanks :

(i) $\frac{5}{8}$ isfraction.

(ii) $\frac{8}{5}$ is fraction.

(iii) $\frac{-15}{-15}$ is fraction.

(iv) The value of $\frac{5}{5}$ =

(v) The value of $\frac{5}{-5}$ =

(vi) $3\frac{3}{10}$ is fraction.

(vii) $\frac{2}{15}$ and $\frac{7}{15}$ arefractions.

(viii) $\frac{23}{12}$ and $\frac{23}{15}$ are fractions.

(ix) $\frac{6}{15}$ and $\frac{28}{70}$ are fractions.

(x) $\frac{8}{24}$ and $\frac{8}{32}$ are not fractions.

(xi) $3\frac{2}{13} = \frac{3 \times 13 + \dots}{13} = \dots$

(xii) $-4\frac{3}{5} = \dots = \dots$

Solution:

(i) Proper

(ii) Improper

(iii) Improper

(iv) 1

(v) -1

(vi) Mixed

(vii) Like

(viii) Unlike fraction

(ix) Equal fraction

(x) Like

$$(xi) + 2 = \frac{41}{13}$$

$$(xii) - \frac{(4 \times 5 + 3)}{5} = -\frac{23}{5}$$

Question 3.

From the following fractions, separate :

(i) Proper fractions

(ii) Improper fractions :

$$\frac{2}{9}, \frac{4}{3}, \frac{7}{15}, \frac{11}{20}, \frac{20}{11}, \frac{18}{23} \text{ and } \frac{27}{35}.$$

Solution:

We know that proper fraction is a fraction whose numerator is less than its denominator and improper fraction is the fraction whose numerator is greater than its denominator :

$$\frac{2}{9}, \frac{7}{15}, \frac{11}{20}, \frac{18}{23} \text{ and } \frac{27}{35} \text{ are proper}$$

$$\text{fractions and } \frac{4}{3}, \frac{20}{11} \text{ are improper fractions.}$$

Question 4.

Change the following mixed fractions to improper fractions :

$$(i) 2\frac{1}{5}$$

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

$$(iii) 7\frac{1}{8}$$

$$(iv) 2\frac{1}{11}$$

Solution:

$$(i) 2\frac{1}{5} = \frac{2 \times 5 + 1}{5} = \frac{10 + 1}{5} = \frac{11}{5}$$

$$(ii) 3\frac{1}{4} = \frac{3 \times 4 + 1}{4} = \frac{12 + 1}{4} = \frac{13}{4}$$

$$(iii) 7\frac{1}{8} = \frac{7 \times 8 + 1}{8} = \frac{56 + 1}{8} = \frac{57}{8}$$

$$(iv) 2\frac{1}{11} = \frac{2 \times 11 + 1}{11} = \frac{22 + 1}{11} = \frac{23}{11}$$

Question 5.

Change the following improper fractions to mixed fractions :

$$(i) \frac{100}{17}$$

$$(ii) \frac{81}{11}$$

$$(iii) -\frac{209}{7}$$

$$(iv) -\frac{113}{15}$$

Solution:

$$(i) \frac{100}{17} = 5\frac{15}{17}$$

$$(ii) \frac{81}{11} = 7\frac{4}{11}$$

$$(iii) -\frac{209}{7} = -29\frac{6}{7}$$

$$(iv) -\frac{113}{15} = -7\frac{8}{15}$$

Question 6.

Change the following groups of fractions to like fractions :

$$(i) \frac{1}{3}, \frac{2}{5}, \frac{3}{4}, \frac{1}{6} \quad (ii) \frac{5}{6}, \frac{7}{8}, \frac{11}{12}, \frac{3}{10}$$

$$(iii) \frac{2}{7}, \frac{7}{8}, \frac{5}{14}, \frac{9}{16}$$

Solution:

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

L.C.M. of denominators 3, 5, 4, 6 = 60

$$\begin{array}{r|rrrr} 2 & 3, & 5, & 4, & 6 \\ \hline 3 & 3, & 5, & 2, & 3 \\ \hline & 1, & 5, & 2, & 1 \end{array}$$

$$= 2 \times 3 \times 1 \times 5 \times 2 \times 1 = 60$$

$$\text{Now, } \frac{1}{3} = \frac{1 \times 20}{3 \times 20} = \frac{20}{60};$$

$$\frac{2}{5} = \frac{2 \times 12}{5 \times 12} = \frac{24}{60}; \frac{3}{4} = \frac{3 \times 15}{4 \times 15} = \frac{45}{60}$$

$$\frac{1}{6} = \frac{1 \times 10}{6 \times 10} = \frac{10}{60}$$

$$\frac{1}{3}, \frac{2}{5}, \frac{3}{4} \text{ and } \frac{1}{6} = \frac{20}{60}, \frac{24}{60}, \frac{45}{60}, \frac{10}{60}$$

$$(ii) \frac{5}{6}, \frac{7}{8}, \frac{11}{12}, \frac{3}{10}$$

L.C.M. of denominators 6, 8, 12, 10
= 120

$$\begin{array}{r|rrrr} 2 & 6, & 8, & 12, & 10 \\ \hline 2 & 3, & 4, & 6, & 5 \\ \hline 3 & 3, & 2, & 3, & 5 \\ \hline & 1, & 2, & 1, & 5 \end{array}$$

$$= 2 \times 2 \times 3 \times 2 \times 5 = 120$$

$$\text{Now, } \frac{5}{6} = \frac{5 \times 20}{6 \times 20} = \frac{100}{120};$$

$$\frac{7}{8} = \frac{7 \times 15}{8 \times 15} = \frac{105}{120}; \frac{11}{12} = \frac{11 \times 10}{12 \times 10}$$

$$= \frac{110}{120}; \quad \frac{3}{10} = \frac{3 \times 12}{10 \times 12} = \frac{36}{120}$$

$$\therefore \frac{5}{6}, \frac{7}{8}, \frac{11}{12}, \frac{3}{10} = \frac{100}{120}, \frac{105}{120}, \frac{110}{120}, \frac{36}{120}$$

$$(iii) \frac{2}{7}, \frac{7}{8}, \frac{5}{14}, \frac{9}{16}$$

L.C.M. of denominators 7, 8, 14, 16 = 112

$$\begin{array}{c|cccc} 2 & 7 & 8 & 14 & 16 \\ \hline 7 & 7 & 4 & 7 & 8 \\ \hline 4 & 1 & 4 & 1 & 8 \\ \hline & 1 & 1 & 1 & 2 \end{array}$$

$$= 2 \times 7 \times 4 \times 2 = 112$$

$$\begin{aligned} \text{Now, } \frac{2}{7} &= \frac{2 \times 16}{7 \times 16} = \frac{32}{112}; \frac{7}{8} = \frac{7 \times 14}{8 \times 14} \\ &= \frac{98}{112}; \frac{5}{14} = \frac{5 \times 8}{14 \times 8} = \frac{40}{112}; \frac{9}{16} \\ &= \frac{9 \times 7}{16 \times 7} = \frac{63}{112} \end{aligned}$$

$$\begin{aligned} \therefore \frac{2}{7}, \frac{7}{8}, \frac{5}{14}, \frac{9}{16} \\ = \frac{32}{112}, \frac{98}{112}, \frac{40}{112}, \frac{63}{112} \end{aligned}$$

EXERCISE 14(B)

Question 1.

Reduce the given fractions to their lowest terms :

$$(i) \frac{8}{10}$$

$$(ii) \frac{50}{75}$$

$$(iii) \frac{18}{81}$$

$$(iv) \frac{40}{120}$$

$$(v) \frac{105}{70}$$

Solution:

$$(i) \frac{8}{10} = \frac{8 \div 2}{10 \div 2} = \frac{4}{5}$$

$$(ii) \frac{50}{75} = \frac{50 \div 25}{75 \div 25} = \frac{2}{3}$$

$$(iii) \frac{18}{81} = \frac{18 \div 9}{81 \div 9} = \frac{2}{9}$$

$$(iv) \frac{40}{120} = \frac{40 \div 40}{120 \div 40} = \frac{1}{3}$$

$$(v) \frac{105}{70} = \frac{105 \div 35}{70 \div 35} = \frac{3}{2}$$

Question 2.

State, whether true or false ?

$$(i) \frac{2}{5} = \frac{10}{15} \quad (ii) \frac{35}{42} = \frac{5}{6}$$

$$(iii) \frac{5}{4} = \frac{4}{5} \quad (iv) \frac{7}{9} = 1\frac{1}{7}$$

$$(v) \frac{9}{7} = 1\frac{1}{7}$$

Solution:

$$(i) \frac{2}{5} = \frac{10}{15} = \frac{10 \div 5}{15 \div 5} = \frac{2}{3}$$

$$\therefore \frac{2}{5} \neq \frac{2}{3}, \text{ False}$$

$$(ii) \frac{35}{42} = \frac{5}{6}$$

$$\frac{35}{42} = \frac{35 \div 7}{42 \div 7} = \frac{5}{6}$$

$$\therefore \frac{5}{6} = \frac{5}{6}, \text{ True}$$

$$(iii) \frac{5}{4} = \frac{4}{5}, \text{ False}$$

$$(iv) \frac{7}{9} = 1\frac{1}{7}$$

$$\text{Now, } \frac{7}{9}; 1\frac{1}{7} = \frac{7 \times 1 + 1}{7} = \frac{8}{7}$$

$$\frac{7}{9} \neq \frac{8}{7}, \text{ False}$$

$$(v) \frac{9}{7} = 1\frac{1}{7}$$

$$\text{Now, } \frac{9}{7}; 1\frac{1}{7} = \frac{7 \times 1 + 1}{7} = \frac{8}{7}$$

$$\frac{9}{7} \neq \frac{8}{7}, \text{ False.}$$

Question 3.

Which fraction is greater ?

$$(i) \frac{3}{5} \text{ or } \frac{2}{3} \quad (ii) \frac{5}{9} \text{ or } \frac{3}{4}$$

$$(iii) \frac{11}{14} \text{ or } \frac{26}{35}$$

Solution:

(i) $\frac{3}{5}$ or $\frac{2}{3}$

L.C.M. of 5, 3 = 15

Now, $\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$;

$$\frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$$

$$\frac{10}{15} > \frac{9}{15} \therefore \frac{2}{3} > \frac{3}{5} \text{ [as its numerator is greater]}$$

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

Converting in like fraction,

$$\frac{5 \times 4}{9 \times 4} = \frac{20}{36}; \frac{3}{4} = \frac{3 \times 9}{4 \times 9} = \frac{27}{36}$$

$$\frac{20}{36} < \frac{27}{36} \text{ [as its numerator is greater]}$$

(iii) $\frac{11}{14}$ or $\frac{26}{35}$

Converting in like fraction,

$$\frac{11}{14} = \frac{11 \times 5}{14 \times 5} = \frac{55}{70}; \frac{26}{35} = \frac{26 \times 2}{35 \times 2} = \frac{52}{70}$$

$$\frac{55}{70} > \frac{52}{70} \text{ [as its numerator is greater]}$$

Question 4.

Which fraction is smaller?

(i) $\frac{3}{8}$ or $\frac{4}{5}$ (ii) $\frac{8}{15}$ or $\frac{4}{7}$

(iii) $\frac{7}{26}$ or $\frac{10}{39}$

Solution:

$$(i) \frac{3}{8} \text{ or } \frac{4}{5}$$

Converting in like fraction

$$\frac{3}{8} = \frac{3 \times 5}{8 \times 5} = \frac{15}{40}; \frac{4}{5} = \frac{4 \times 8}{5 \times 8} = \frac{32}{40}$$

$$\frac{3}{8} < \frac{4}{5} \quad [\text{as its numerator is smaller}]$$

$$(ii) \frac{8}{15} \text{ or } \frac{4}{7}$$

Converting into like fraction

$$\frac{8}{15} = \frac{8 \times 7}{15 \times 7} = \frac{56}{105}; \frac{4}{7} = \frac{4 \times 15}{7 \times 15} = \frac{60}{105}$$

$$\frac{8}{15} < \frac{4}{7} \quad [\text{as its numerator is smaller}]$$

$$(iii) \frac{7}{26} \text{ or } \frac{10}{39}$$

Converting the like fraction

$$\frac{7}{26} = \frac{7 \times 3}{26 \times 3} = \frac{21}{78}; \frac{10}{39} = \frac{10 \times 2}{39 \times 2} = \frac{20}{78}$$

$$\frac{10}{39} < \frac{7}{26} \quad [\text{as its numerator is smaller}]$$

Question 5.

Arrange the given fractions in descending order of magnitude :

$$(i) \frac{5}{16}, \frac{13}{24}, \frac{7}{8} \quad (ii) \frac{4}{5}, \frac{7}{15}, \frac{11}{20}, \frac{3}{4}$$

$$(iii) \frac{5}{7}, \frac{3}{8}, \frac{9}{11}$$

Solution:

$$(i) \frac{5}{16}, \frac{13}{24}, \frac{7}{8}$$

2	16, 24, 8
2	8, 12, 4
2	4, 6, 2
2	2, 3, 1
3	1, 3, 1
	1, 1, 1

$$\therefore \text{L.C.M. of } 16, 24, 8 = 2 \times 2 \times 2 \times 2 \times 3 = 48$$

L.C.M. of denominator 16, 24, 8 = 48

Converting into like fractions

$$\frac{5}{16} = \frac{5 \times 3}{16 \times 3} = \frac{15}{48}; \frac{13}{24} = \frac{13 \times 2}{24 \times 2} = \frac{26}{48};$$

$$\frac{7}{8} = \frac{7 \times 6}{8 \times 6} = \frac{42}{48}$$

Now, arranging in descending order

$$\frac{7}{8}, \frac{13}{24}, \frac{5}{16}$$

$$(ii) \frac{4}{5}, \frac{7}{15}, \frac{11}{20}, \frac{3}{4}$$

L.C.M. of denominator 5, 15, 20, 4 = 60

Converting into like fractions,

$$\frac{4}{5} = \frac{4 \times 12}{5 \times 12} = \frac{48}{60}; \frac{7}{15} = \frac{7 \times 4}{15 \times 4} = \frac{28}{60};$$

$$\frac{11}{20} = \frac{11 \times 3}{20 \times 3} = \frac{33}{60}; \frac{3}{4} = \frac{3 \times 15}{4 \times 15} = \frac{45}{60}$$

Now, arranging in descending order,

$$\frac{4}{5}, \frac{3}{4}, \frac{11}{20}, \frac{7}{15}$$

$$(iii) \frac{5}{7}, \frac{3}{8}, \frac{9}{11}$$

L.C.M. of denominator 5, 3, 9 = 45

$$\begin{array}{r|l} 3 & 5, 3, 9 \\ \hline 5 & 5, 1, 3 \\ \hline 3 & 1, 1, 3 \\ \hline & 1, 1, 1 \end{array}$$

$$= 3 \times 5 \times 3 = 45$$

$$\therefore \frac{5}{7} = \frac{5 \times 9}{7 \times 9} = \frac{45}{63}; \frac{3}{8} = \frac{3 \times 15}{8 \times 15} = \frac{45}{120}$$

$$\frac{9}{11} = \frac{9 \times 5}{11 \times 5} = \frac{45}{55}$$

We know that the numerator being same, the fraction having the smallest denominator is the biggest fraction.

$$\therefore \frac{45}{55}, \frac{45}{63}, \frac{45}{120}$$

$$i.e. \frac{9}{11}, \frac{5}{7}, \frac{3}{8}$$

Question 6.

Arrange the given fractions in ascending order of magnitude :

$$(i) \frac{9}{16}, \frac{7}{12}, \frac{1}{4} \quad (ii) \frac{5}{6}, \frac{2}{7}, \frac{8}{9}, \frac{1}{3}$$

$$(iii) \frac{2}{3}, \frac{5}{9}, \frac{5}{6}, \frac{3}{8}$$

Solution:

$$(i) \quad \frac{9}{16}, \frac{7}{12}, \frac{1}{4}$$

L.C.M. of the denominator 16, 12, 4
= 48

$$\begin{array}{r|l} 4 & 16, 12, 4 \\ \hline 4 & 4, 3, 1 \\ \hline 3 & 1, 3, 1 \\ \hline & 1, 1, 1 \end{array}$$

$$= 4 \times 4 \times 3 = 48$$

$$\therefore \frac{9}{16} = \frac{9 \times 3}{16 \times 3} = \frac{27}{48}; \quad \frac{7}{12} = \frac{7 \times 4}{12 \times 4} = \frac{28}{48}$$

$$\frac{1}{4} = \frac{1 \times 12}{4 \times 12} = \frac{12}{48}$$

Arranging in ascending order,

$$\frac{12}{48}, \frac{27}{48}, \frac{28}{48}$$

$$\text{i.e. } \frac{1}{4}, \frac{9}{16}, \frac{7}{12}$$

$$(ii) \frac{5}{6}, \frac{2}{7}, \frac{8}{9}, \frac{1}{3}$$

L.C.M. of the denominator 6, 7, 9, 3
= 126

$$\begin{array}{r|l} 3 & 6, 7, 9, 3 \\ \hline & 2, 7, 3, 1 \\ \hline \end{array}$$

$$= 3 \times 2 \times 7 \times 3 = 126$$

$$\therefore \frac{5}{6} = \frac{5 \times 21}{6 \times 21} = \frac{105}{126}; \frac{2}{7} = \frac{2 \times 18}{7 \times 18} = \frac{36}{126}$$

$$\frac{8}{9} = \frac{8 \times 14}{9 \times 14} = \frac{112}{126};$$

$$\frac{1}{3} = \frac{1 \times 42}{3 \times 42} = \frac{42}{126}$$

Arranging in ascending order,

$$\frac{36}{126}, \frac{42}{126}, \frac{105}{126}, \frac{112}{126}$$

$$i.e. \frac{2}{7}, \frac{1}{3}, \frac{5}{6}, \frac{8}{9}$$

$$(iii) \frac{2}{3}, \frac{5}{9}, \frac{5}{6}, \frac{3}{8}$$

L.C.M. of the denominator 3, 9, 6, 8
= 72

$$\begin{array}{r|l} 2 & 3, 9, 6, 8 \\ \hline 3 & 3, 9, 3, 4 \\ \hline & 1, 3, 1, 4 \\ \hline \end{array}$$

$$= 2 \times 3 \times 3 \times 4 = 72$$

$$\therefore \frac{2}{3} = \frac{2 \times 24}{3 \times 24} = \frac{48}{72}; \frac{5}{9} = \frac{5 \times 8}{9 \times 8} = \frac{40}{72}$$

$$\frac{5}{6} = \frac{5 \times 12}{6 \times 12} = \frac{60}{72}; \frac{3}{8} = \frac{3 \times 9}{8 \times 9} = \frac{27}{72}$$

Arranging in ascending order,

$$\frac{27}{72}, \frac{40}{72}, \frac{48}{72}, \frac{60}{72}$$

$$i.e. \frac{3}{8}, \frac{5}{9}, \frac{2}{3}, \frac{5}{6}$$

Question 7.

I bought one dozen bananas and ate five of them. What fraction of the total number of bananas was left ?

Solution:

Number of bananas bought = 1

Dozen = 12

Number of bananas eaten by me = 5

Number of bananas left = $12 - 5 = 7$

Fraction = $\frac{7}{12}$

Question 8.

Insert the symbol '=' or '>' or '<' between each of the pairs of fractions, given below :

(i) $\frac{6}{11}$... $\frac{5}{9}$ (ii) $\frac{3}{7}$... $\frac{9}{13}$

(iii) $\frac{56}{64}$... $\frac{7}{8}$ (iv) $\frac{5}{12}$... $\frac{8}{33}$

Solution:

(i) $\frac{6}{11}, \frac{5}{9}$

L.C.M. of 11, 9 = 99

$$\therefore \frac{6}{11} = \frac{6 \times 9}{11 \times 9} = \frac{54}{99}$$

$$\text{and } \frac{5}{9} = \frac{5 \times 11}{9 \times 11} = \frac{55}{99}$$

It is clear that $\frac{54}{99} < \frac{55}{99}$

$$\Rightarrow \frac{6}{11} < \frac{5}{9}$$

(ii) $\frac{3}{7}, \frac{9}{13}$

L.C.M. of 7, 13 = 91

$$\therefore \frac{3}{7} = \frac{3 \times 13}{7 \times 13} = \frac{39}{91}$$

$$\text{and } \frac{9}{13} = \frac{9 \times 7}{13 \times 7} = \frac{63}{91}$$

It is clear that $\frac{39}{91} < \frac{63}{91}$

$$\Rightarrow \frac{3}{7} < \frac{9}{13}$$

$$(iii) \frac{56}{64}, \frac{7}{8}$$

L.C.M. of 64, 8 = 64

$$\therefore \frac{56 \times 1}{64 \times 1} = \frac{56}{64}$$

$$\frac{7}{8} = \frac{7 \times 8}{8 \times 8} = \frac{56}{64}$$

It is clear that

$$\frac{56}{64} = \frac{56}{64} \Rightarrow \frac{56}{64} = \frac{7}{8}$$

$$(iv) \frac{5}{12}, \frac{8}{33}$$

L.C.M. of 12, 33 = 132

$$\frac{5}{12} = \frac{5 \times 11}{12 \times 11} = \frac{55}{132}$$

$$\text{and } \frac{8}{33} = \frac{8 \times 4}{33 \times 4} = \frac{32}{132}$$

It is clear that

$$\frac{55}{132} > \frac{32}{132} \Rightarrow \frac{5}{12} > \frac{8}{33}$$

Question 9.

Out of 50 identical articles, 36 are broken. Find the fraction of :

- (i) The total number of articles and the articles broken.
- (ii) The remaining articles and total number of articles.

Solution:

Total number of articles = 50

Number of articles broken = 36

Remaining articles = 50 – 36 = 14

Now (i) the fraction of the total number of articles and articles broken = $\frac{50}{36}$

$$= \frac{50 \div 2}{36 \div 2} = \frac{25}{18}$$

- (ii) The fraction between the remaining articles and total number of articles

$$= \frac{14}{50} = \frac{14 \div 2}{50 \div 2} = \frac{7}{25}$$

EXERCISE 14(C)

Question 1.

Add the following fractions :

(i) $1\frac{3}{4}$ and $\frac{3}{8}$

(ii) $\frac{2}{5}$, $2\frac{3}{15}$ and $\frac{7}{10}$

(iii) $1\frac{7}{8}$, $1\frac{1}{2}$ and $1\frac{3}{4}$

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

(v) $2\frac{8}{9}$, $\frac{11}{18}$ and $3\frac{5}{6}$

(vi) $3\frac{1}{8}$, $5\frac{5}{12}$ and $\frac{5}{16}$

Solution:

(i) $1\frac{3}{4}$ and $\frac{3}{8}$

$$= \frac{7}{4} + \frac{3}{8}$$

$$= \frac{7 \times 2}{4 \times 2} + \frac{3}{8} \quad (\text{LCM of 4, 8} = 8)$$

$$= \frac{14}{8} + \frac{3}{8} = \frac{14+3}{8} = \frac{17}{8} = 2\frac{1}{8}$$

(ii) $\frac{2}{5}$, $2\frac{3}{15}$ and $\frac{7}{10}$

$$= \frac{2}{5} + \frac{33}{15} + \frac{7}{10}$$

$$= \frac{2 \times 6}{5 \times 6} + \frac{33 \times 2}{15 \times 2} + \frac{7 \times 3}{10 \times 3}$$

(LCM of 5, 15 and 10 = 30)

$$= \frac{12}{30} + \frac{66}{30} + \frac{21}{30}$$

$$= \frac{12+66+21}{30} = \frac{99}{30} = \frac{99 \div 3}{30 \div 3}$$

$$= \frac{33}{10} = 3\frac{3}{10}$$

$$\begin{aligned}
 \text{(iii)} \quad & 1\frac{7}{8} + 1\frac{1}{2} + 1\frac{3}{4} \\
 &= \frac{1 \times 8 + 7}{8} + \frac{1 \times 2 + 1}{2} + \frac{1 \times 4 + 3}{4} \\
 &= \frac{15}{8} + \frac{3}{2} + \frac{7}{4} = \frac{15 \times 1}{8 \times 1} + \frac{3 \times 4}{2 \times 4} + \frac{7 \times 2}{4 \times 2} \\
 &= \frac{15}{8} + \frac{12}{8} + \frac{14}{8} = \frac{15 + 12 + 14}{8} \\
 &\quad \text{(L.C.M. 8, 2 and 4 is 8)} \\
 &= \frac{41}{8} = 5\frac{1}{8}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad & 3\frac{3}{4} + 2\frac{1}{6} + 1\frac{5}{8} \\
 &= \frac{3 \times 4 + 3}{4} + \frac{2 \times 6 + 1}{6} + \frac{1 \times 8 + 5}{8} \\
 &= \frac{15}{4} + \frac{13}{6} + \frac{13}{8} \quad \text{(L.C.M. 4, 6 and 8 is 24)} \\
 &= \frac{15 \times 6}{4 \times 6} + \frac{13 \times 4}{6 \times 4} + \frac{13 \times 3}{8 \times 3} \\
 &= \frac{90}{24} + \frac{52}{24} + \frac{39}{24} = \frac{181}{24} = 7\frac{13}{24}
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} \quad & 2\frac{8}{9}, \frac{11}{18} \text{ and } 3\frac{5}{6} \\
 &= \frac{26}{9} + \frac{11}{18} + \frac{23}{6} = \frac{26 \times 2}{9 \times 2} + \frac{11}{18} + \frac{23 \times 3}{6 \times 3} \\
 &\quad \text{(LCM of 9, 18 and 6 = 18)} \\
 &= \frac{52}{18} + \frac{11}{18} + \frac{69}{18} \\
 &= \frac{52 + 11 + 69}{18} = \frac{132}{18} = \frac{132 \div 6}{18 \div 6} \\
 &= \frac{22}{3} = 7\frac{1}{3}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vi)} \quad & 3\frac{1}{8} + 5\frac{5}{12} + \frac{5}{16} \\
 &= \frac{3 \times 8 + 1}{8} + \frac{5 \times 12 + 5}{12} + \frac{5}{16} \\
 &= \frac{25}{8} + \frac{65}{12} + \frac{5}{16} \\
 &\text{(L.C.M. 8, 12 and 16 is 48)} \\
 &= \frac{25 \times 6}{8 \times 6} + \frac{65 \times 4}{12 \times 4} + \frac{5 \times 3}{16 \times 3} \\
 &= \frac{150}{48} + \frac{260}{48} + \frac{15}{48} \\
 &= \frac{150 + 260 + 15}{48} \\
 &= \frac{425}{48} = 8\frac{41}{48}
 \end{aligned}$$

Question 2.

Simplify:

- (i) $1\frac{11}{12} - \frac{13}{16}$
- (ii) $2\frac{3}{4} - 1\frac{5}{6}$
- (iii) $2\frac{5}{7} + \frac{3}{14} - \frac{13}{21}$
- (iv) $3\frac{5}{6} - \frac{1}{6} - 1\frac{1}{12}$
- (v) $6 + \frac{3}{10} - 1\frac{8}{15}$
- (vi) $1\frac{3}{4} + 2\frac{5}{7} - 1\frac{3}{14}$
- (vii) $4 + 3\frac{1}{8} - 3\frac{1}{6}$
- (viii) $6 - 3\frac{1}{2} - 2\frac{1}{5}$
- (ix) $1\frac{5}{8} - 2\frac{1}{6} + 3\frac{3}{4}$
- (x) $3\frac{1}{2} + 1\frac{2}{3} - 2\frac{1}{4}$
- (xi) $4\frac{3}{5} - 2\frac{7}{9} - 1\frac{2}{15} - \frac{2}{45}$

Solution:

$$\begin{aligned}(i) \quad 1\frac{11}{12} - \frac{13}{16} &= \frac{23}{12} - \frac{13}{16} \\&= \frac{23 \times 4}{12 \times 4} - \frac{13 \times 3}{16 \times 3} \text{ (LCM of 12, 16 = 48)} \\&= \frac{92}{48} - \frac{39}{48} = \frac{92-39}{48} \\&= \frac{53}{48} = 1\frac{5}{48}\end{aligned}$$

$$\begin{aligned}(ii) \quad 2\frac{3}{4} - 1\frac{5}{6} &= \frac{11}{4} - \frac{11}{6} = \frac{11 \times 6}{4 \times 6} - \frac{11 \times 4}{6 \times 4} \\&= \frac{66}{24} - \frac{44}{24} \\&= \frac{66-44}{24} = \frac{22}{24} = \frac{11}{12}\end{aligned}$$

$$\begin{aligned}(iii) \quad 2\frac{5}{7} + \frac{3}{14} - \frac{13}{21} \\&= \frac{19}{7} + \frac{3}{14} - \frac{13}{21} \\&= \frac{19 \times 6}{7 \times 6} + \frac{3 \times 3}{14 \times 3} - \frac{13 \times 2}{21 \times 2} \\&\quad \text{(LCM of 7, 14, 21 = 42)} \\&= \frac{114}{42} + \frac{9}{42} - \frac{26}{42} \\&= \frac{114+9-26}{42} = \frac{123-26}{42} \\&= \frac{97}{42} = 2\frac{13}{42}\end{aligned}$$

$$\begin{aligned}
 (iv) \quad 3\frac{5}{6} - \frac{1}{6} - 1\frac{1}{12} &= \frac{23}{6} - \frac{1}{6} - \frac{13}{12} \\
 &= \frac{23 \times 2}{6 \times 2} - \frac{1 \times 2}{6 \times 2} - \frac{13}{12} \\
 &= \frac{46}{12} - \frac{2}{12} - \frac{13}{12} = \frac{46 - 2 - 13}{12} \\
 &= \frac{46 - 15}{12} = \frac{31}{12} = 2\frac{7}{12}
 \end{aligned}$$

$$\begin{aligned}
 (v) \quad 6 + \frac{3}{10} - 1\frac{8}{15} \\
 &= \frac{6}{1} + \frac{3}{10} - \frac{23}{15} \\
 &= \frac{6 \times 30}{1 \times 30} + \frac{3 \times 3}{10 \times 3} - \frac{23 \times 2}{15 \times 2} \\
 &\quad \text{(LCM of 1, 10, 15 = 30)} \\
 &= \frac{180}{30} + \frac{9}{30} - \frac{46}{30} \\
 &= \frac{180 + 9 - 46}{30} = \frac{189 - 46}{30}
 \end{aligned}$$

$$= \frac{143}{30} = 4\frac{23}{30}$$

$$\begin{aligned} \text{(vi)} \quad 1\frac{3}{4} + 2\frac{5}{7} - 1\frac{3}{14} &= \frac{7}{4} + \frac{19}{7} - \frac{17}{14} \\ &= \frac{7 \times 7}{4 \times 7} + \frac{19 \times 4}{7 \times 4} - \frac{17 \times 2}{14 \times 2} \\ &= \frac{49}{28} + \frac{76}{28} - \frac{34}{28} = \frac{49 + 76 - 34}{28} = \frac{91}{28} \\ &= 3\frac{7}{28} = 3\frac{1}{4} \end{aligned}$$

$$\begin{aligned} \text{(vii)} \quad 4 + 3\frac{1}{8} - 3\frac{1}{6} &= \frac{4}{1} + \frac{25}{8} - \frac{19}{6} \\ &= \frac{4 \times 24}{1 \times 24} + \frac{25 \times 3}{8 \times 3} - \frac{19 \times 4}{6 \times 4} \\ &\quad (\text{LCM of } 8, 6 = 24) \\ &= \frac{96}{24} + \frac{75}{24} - \frac{76}{24} \\ &= \frac{96 + 75 - 76}{24} = \frac{95}{24} = 3\frac{23}{24} \end{aligned}$$

$$\begin{aligned} \text{(viii)} \quad 6 - 3\frac{1}{2} - 2\frac{1}{5} &= \frac{6}{1} - \frac{7}{2} - \frac{11}{5} \\ &= \frac{6 \times 10}{1 \times 10} - \frac{7 \times 5}{2 \times 5} - \frac{11 \times 2}{5 \times 2} \\ &\quad (\text{LCM of } 2, 5 = 10) \\ &= \frac{60}{10} - \frac{35}{10} - \frac{22}{10} \\ &= \frac{60 - 35 - 22}{10} = \frac{60 - 57}{10} = \frac{3}{10} \end{aligned}$$

$$\text{(ix)} \quad 1\frac{5}{8} - 2\frac{1}{6} + 3\frac{3}{4} = \frac{13}{8} - \frac{13}{6} + \frac{15}{4}$$

$$= \frac{13 \times 3}{8 \times 3} - \frac{13 \times 4}{6 \times 4} + \frac{15 \times 6}{4 \times 6} = \frac{39}{24} - \frac{52}{24} + \frac{90}{24}$$

$$= \frac{39 - 52 + 90}{24} = \frac{129 - 52}{24} = \frac{77}{24} = 3\frac{5}{24}$$

$$(x) \quad 3\frac{1}{2} + 1\frac{2}{3} - 2\frac{1}{4} = \frac{7}{2} + \frac{5}{3} - \frac{9}{4}$$

$$= \frac{7 \times 6}{2 \times 6} + \frac{5 \times 4}{3 \times 4} - \frac{9 \times 3}{4 \times 3}$$

$$= \frac{42}{12} + \frac{20}{12} - \frac{27}{12}$$

$$= \frac{42 + 20 - 27}{12}$$

$$= \frac{62 - 27}{12} = \frac{35}{12} = 2\frac{11}{12}$$

$$(xi) \quad 4\frac{3}{5} - 2\frac{7}{9} - 1\frac{2}{15} - \frac{2}{45}$$

$$= \frac{23}{5} - \frac{25}{9} - \frac{17}{15} - \frac{2}{45}$$

$$= \frac{23 \times 9}{5 \times 9} - \frac{25 \times 5}{9 \times 5} - \frac{17 \times 3}{15 \times 3} - \frac{2 \times 1}{45 \times 1}$$

$$= \frac{207}{45} - \frac{125}{45} - \frac{51}{45} - \frac{2}{45}$$

$$= \frac{207 - 125 - 51 - 2}{45}$$

$$= \frac{207 - 178}{45} = \frac{29}{45}$$

EXERCISE 14(D)

Point to Remember :

BODMAS :- While simplifying an expressions we can involve six operation in following orders.

B Stands for “**BRACKET**”

O Stands for “**OF**”

D Stands for “**DIVISION**”

M Stands for “**MULTIPLICATION**”

A Stands for “**ADDITION**”

S Stands for “**SUBTRACTION**”

Question 1.

$$(i) \frac{3}{7} \times \frac{2}{5}$$

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

$$(iii) \frac{5}{12} \times 8$$

$$(iv) \frac{7}{6} \text{ of } \frac{3}{14}$$

$$(v) 3\frac{3}{8} \times 3\frac{6}{7}$$

$$(vi) \frac{1}{2} \text{ of } \frac{1}{3} \times \frac{3}{4} \quad (vii) \frac{3}{7} \times \frac{5}{9} \times 4\frac{1}{5}$$

$$(viii) 1\frac{1}{3} \times 1\frac{2}{7} \text{ of } 1\frac{1}{4}$$

Solution:

$$(i) \frac{3}{7} \times \frac{2}{5} = \frac{3 \times 2}{7 \times 5} = \frac{6}{35}$$

$$(ii) \frac{4}{9} \times \frac{3}{5} = \frac{4 \times 3}{9 \times 5} = \frac{4 \times 1}{3 \times 5} = \frac{4}{15}$$

$$(iii) \frac{5}{12} \times 8 = \frac{5}{12} \times \frac{8}{1} = \frac{5 \times 2}{3 \times 1} = \frac{10}{3} = 3\frac{1}{3}$$

$$(iv) \frac{7}{6} \text{ of } \frac{3}{14} = \frac{7}{6} \times \frac{3}{14} = \frac{3 \times 1}{2 \times 1} = \frac{1}{4}$$

$$(v) 3\frac{3}{8} \times 3\frac{6}{7} = \frac{27}{8} \times \frac{27}{7}$$

$$= \frac{27 \times 27}{8 \times 7} = \frac{729}{56} = 13\frac{1}{56}$$

$$(vi) \frac{1}{2} \text{ of } \frac{1}{3} \times \frac{3}{4} = \frac{1}{2} \times \frac{1}{3} \times \frac{3}{4} = \frac{1}{6} \times \frac{3}{4} = \frac{1 \times 1}{2 \times 4} = \frac{1}{8}$$

$$\left[\begin{array}{l} \text{Using} \\ \text{Bodmas} \end{array} \frac{1}{2} \text{ of } \frac{1}{3} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6} \right]$$

$$(vii) \frac{3}{7} \times \frac{5}{9} \times 4\frac{1}{5} = \frac{3}{7} \times \frac{5}{9} \times \frac{21}{5}$$

$$= \frac{3 \times 5 \times 21}{7 \times 9 \times 5} = 1$$

$$(viii) \quad 1\frac{1}{3} \times 1\frac{2}{7} \text{ of } 1\frac{1}{4} = \frac{4}{3} \times \frac{9}{7} \times \frac{5}{4}$$

$$= \frac{4 \times 9 \times 5}{3 \times 7 \times 4} = \frac{15}{7} = 2\frac{1}{7}$$

Question 2.

Simplify :

$$(i) \quad \frac{2}{3} \div 1\frac{1}{5}$$

$$(ii) \quad 4\frac{1}{2} \div \frac{4}{9}$$

$$(iii) \quad 1 \div \frac{2}{5}$$

$$(iv) \quad \frac{4}{9} \div \frac{4}{9}$$

$$(v) \quad 2\frac{1}{3} \div 1\frac{3}{4}$$

$$(vi) \quad 2\frac{2}{3} \times 3\frac{1}{2} \div 2\frac{4}{9}$$

Solution:

(i)

$$\frac{2}{3} \div 1\frac{1}{5} = \frac{2}{3} \div \frac{6}{5} = \frac{2}{3} \times \frac{5}{6} = \frac{2 \times 5}{3 \times 6} = \frac{5}{9}$$

$$(ii) \quad 4\frac{1}{2} \div \frac{4}{9} = \frac{9}{2} \div \frac{4}{9} = \frac{9}{2} \times \frac{9}{4} = \frac{9 \times 9}{2 \times 4}$$

$$= \frac{81}{8} = 10\frac{1}{8}$$

$$(iii) \quad 1 \div \frac{2}{5} = \frac{1}{1} \div \frac{2}{5} = \frac{1}{1} \times \frac{5}{2} = \frac{5}{2} = 2\frac{1}{2}$$

$$(iv) \quad \frac{4}{9} \div \frac{4}{9} = \frac{4}{9} \times \frac{9}{4} = \frac{4 \times 9}{9 \times 4} = 1$$

$$(v) \quad 2\frac{1}{3} \div 1\frac{3}{4} = \frac{7}{3} \div \frac{7}{4} = \frac{7}{3} \times \frac{4}{7}$$

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

$$(vi) \quad 2\frac{2}{3} \times 3\frac{1}{2} \div 2\frac{4}{9} = \frac{8}{3} \times \frac{7}{2} \div \frac{22}{9}$$

$$= \frac{8}{3} \times \frac{7}{2} \times \frac{9}{22} = \frac{2 \times 7 \times 3}{11} = \frac{42}{11} = 3\frac{9}{11}$$

Question 3.

Simplify:

$$(i) \frac{1}{4} \text{ of } 2\frac{2}{7} \div \frac{3}{5}$$

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

$$(iii) 6\frac{1}{7} \times 0 \times 5\frac{3}{8}$$

$$(iv) \frac{3}{4} \times 1\frac{1}{3} \div \frac{3}{7} \text{ of } 2\frac{5}{8}$$

$$(v) 2\frac{1}{4} \div \frac{2}{7} \text{ of } 1\frac{1}{3} \times \frac{2}{3}$$

$$(vi) \left(\frac{3}{7} \div \frac{1}{2} \right) \text{ of } 1\frac{1}{7}$$

$$(vii) \left(1\frac{7}{8} \div 1\frac{1}{2} \right) \text{ of } \left(8\frac{1}{3} \div 1\frac{1}{2} \right)$$

$$(viii) \frac{1}{3} \text{ of } 60 \div 60.$$

Solution:

$$(i) \frac{1}{4} \text{ of } 2\frac{2}{7} \div \frac{3}{5}$$

$$= \frac{1}{4} \times \frac{16}{7} \div \frac{3}{5} = \frac{4}{7} \times \frac{5}{3} = \frac{20}{21}$$

$$(ii) 1\frac{1}{4} \times \frac{1}{2} \div 1\frac{1}{3} = \frac{5}{4} \times \frac{1}{2} \div \frac{4}{3}$$

$$= \frac{5}{8} \times \frac{3}{4} = \frac{15}{32}$$

$$(iii) 6\frac{1}{7} \times 0 \times 5\frac{3}{8} = \frac{43}{7} \times \frac{0}{1} \times \frac{43}{8}$$

$$= \frac{43 \times 0 \times 43}{7 \times 1 \times 8} = 0$$

$$(iv) \frac{3}{4} \times 1\frac{1}{3} \div \frac{3}{7} \text{ of } 2\frac{5}{8} = \frac{3}{4} \times \frac{4}{3} \div \frac{9}{8}$$

$$\left[\frac{3}{7} \text{ of } 2\frac{5}{8} = \frac{3}{7} \times \frac{21}{8} = \frac{9}{8} \right]$$

$$= \frac{3}{4} \times \frac{4}{3} \times \frac{8}{9} = \frac{8}{9}$$

$$(v) 2\frac{1}{4} \div \frac{2}{7} \text{ of } 1\frac{1}{3} \times \frac{2}{3}$$

$$\begin{aligned} & \left[\frac{2}{7} \text{ of } 1\frac{1}{3} = \frac{2}{7} \times \frac{4}{3} = \frac{8}{21} \right] \\ & = \frac{9}{4} \div \frac{8}{21} \times \frac{2}{3} \\ & = \frac{9}{4} \times \frac{21}{8} \times \frac{2}{3} = \frac{63}{16} = 3\frac{15}{16} \end{aligned}$$

$$\begin{aligned} \text{(vi)} \quad & \left(\frac{3}{7} \div \frac{1}{2} \right) \text{ of } 1\frac{1}{7} = \frac{3}{7} \times \frac{2}{1} \text{ of } \frac{8}{7} \\ & \left[\frac{2}{1} \text{ of } \frac{8}{7} = \frac{2 \times 8}{7 \times 1} = \frac{16}{7} \right] \\ & = \frac{3}{7} \times \frac{16}{7} = \frac{48}{49} \end{aligned}$$

$$\begin{aligned} \text{(vii)} \quad & \left(1\frac{7}{8} \div 1\frac{1}{2} \right) \text{ of } \left(8\frac{1}{3} \div 1\frac{1}{2} \right) \\ & = \left(\frac{15}{8} \div \frac{3}{2} \right) \text{ of } \left(\frac{25}{3} \div \frac{3}{2} \right) \\ & = \frac{15}{8} \times \frac{2}{3} \text{ of } \frac{25}{3} \times \frac{2}{3} \\ & = \frac{5}{4} \text{ of } \frac{50}{9} = \frac{5}{4} \times \frac{50}{9} = \frac{125}{18} = 6\frac{17}{18} \end{aligned}$$

$$\begin{aligned} \text{(viii)} \quad & \frac{1}{3} \text{ of } 60 \div 60 = \frac{1}{3} \times \frac{60}{1} \div \frac{60}{1} \\ & = 20 \times \frac{1}{60} = \frac{20}{60} = \frac{1}{3} \end{aligned}$$

Question 4.

Simplify :

$$(i) 5 - \left(\frac{8}{11} - 3\frac{3}{11} \right)$$

$$(ii) \frac{1}{2} \div \left(\frac{7}{8} - \frac{3}{5} \right)$$

$$(iii) 2\frac{1}{3} \div \left(5\frac{1}{2} + 3\frac{3}{4} \right)$$

$$(iv) \left(3\frac{7}{8} - 3\frac{3}{5} \right) \div \frac{1}{2}$$

$$(v) \frac{4}{7} \div \left(\frac{1}{3} \times 2\frac{4}{5} \right)$$

$$(vi) \frac{3}{4} \div \left(\frac{1}{6} \div \frac{1}{2} \right)$$

$$(vii) \left(\frac{1}{4} - \frac{1}{6} \right) \text{ of } \left(\frac{2}{3} - \frac{5}{12} \right) \times \left(\frac{5}{8} - \frac{7}{12} \right)$$

Solution:

$$\begin{aligned}(i) 5 - \left(\frac{8}{11} - 3\frac{3}{11} \right) &= 5 - \left(\frac{8}{11} - \frac{36}{11} \right) \\&= 5 - \frac{8}{11} + \frac{36}{11} = \frac{55 - 8 + 36}{11} \\&= \frac{55 + 36 - 8}{11} = \frac{83}{11} = 7\frac{6}{11}\end{aligned}$$

$$\begin{aligned}(ii) \frac{1}{2} \div \left(\frac{7}{8} - \frac{3}{5} \right) &= \frac{1}{2} \div \left(\frac{5 \times 7 - 8 \times 3}{40} \right) \\&= \frac{1}{2} \div \left(\frac{35 - 24}{40} \right) = \frac{1}{2} \div \left(\frac{11}{40} \right) \\&= \frac{1}{2} \times \frac{40}{11} = \frac{20}{11} = 1\frac{9}{11}\end{aligned}$$

$$\begin{aligned}
 \text{(iii)} \quad 2\frac{1}{3} \div \left(5\frac{1}{2} + 3\frac{3}{4}\right) &= \frac{7}{3} \div \left(\frac{11}{2} + \frac{15}{4}\right) \\
 &= \frac{7}{3} \div \left(\frac{2 \times 11 + 1 \times 15}{4}\right) \\
 &= \frac{7}{3} \div \left(\frac{22 + 15}{4}\right) = \frac{7}{3} \div \left(\frac{37}{4}\right) \\
 &= \frac{7}{3} \times \frac{4}{37} = \frac{28}{111}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad \left(3\frac{7}{8} - 3\frac{3}{5}\right) \div \frac{1}{2} & \\
 &= \left(\frac{31}{8} - \frac{18}{5}\right) \div \frac{1}{2} \\
 &= \left(\frac{31 \times 5}{8 \times 5} - \frac{18 \times 8}{5 \times 8}\right) \div \frac{1}{2} \\
 &= \left(\frac{155}{40} - \frac{144}{40}\right) \div \frac{1}{2} \\
 &= \frac{11}{40} \div \frac{1}{2} = \frac{11}{40} \times \frac{2}{1} = \frac{11}{20}
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} \quad \frac{4}{7} \div \left(\frac{1}{3} \times 2\frac{4}{5}\right) & \\
 &= \frac{4}{7} \div \left(\frac{1}{3} \times \frac{14}{5}\right) = \frac{4}{7} \div \left(\frac{14}{15}\right) \\
 &= \frac{4}{7} \times \frac{15}{14} = \frac{60}{98} = \frac{30}{49}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vi)} \quad \frac{3}{4} \div \left(\frac{1}{6} \div \frac{1}{2}\right) & \\
 &= \frac{3}{4} \div \left(\frac{1}{6} \times \frac{2}{1}\right) = \frac{3}{4} \div \left(\frac{1}{3}\right) \\
 &= \frac{3}{4} \times \frac{3}{1} = \frac{9}{4} = 2\frac{1}{4}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad \left(\frac{1}{4} - \frac{1}{6}\right) \text{ of } \left(\frac{2}{3} - \frac{5}{12}\right) \times \left(\frac{5}{8} - \frac{7}{12}\right) & \\
 &= \left(\frac{3-2}{12}\right) \text{ of } \left(\frac{8-5}{12}\right) \times \left(\frac{15-14}{24}\right) \\
 &= \left(\frac{1}{12}\right) \text{ of } \left(\frac{3}{12}\right) \times \left(\frac{1}{24}\right) \\
 &= \frac{1}{12} \text{ of } \frac{3}{12} \times \frac{1}{24} \\
 &= \frac{1}{12} \times \frac{1}{96} = \frac{1}{1152}
 \end{aligned}$$

Question 5.

Simplify :

$$(i) \left(\frac{1}{2} + \frac{1}{3} \right) \div \left(\frac{1}{4} - \frac{1}{6} \right)$$

$$(ii) \left(\frac{24}{35} \div \frac{6}{7} + \frac{5}{9} \right) \times \frac{3}{4}$$

$$(iii) \frac{3}{4} \text{ of } 6\frac{1}{8} - \frac{2}{3} \text{ of } 2\frac{1}{4}$$

$$(iv) \frac{7}{30} \text{ of } \left(\frac{1}{3} + \frac{7}{15} \right) \div \left(\frac{5}{6} - \frac{3}{5} \right)$$

$$(v) 2\frac{1}{2} - 3\frac{1}{2} \times 1\frac{3}{4} + 2\frac{1}{2}$$

$$(vi) 4\frac{5}{7} \left(3\frac{1}{8} \div \frac{11}{12} \right)$$

$$(vii) \frac{2}{5} \text{ of } \left(\frac{1}{7} - \frac{1}{12} \right) \text{ of } 1\frac{2}{5}$$

$$(viii) \left(\frac{1}{2} - \frac{1}{3} \right) \left(\frac{3}{4} - \frac{4}{5} \right) \div \left(\frac{1}{2} - \frac{2}{5} + \frac{1}{7} \right)$$

$$(ix) \frac{5}{6} - \frac{3}{5} \left(\frac{1}{3} + \frac{2}{11} \right)$$

$$(x) 4\frac{2}{3} \div \left(3 - \frac{1}{2} \right) + \left(\frac{2}{5} \div 1\frac{1}{5} \right)$$

$$(xi) \frac{1}{2} \text{ of } 40 + 1\frac{3}{4} \text{ of } 2\frac{2}{9} + 2\frac{1}{5} \times 0$$

$$(xii) \left(1 \div 2\frac{1}{5} \right) \div 2\frac{1}{5} \text{ of } 2\frac{1}{2} - 2$$

$$(xiii) 2\frac{6}{11} \text{ of } 1\frac{2}{7} \div 2\frac{2}{11}$$

Solution:

$$\begin{aligned}(i) \quad & \left(\frac{1}{2} + \frac{1}{3}\right) \div \left(\frac{1}{4} - \frac{1}{6}\right) \\& = \left(\frac{3+2}{6}\right) \div \left(\frac{3-2}{12}\right) = \left(\frac{5}{6}\right) \div \left(\frac{1}{12}\right) \\& = \frac{5}{6} \times \frac{12}{1} = \mathbf{10}\end{aligned}$$

$$\begin{aligned}(ii) \quad & \left(\frac{24}{35} \div \frac{6}{7} + \frac{5}{9}\right) \times \frac{3}{4} \\& = \left(\frac{24}{35} \times \frac{7}{6} + \frac{5}{9}\right) \times \frac{3}{4} = \left(\frac{4}{5} + \frac{5}{9}\right) \times \frac{3}{4} \\& = \left(\frac{36+25}{45}\right) \times \frac{3}{4} \\& = \frac{61}{45} \times \frac{3}{4} = \frac{61}{60} = \mathbf{1\frac{1}{60}}\end{aligned}$$

$$\begin{aligned}(iii) \quad & \frac{3}{4} \text{ of } 6\frac{1}{8} - \frac{2}{3} \text{ of } 2\frac{1}{4} \\& = \frac{3}{4} \text{ of } \frac{49}{8} - \frac{2}{3} \text{ of } \frac{9}{4} \\& = \frac{3}{4} \times \frac{49}{8} - \frac{2}{3} \times \frac{9}{4} \\& = \frac{147}{32} - \frac{3}{2} = \frac{147-48}{32} = \frac{99}{32} \\& = \mathbf{3\frac{3}{32}}\end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad & \frac{7}{30} \text{ of } \left(\frac{1}{3} + \frac{7}{15} \right) \div \left(\frac{5}{6} - \frac{3}{5} \right) \\
 &= \frac{7}{30} \text{ of } \left(\frac{5+7}{15} \right) \div \left(\frac{25-18}{30} \right) \\
 &= \frac{7}{30} \times \frac{12}{15} \div \left(\frac{7}{30} \right) \\
 &= \frac{7}{30} \times \frac{12}{15} \times \frac{30}{7} = \frac{12}{15} = \frac{4}{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{(v)} \quad & 2\frac{1}{2} - 3\frac{1}{2} \times 1\frac{3}{4} + 2\frac{1}{2} \\
 &= \frac{5}{2} - \frac{7}{2} \times \frac{7}{4} + \frac{5}{2} \\
 &= \frac{5}{2} - \frac{49}{8} + \frac{5}{2} = \frac{5}{2} + \frac{5}{2} - \frac{49}{8} \\
 &= \frac{20+20-49}{8} = -\frac{9}{8} = -1\frac{1}{8}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vi)} \quad & 4\frac{5}{7} \left(3\frac{1}{8} \div \frac{11}{12} \right) = \frac{33}{7} \left(\frac{25}{8} \div \frac{11}{12} \right) \\
 &= \frac{33}{7} \left(\frac{25}{8} \times \frac{12}{11} \right) = \frac{33}{7} \left(\frac{75}{22} \right) \\
 &= \frac{33}{7} \times \frac{75}{22} = \frac{225}{14} = 16\frac{1}{14}
 \end{aligned}$$

$$\begin{aligned}
 \text{(vii)} \quad & \frac{2}{5} \text{ of } \left(\frac{1}{7} - \frac{1}{12} \right) \text{ of } 1\frac{2}{5} \\
 &= \frac{2}{5} \text{ of } \left(\frac{12-7}{84} \right) \text{ of } \frac{7}{5} \\
 &= \frac{2}{5} \text{ of } \left(\frac{5}{84} \right) \text{ of } \frac{7}{5} \\
 &= \frac{2}{5} \times \frac{5}{84} \times \frac{7}{5} = \frac{1}{30}
 \end{aligned}$$

$$\begin{aligned}
 \text{(viii)} \quad & \left(\frac{1}{2} - \frac{1}{3} \right) \left(\frac{3}{4} - \frac{4}{5} \right) \div \left(\frac{1}{2} - \frac{2}{5} + \frac{1}{7} \right) \\
 &= \left(\frac{3-2}{6} \right) \left(\frac{15-16}{20} \right) \div \left(\frac{35-28+10}{70} \right) \\
 &= \left(\frac{1}{6} \right) \left(\frac{-1}{20} \right) \div \left(\frac{17}{70} \right) = \frac{1}{6} \times \frac{-1}{20} \div \frac{17}{70} \\
 &= \frac{1}{6} \times \frac{-1}{20} \times \frac{70}{17} = -\frac{7}{204}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ix)} \quad \frac{5}{6} - \frac{3}{5} \left(\frac{1}{3} + \frac{2}{11} \right) &= \frac{5}{6} - \frac{3}{5} \left(\frac{11+6}{33} \right) \\
 &= \frac{5}{6} - \frac{3}{5} \times \frac{17}{33} = \frac{5}{6} - \frac{17}{55} \\
 &= \frac{275-102}{330} = \frac{173}{330}
 \end{aligned}$$

$$\begin{aligned}
 \text{(x)} \quad 4\frac{2}{3} \div \left(3 - \frac{1}{2} \right) + \left(\frac{2}{5} \div 1\frac{1}{5} \right) \\
 &= \frac{14}{3} \div \left(3 - \frac{1}{2} \right) + \left(\frac{2}{5} \div \frac{6}{5} \right) \\
 &= \frac{14}{3} \div \left(\frac{6-1}{2} \right) + \left(\frac{2}{5} \times \frac{5}{6} \right) \\
 &= \frac{14}{3} \div \left(\frac{5}{2} \right) + \frac{1}{3} = \frac{14}{3} \times \frac{2}{5} + \frac{1}{3} \\
 &= \frac{28}{15} + \frac{1}{3} = \frac{28+5}{15} = \frac{33}{15} = \frac{11}{5} = 2\frac{1}{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{(xi)} \quad \frac{1}{2} \text{ of } 40 + 1\frac{3}{4} \text{ of } 2\frac{2}{9} + 2\frac{1}{5} \times 0 \\
 &= \frac{1}{2} \times 40 + \frac{7}{4} \times \frac{20}{9} + \frac{11}{5} \times 0 \\
 &= 20 + \frac{35}{9} + 0 = \frac{180+35}{9} = \frac{215}{9} \\
 &= 23\frac{8}{9}
 \end{aligned}$$

$$\begin{aligned}
 \text{(xii)} \quad \left(1 \div 2\frac{1}{5} \right) \div 2\frac{1}{5} \text{ of } 2\frac{1}{2} - 2 \\
 &= \left(1 \div \frac{11}{5} \right) \div \frac{11}{5} \text{ of } \frac{5}{2} - 2 \\
 &= \left(1 \times \frac{5}{11} \right) \div \frac{11}{5} \text{ of } \frac{5}{2} - 2 \\
 &= \frac{5}{11} \div \frac{11}{5} \times \frac{5}{2} - 2 = \frac{5}{11} \div \frac{11}{2} - 2 \\
 &= \frac{5}{11} \times \frac{2}{11} - 2 = \frac{10}{121} - 2 \\
 &= \frac{10-242}{121} = -\frac{232}{121} = -1\frac{111}{121}
 \end{aligned}$$

$$\text{(xiii)} \quad 2\frac{6}{11} \text{ of } 1\frac{2}{7} \div 2\frac{2}{11}$$

$$\begin{aligned}
 &= \frac{28}{11} \text{ of } \frac{9}{7} \div \frac{24}{11} \\
 &= \frac{28}{11} \times \frac{9}{7} \div \frac{24}{11} = \frac{36}{11} \div \frac{24}{11} \\
 &= \frac{36}{11} \times \frac{11}{24} = \frac{3}{2} = 1\frac{1}{2}
 \end{aligned}$$

EXERCISE 14(E)

Question 1.

From a rope of $10\frac{1}{2}$ m long, $4\frac{5}{8}$ m is cut off. Find the length of the remaining rope.

Solution:

$$\text{Length of rope} = 10\frac{1}{2}m$$

$$\text{Length of cut off rope} = 4\frac{5}{8}m$$

$$\begin{aligned}
 \text{Remaining rope} &= \left(10\frac{1}{2}m - 4\frac{5}{8}m\right) \\
 &= \frac{21}{2}m - \frac{37}{8}m \\
 &= \frac{84 - 37}{8} = \frac{47}{8} = 5\frac{7}{8}m.
 \end{aligned}$$

Question 2.

A piece of cloth is 5 metre long. After washing, it shrinks by $\frac{1}{25}$ of its length. What is the length of the cloth after washing?

Solution:

$$\text{Length of a piece of cloth} = 5 \text{ m}$$

After washing, it is shrunk

$$= \frac{1}{25} \text{ of } 5 \text{ m} = \frac{1}{5} \text{ m}$$

Length of cloth after washing

$$= \left(5 - \frac{1}{5}\right) \text{ m}$$

$$= \frac{25-1}{5} = \frac{24}{5} \text{ m} = 4\frac{4}{5} \text{ m}$$

Question 3.

I bought wheat worth Rs. $12\frac{1}{2}$, rice worth Rs. $25\frac{3}{4}$ and vegetables worth Rs. $10\frac{1}{4}$. If I gave a hundred-rupee note to the shopkeeper; how much did he return to me

Solution:

Money given to Shopkeeper = Rs. 100

Total Amount of goods bought

$$= \text{Rs.} \left(12\frac{1}{2} + 25\frac{3}{4} + 10\frac{1}{4} \right)$$

(Wheat, Rice and Vegetable)

$$= \frac{25}{2} + \frac{103}{4} + \frac{41}{4}$$

$$= \frac{50 + 103 + 41}{4} = \text{Rs.} \frac{194}{4}$$

∴ Money returned by shopkeeper

$$= \text{Rs.} \left(100 - \frac{194}{4} \right) = \text{Rs.} \frac{400 - 194}{4}$$

$$= \frac{206}{4} = \text{Rs.} \frac{103}{2} = \text{Rs.} 51\frac{1}{2}.$$

Question 4.

Out of 500 oranges in a box, $\frac{3}{25}$ are rotten and $\frac{1}{5}$ are kept for some guests. How many oranges are left in the box?

Solution:

Number of oranges = 500

$$\begin{aligned} \text{Bad oranges} &= \frac{3}{25} \text{ of } 500 = \frac{3}{25} \times 500 \\ &= 60 \end{aligned}$$

$$\begin{aligned} \text{Kept for guests} &= \frac{1}{5} \text{ of } 500 \\ &= \frac{1}{5} \times 500 = 100 \end{aligned}$$

∴ No of oranges which can be used

$$= 500 - 60 - 100 = 500 - 160 = 340.$$

Question 5.

An ornament piece is made of gold and copper. Its total weight is 96g. If $\frac{1}{12}$ of the ornament is copper, find the weight of gold in it.

Solution:

Total weight = 96 g

$$\text{Weight of copper} = \frac{1}{12} \text{ of } 96$$

$$= \frac{1}{12} \times 96 = 8 \text{ gm}$$

$$\begin{aligned} \therefore \text{Weight of gold} &= \text{Total weight} - \\ \text{weight of copper} &= 96\text{g} - 8\text{g} = 88\text{g} \end{aligned}$$

Question 6.

A girl did half of some work on Monday and one-third of it on Tuesday. How much will she have to do on Wednesday in order to complete the work?

Solution:

Let total work done = 1

$$\text{Work done on Monday} = \frac{1}{2}$$

$$\text{Work done on Tuesday} = \frac{1}{3}$$

Work done on Wednesday = remaining work

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

$$= 1 - \frac{3+2}{6} = 1 - \frac{5}{6}$$

$$= \frac{6-5}{6} = \frac{1}{6}$$

Work done on Wednesday = $\frac{1}{6}$ of work

Question 7.

A man spends $\frac{3}{8}$ of his money and still has Rs. 720 left with him. How much money did he have at first?

Solution:

Let a man has money = Re. 1

$$\text{Amount spent} = \frac{3}{8} \text{ of Re. 1} = \text{Rs. } \frac{3}{8}$$

$$\text{Amount left} = 1 - \frac{3}{8} = \frac{8-3}{8} = \text{Re. } \frac{5}{8}$$

$$\therefore \frac{5}{8} \text{ of his total money} = \text{Rs. 720}$$

$$\begin{aligned} \therefore \text{Total money} &= \text{Rs. } \frac{720 \times 8}{5} \\ &= \text{Rs. } 144 \times 8 = \text{Rs. 1152} \end{aligned}$$

Question 8.

In a school, $\frac{4}{5}$ of the students are boys, and the number of girls is 100. Find the number

of boys.

Solution:

Let the total number of boys and girls = x

Total number of boys = $\frac{4}{5}$ of $x = \frac{4x}{5}$

According to question, total strength of School,

$$x - \frac{4x}{5} = 100$$

$$\frac{5x - 4x}{5} = 100$$

$$\frac{x}{5} = 100 \Rightarrow x = 500$$

$$\begin{aligned}\therefore \text{Number of boys} &= \text{total strength} - \text{girls} \\ &= 500 - 100 = \mathbf{400}.\end{aligned}$$

Question 9.

After finishing $\frac{3}{4}$ of my journey, I find that 12 km of my journey is covered. How much distance is still left to be covered ?

Solution:

Let the total journey = x ,

distance covered = $\frac{3}{4} = 12$ km

Then, according to question $\frac{3}{4}$ of $x = 12$ km

$$x = 12 \times \frac{4}{3} \Rightarrow x = \mathbf{16 \text{ km}}$$

Distance left = total distance – distance cover = $16 - 12 = \mathbf{4 \text{ km}}$.

Question 10.

When Ajit travelled 15 km, he found that one-fourth of his journey was still left. What was the full length of the journey?

Solution:

Let the total length of journey = x

Journey travelled = 15 km

Journey still left = $\frac{1}{4}$ of x

Now, according to question,

$$x - 15 = \frac{1}{4} \text{ of } x$$

$$x - 15 = \frac{x}{4}$$

$$x - \frac{x}{4} = 15$$

$$\frac{4x - x}{4} = 15$$

$$3x = 15 \times 4$$

$$x = \frac{15 \times 4}{3} = 20 \text{ km}$$

$\therefore$ Total length of the journey = **20 km**.

Question 11.

In a particular month, a man earns Rs. 7,200. Out of this income, he spends $\frac{3}{10}$ on food, $\frac{1}{4}$ on house rent, $\frac{1}{10}$ on insurance and $\frac{2}{25}$ on holidays. How much did he save in that month ?

Solution:

Earning of a man in a particular month
= Rs. 7200

Amount spent on food = $\frac{3}{10}$ of Rs. 7200

= Rs. 2160

Amount spent on house rent

= $\frac{1}{4}$ of Rs. 7200 = Rs. 1800

Amount spent on insurance

= $\frac{1}{10}$ of Rs. 7200 = Rs. 720

Amount spent on holidays

= $\frac{2}{25}$ of Rs. 7200

= Rs. 2×288 = Rs. 576

∴ Total amount spent = Rs. (2160 + 1800
+ 720 + 576) = Rs. 5256

∴ Amount saved = Rs. 7200 – Rs. 5256
= Rs. 1944

REVISION EXERCISE

Question 1.

Show that $\frac{3}{7}$ lies between $\frac{2}{5}$ and $\frac{5}{7}$.

Solution:

$\frac{3}{7}$ will lie between $\frac{2}{5}$ and $\frac{5}{7}$ if

$$\frac{2}{5} > \frac{3}{7} > \frac{5}{7} \text{ or } \frac{2}{5} < \frac{3}{7} < \frac{5}{7}$$

Now, comparing $\frac{2}{5}$, $\frac{3}{7}$, $\frac{5}{7}$

L.C.M. of 5 and 7 = 35

$$\therefore \frac{2}{5} = \frac{2 \times 7}{5 \times 7} = \frac{14}{35}$$

$$\frac{3}{7} = \frac{3 \times 5}{7 \times 5} = \frac{15}{35}$$

$$\text{and } \frac{5}{7} = \frac{5 \times 5}{7 \times 5} = \frac{25}{35}$$

$$\therefore \frac{14}{35} < \frac{15}{35} < \frac{25}{35}$$

$$\frac{2}{5} < \frac{3}{7} < \frac{5}{7}$$

$\frac{3}{7}$ lies between $\frac{2}{5}$ and $\frac{5}{7}$

Question 2.

Show that $\frac{4}{5}$ lies between $\frac{3}{4}$ and $\frac{5}{6}$.

Solution:

$$\frac{3}{4} > \frac{4}{5} > \frac{5}{6} \text{ or } \frac{3}{4} < \frac{4}{5} < \frac{5}{6}$$

Now L.C.M. of 4, 5, 6 = 60

$$\therefore \frac{3}{4} = \frac{3 \times 15}{4 \times 15} = \frac{45}{60}$$

$$\frac{4}{5} = \frac{4 \times 12}{5 \times 12} = \frac{48}{60}$$

$$\frac{5}{6} = \frac{5 \times 10}{6 \times 10} = \frac{50}{60}$$

$$\therefore \frac{45}{60} < \frac{48}{60} < \frac{50}{60}$$

$$\Rightarrow \frac{3}{4} < \frac{4}{5} < \frac{5}{6}$$

Hence $\frac{4}{5}$ lies between $\frac{3}{4}$ and $\frac{5}{6}$

Question 3.

Evaluate :

$$(i) 3\frac{5}{6} - 1\frac{4}{15} - \left(3\frac{2}{9} - 1\frac{3}{5}\right)$$

$$(ii) \frac{3}{4} \text{ of } 1\frac{1}{2} \div 4\frac{1}{2}$$

$$(iii) \frac{5}{6} \text{ of } \frac{3}{4} \div \frac{7}{8} \times 1\frac{1}{2}$$

$$(iv) \frac{1}{3} + \frac{7}{9} \div \left(\frac{7}{10} \times 1\frac{1}{4}\right)$$

$$(v) 1\frac{4}{13} \text{ of } 2\frac{2}{7} \div \frac{68}{91} - \left(1\frac{1}{2} - 1\frac{1}{3}\right)$$

$$(vi) 8 - \left\{5\frac{1}{3} - \left(3 - 2\frac{1}{2}\right)\right\}$$

Solution:

$$(i) 3\frac{5}{6} - 1\frac{4}{15} - \left(3\frac{2}{9} - 1\frac{3}{5}\right)$$

$$= \frac{23}{6} - \frac{19}{15} - \left(\frac{29}{9} - \frac{8}{5}\right)$$

$$= \frac{23}{6} - \frac{19}{15} - \frac{29}{9} + \frac{8}{5}$$

$$= \frac{345 - 114 - 290 + 144}{90}$$

L.C.M. of 6, 15, 9, 5 = 90

$$= \frac{345 + 144 - 114 - 290}{90} = \frac{489 - 404}{90}$$

$$= \frac{85}{90} = \frac{85 \div 5}{90 \div 5} = \frac{17}{18}$$

$$(ii) \frac{3}{4} \text{ of } 1\frac{1}{2} + 4\frac{1}{2}$$

$$= \frac{3}{4} \text{ of } \frac{3}{2} + \frac{9}{2}$$

$$= \frac{9}{8} + \frac{9}{2} \quad (\text{first remove 'of'})$$

$$= \frac{9}{8} \times \frac{2}{9} = \frac{1}{4}$$

$$(iii) \frac{5}{6} \text{ of } \frac{3}{4} + \frac{7}{8} \times 1\frac{1}{2}$$

$$= \frac{5}{6} \text{ of } \frac{3}{4} + \frac{7}{8} \times \frac{3}{2}$$

$$= \frac{5}{8} + \frac{7}{8} \times \frac{3}{2} \quad (\text{first remove of})$$

$$= \frac{5}{8} \times \frac{8}{7} \times \frac{3}{2} \quad (\text{then remove } \div)$$

$$= \frac{15}{14} = 1\frac{1}{14}$$

$$(iv) \frac{1}{3} + \frac{7}{9} + \left(\frac{7}{10} \times 1\frac{1}{4} \right)$$

$$= \frac{1}{3} + \frac{7}{9} + \left(\frac{7}{10} \times \frac{5}{4} \right)$$

$$= \frac{1}{3} + \frac{7}{9} + \frac{7}{8} \quad (\text{remove bracket})$$

$$= \frac{1}{3} + \frac{7}{9} \times \frac{8}{7} \quad (\text{remove } \div)$$

$$= \frac{1}{3} + \frac{8}{9}$$

$$= \frac{3+8}{9} = \frac{11}{9} = 1\frac{2}{9}$$

$$(v) 1\frac{4}{13} \text{ of } 2\frac{2}{7} \div \frac{68}{91} - \left(1\frac{1}{2} - 1\frac{1}{3}\right)$$

$$= \frac{17}{13} \text{ of } \frac{16}{7} \div \frac{68}{91} - \left(\frac{3}{2} - \frac{4}{3}\right)$$

$$= \frac{17}{13} \text{ of } \frac{16}{7} \div \frac{68}{91} - \frac{3}{2} + \frac{4}{3}$$

(remove bracket)

$$= \frac{272}{91} \div \frac{68}{91} - \frac{3}{2} + \frac{4}{3} \quad (\text{remove 'of'})$$

$$= \frac{272}{91} \times \frac{91}{68} - \frac{3}{2} + \frac{4}{3}$$

$$= \frac{4}{1} - \frac{3}{2} + \frac{4}{3} \quad (\text{remove 'x'})$$

$$= \frac{24-9+8}{6} = \frac{32-9}{6}$$

$$= \frac{23}{6} = 3\frac{5}{6}$$

$$(vi) 8 - \left\{5\frac{1}{3} - \left(3 - 2\frac{1}{2}\right)\right\}$$

$$= 8 - \left\{\frac{16}{3} - \left(3 - \frac{5}{2}\right)\right\}$$

$$= 8 - \left\{\frac{16}{3} - 3 + \frac{5}{2}\right\}$$

$$= \frac{8}{1} - \frac{16}{3} + \frac{3}{1} - \frac{5}{2}$$

$$= \frac{48-32+18-15}{6} = \frac{48+18-32-15}{6}$$

$$= \frac{66-47}{6} = \frac{19}{6} = 3\frac{1}{6}$$

Question 4.

Mr. Mehra gave one-third of his money to his son, one-fifth of his money to his daughter and the remaining amount to his wife. If his wife got Rs. 91,000, how much money did Mr. Mehra have originally?

Solution:

Let Mr. Mehra has money = 1

$$\text{Money given to his son} = \frac{1}{3}$$

$$\text{and money given to his daughter} = \frac{1}{5}$$

∴ Remaining money given to his wife

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

$$= 1 - \frac{5+3}{15}$$

$$= 1 - \frac{8}{15} = \frac{15-8}{15} = \frac{7}{15}$$

$$\therefore \frac{7}{15} \text{ of his money} = \text{Rs. 91000}$$

$$\begin{aligned} \therefore \text{Total money} &= \text{Rs. } \frac{91000 \times 15}{7} \\ &= \text{Rs. } 13,000 \times 15 = \text{Rs. 1,95,000} \end{aligned}$$

Question 5.

A sum of Rs. 84,000 is divided among three persons A, B and C. If A gets one-fourth of it and B gets one-fifth of it; how much did C get ?

Solution:

Total money = Rs. 84,000

$$\text{A gets} = \frac{1}{4} \text{ of } 84,000 = \text{Rs. 21,000}$$

$$\text{B gets} = \frac{1}{5} \text{ of } 84,000 = \text{Rs. 16,800}$$

∴ C gets remaining money

$$\therefore \text{C's share} = \text{Rs. 84,000} - (\text{Rs. 21,000} + \text{Rs. 16,800})$$

$$= \text{Rs. 84,000} - (37,800) = \text{Rs. 46,200}$$

Question 6.

In one hour Rohit walks $3\frac{2}{5}$ km. How much distance will he cover in $2\frac{1}{2}$ hours?

Solution:

$$\text{Distance covered in 1 hour} = 3\frac{2}{5} = \frac{17}{5} \text{ km}$$

$$\text{Distance covered in } 2\frac{1}{2} \text{ hours}$$

$$= 3\frac{2}{5} \times 2\frac{1}{2} \text{ km} = \frac{17}{5} \times \frac{5}{2} \text{ km}$$

$$= \frac{17}{2} = 8\frac{1}{2} \text{ km}$$

Question 7.

An 84 m long string is cut into pieces each of length $5\frac{1}{4}$ m. How many pieces are obtained ?

Solution:

$$\text{Length of string} = 84 \text{ m}$$

$$\text{Length of each piece} = 5\frac{1}{4} \text{ m} = \frac{21}{4} \text{ m}$$

$$\text{Number of pieces} = 84 \div \frac{21}{4}$$

$$= 84 \times \frac{4}{21} = 4 \times 4 = 16$$

Question 8.

In buying a ready made shirt-two-fifths of my pocket money is spent If Rs. 540 is still left with me, find :

(i) The money I had before I bought the shirt.

(ii) The cost of the shirt

Solution:

Let total money in the pocket = 1

$$\text{Amount spent on shirt} = \frac{2}{5}$$

$$\text{Balance amount} = 1 - \frac{2}{5} = \frac{5-2}{5} = \frac{3}{5}$$

$$\text{Now } \frac{3}{5} \text{ of total money} = \text{Rs. 540}$$

$$\begin{aligned} (i) \therefore \text{Total money} &= \text{Rs. 540} \times \frac{5}{3} = 180 \times 5 \\ &= \text{Rs. 900} \end{aligned}$$

$$\begin{aligned} (ii) \text{Cost of shirt} &= \frac{2}{5} \text{ of Rs. 900} = \text{Rs. } 2 \times 180 \\ &= \text{Rs. 360} \end{aligned}$$

Question 9.

Mohan leaves Rs. 1,20,000 to his wife and three children such that two-fifths of this money is given to his wife and the remaining is distributed equally among the children. Find, how much each child gets ?

Solution:

Total amount = Rs. 12,0,000

Amount given to his wife = $\frac{2}{5}$ of Rs. 1,20,000
= Rs. 2 × 24,000 = Rs. 48,000

Remaining amount = Rs. 120000 – Rs. 48000 = Rs. 72000

This amount is distributed among three children equally.

Each's share = Rs. 72,000 × $\frac{1}{3}$ = Rs. 24,000

Question 10.

Simplify :

$$(i) 3\frac{5}{8} \text{ of } 2\frac{2}{3} \div 1\frac{3}{8}$$

$$(ii) \left(1 \div 3\frac{1}{3}\right) \times 3\frac{1}{3} \text{ of } 7\frac{2}{9} - 6$$

$$(iii) \frac{3}{4} \times 1\frac{1}{3} \div \frac{3}{7} \text{ of } 2\frac{5}{8}$$

Solution:

$$(i) 3\frac{5}{8} \text{ of } 2\frac{2}{3} \div 1\frac{3}{8}$$

$$= \frac{29}{8} \text{ of } \frac{8}{3} \div \frac{11}{8}$$

$$= \frac{29}{3} \div \frac{11}{8} \quad (\text{Removing 'of'})$$

$$= \frac{29}{3} \times \frac{8}{11} = \frac{232}{33} = 7\frac{1}{33}$$

$$(ii) \left(1 \div 3\frac{1}{3}\right) \times 3\frac{1}{3} \text{ of } 7\frac{2}{9} - 6$$

$$= \left(1 \div \frac{10}{3}\right) \times \frac{10}{3} \text{ of } \frac{65}{9} - 6$$

$$= \left(1 \times \frac{3}{10}\right) \times \frac{10}{3} \text{ of } \frac{65}{9} - 6$$

$$= \frac{3}{10} \times \frac{10}{3} \text{ of } \frac{65}{9} - 6 \quad (\text{Removing bracket})$$

$$= \frac{3}{10} \times \frac{650}{27} - \frac{6}{1} \quad (\text{Removing 'of'})$$

$$= \frac{65}{9} - \frac{6}{1} \quad (\text{Removing '×'})$$

$$= \frac{65-54}{9} = \frac{11}{9} = 1\frac{2}{9}$$

$$(iii) \frac{3}{4} \times 1\frac{1}{3} \div \frac{3}{7} \text{ of } 2\frac{5}{8}$$

$$= \frac{3}{4} \times \frac{4}{3} \div \frac{3}{7} \text{ of } \frac{21}{8}$$

$$= \frac{3}{4} \times \frac{4}{3} \div \frac{9}{8} \quad (\text{Removing 'of'})$$

$$= \frac{3}{4} \times \frac{4}{3} \times \frac{8}{9} \quad (\text{Removing ÷})$$

$$= \frac{8}{9}$$