Fractions

IMPORTANT POINTS

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 unlike 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 $\frac{1}{2} = \frac{2}{4} = \frac{6}{12} = \frac{8}{16}$.

CONVERTION 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., $2\frac{5}{15}$

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

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

$\therefore \frac{2}{7}, \frac{3}{5}$ and $\frac{1}{3} = \frac{30}{105}, \frac{63}{105}$ and $\frac{35}{103}$

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*) $\frac{5}{8}$ is .....fraction.

(*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 $\frac{7}{15}$ are .....fractions.

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

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

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 :

$\frac{2}{9}, \frac{4}{3}, \frac{7}{15}, \frac{11}{20}, \frac{20}{11}, \frac{18}{23}$ 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 them its denominator :

$\frac{2}{9}, \frac{7}{15}, \frac{11}{20}, \frac{18}{23}$ and $\frac{27}{35}$ are proper fractions and $\frac{4}{3}, \frac{20}{11}$ are imporper 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) $2\frac{1}{5} = \frac{2\times5+1}{5} = \frac{10+1}{5} = \frac{11}{5}$

(ii) $3\frac{1}{4} = \frac{3\times4+1}{4} = \frac{12+1}{4} = \frac{13}{4}$

(iii) $7\frac{1}{8} = \frac{7\times8+1}{8} = \frac{56+1}{8} = \frac{57}{8}$

(iv) $2\frac{1}{11} = \frac{2\times11+1}{11} = \frac{22+1}{11} = \frac{23}{11}$

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

2	3, 5, 4, 6
3	3, 5, 2, 3
	1, 5, 2, 1

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

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

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

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

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

2	6, 8, 12, 10
2	3, 4, 6, 5
3	3, 2, 3, 5
	1, 2, 1, 5

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

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

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

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

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

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

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

2	7, 8, 14 16
7	7, 4, 7, 8
4	1, 4, 1, 8
	1, 1, 1, 2

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

Now, $\frac{2}{7} = \frac{2 \times 16}{7 \times 16} = \frac{32}{112}$; $\frac{7}{8} = \frac{7 \times 14}{8 \times 14}$

$= \frac{98}{112}$; $\frac{5}{14} = \frac{5 \times 8}{14 \times 8} = \frac{40}{112}$; $\frac{9}{16}$

$= \frac{9 \times 7}{16 \times 7} = \frac{63}{112}$

$\therefore \frac{2}{7}, \frac{7}{8}, \frac{5}{14}, \frac{9}{16}$

$= \mathbf{\frac{32}{112}, \frac{98}{112}, \frac{40}{112}, \frac{63}{112}}$

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

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

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

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

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

Question 2.

State, whether true or false ?

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

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

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

Solution:

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

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

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

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

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

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

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

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

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

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

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

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

Question 3.

Which fraction is greater ?

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

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

Solution:

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

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

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

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

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

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

Converting in like fraction,

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

$\frac{3}{4} > \frac{5}{9}$ [as its numerator is greater]

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

Converting in like fraction,

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

$\frac{11}{14} > \frac{26}{35}$ [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*) $\frac{3}{8}$ or $\frac{4}{5}$

Converting in like fraction

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

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

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

Converting into like fraction

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

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

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

Converting the like fraction

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

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

Question 5.

Arrange the given fractions in descending order of magnitude :

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

∴L.C.M. of 16, 24, 8 = 2 × 2 × 2 × 2 × 3 = 48

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

Converting into like fractions

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

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

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,

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

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

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 numerator 5, 3, 9 = 45

3	5, 3, 9
5	5, 1, 3
3	1, 1, 3
	1, 1, 1

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

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

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

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

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

$= 48$

4	16, 12, 4
4	4, 3, 1
3	1, 3, 1
	1, 1, 1

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

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

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

Arranging in ascending order,

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

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

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

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

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

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

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

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

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

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

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

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

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*) $\frac{6}{11} \cdots \frac{5}{9}$ **(*ii*)** $\frac{3}{7} \cdots \frac{9}{13}$

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

Solution:

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

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

$\therefore \frac{6}{11} = \frac{6\times9}{11\times9} = \frac{54}{99}$

and $\frac{5}{9} = \frac{5\times11}{9\times11} = \frac{55}{99}$

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

$\therefore \frac{3}{7} = \frac{3\times13}{7\times13} = \frac{39}{91}$

and $\frac{9}{13} = \frac{9\times7}{13\times7} = \frac{63}{91}$

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

$\therefore \frac{56\times1}{64\times1} = \frac{56}{64}$

$\frac{7}{8} = \frac{7\times8}{8\times8} = \frac{56}{64}$

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

$\frac{5}{12} = \frac{5\times11}{12\times11} = \frac{55}{132}$

and $\frac{8}{33} = \frac{8\times4}{33\times4} = \frac{32}{132}$

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 = $\frac{50}{36}$

$= \frac{50\div2}{36\div2} = \frac{25}{18}$

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

$= \frac{14}{50} = \frac{14\div2}{50\div2} = \frac{7}{25}$

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 $\frac{3}{8}$

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

$= \frac{7\times 2}{4\times 2} + \frac{3}{8}$ (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)

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

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

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

(*iii*) $1\frac{7}{8}+1\frac{1}{2}+1\frac{3}{4}$

$$=\frac{1\times 8+7}{8}+\frac{1\times 2+1}{2}+\frac{1\times 4+3}{4}$$

$$=\frac{15}{8}+\frac{3}{2}+\frac{7}{4}=\frac{15\times 1}{8\times 1}+\frac{3\times 4}{2\times 4}+\frac{7\times 2}{4\times 2}$$

$$=\frac{15}{8}+\frac{12}{8}+\frac{14}{8}=\frac{15+12+14}{8}$$

(L.C.M. 8, 2 and 4 is 8)

$$=\frac{41}{8}=\mathbf{5\frac{1}{8}}$$

(*iv*) $3\frac{3}{4}+2\frac{1}{6}+1\frac{5}{8}$

$$=\frac{3\times 4+3}{4}+\frac{2\times 6+1}{6}+\frac{1\times 8+5}{8}$$

$=\frac{15}{4}+\frac{13}{6}+\frac{13}{8}$ (L.C.M. 4, 6 and 8 is 24)

$$=\frac{15\times 6}{4\times 6}+\frac{13\times 4}{6\times 4}+\frac{13\times 3}{8\times 3}$$

$$=\frac{90}{24}+\frac{52}{24}+\frac{39}{24}=\frac{181}{24}=\mathbf{7\frac{13}{24}}$$

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

$$=\frac{26}{9}+\frac{11}{18}+\frac{23}{6}=\frac{26\times 2}{9\times 2}+\frac{11}{18}+\frac{23\times 3}{6\times 3}$$

(LCM of 9, 18 and 6 = 18)

$$=\frac{52}{18}+\frac{11}{18}+\frac{69}{18}$$

$$=\frac{52+11+69}{18}=\frac{132}{18}=\frac{132\div 6}{18\div 6}$$

$$=\frac{22}{3}=7\frac{1}{3}$$

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

$=\frac{3\times 8+1}{8}+\frac{5\times 12+5}{12}+\frac{5}{16}$

$=\frac{25}{8}+\frac{65}{12}+\frac{5}{16}$

(L.C.M. 8, 12 and 16 is 48)

$=\frac{25\times 6}{8\times 6}+\frac{65\times 4}{12\times 4}+\frac{5\times 3}{16\times 3}$

$=\frac{150}{48}+\frac{260}{48}+\frac{15}{48}$

$=\frac{150+260+15}{48}$

$=\frac{425}{48}=\mathbf{8\frac{41}{48}}$

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:

(*i*) $1\frac{11}{12} - \frac{13}{16} = \frac{23}{12} - \frac{13}{16}$

$= \frac{23\times4}{12\times4} - \frac{13\times3}{16\times3}$ (LCM of 12, 16 = 48)

$= \frac{92}{48} - \frac{39}{48} = \frac{92-39}{48}$

$= \frac{53}{48} = 1\frac{5}{48}$

(*ii*) $2\frac{3}{4} - 1\frac{5}{6} = \frac{11}{4} - \frac{11}{6} = \frac{11\times6}{4\times6} - \frac{11\times4}{6\times4}$

$= \frac{66}{24} - \frac{44}{24}$

$= \frac{66-44}{24} = \frac{22}{24} = \mathbf{\frac{11}{12}}$

(*iii*) $2\frac{5}{7} + \frac{3}{14} - \frac{13}{21}$

$= \frac{19}{7} + \frac{3}{14} - \frac{13}{21}$

$= \frac{19\times6}{7\times6} + \frac{3\times3}{14\times3} - \frac{13\times2}{21\times2}$

(LCM of 7, 14, 21 = 42)

$= \frac{114}{42} + \frac{9}{42} - \frac{26}{42}$

$= \frac{114+9-26}{42} = \frac{123-26}{42}$

$= \frac{97}{42} = 2\frac{13}{42}$

(*iv*) $3\frac{5}{6} - \frac{1}{6} - 1\frac{1}{12} = \frac{23}{6} - \frac{1}{6} - \frac{13}{12}$

$= \frac{23 \times 2}{6 \times 2} - \frac{1 \times 2}{6 \times 2} - \frac{13}{12}$

$= \frac{46}{12} - \frac{2}{12} - \frac{13}{12} = \frac{46 - 2 - 13}{12}$

$= \frac{46 - 15}{12} = \frac{31}{12} = 2\frac{7}{12}$

(*v*) $6 + \frac{3}{10} - 1\frac{8}{15}$

$= \frac{6}{1} + \frac{3}{10} - \frac{23}{15}$

$= \frac{6 \times 30}{1 \times 30} + \frac{3 \times 3}{10 \times 3} - \frac{23 \times 2}{15 \times 2}$

(LCM of 1, 10, 15 = 30)

$= \frac{180}{30} + \frac{9}{30} - \frac{46}{30}$

$= \frac{180 + 9 - 46}{30} = \frac{189 - 46}{30}$

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

(*vi*) $1\frac{3}{4} + 2\frac{5}{7} - 1\frac{3}{14} = \frac{7}{4} + \frac{19}{7} - \frac{17}{14}$

$$= \frac{7 \times 7}{4 \times 7} + \frac{19 \times 4}{7 \times 4} - \frac{17 \times 2}{14 \times 2}$$

$$= \frac{49}{28} + \frac{76}{28} - \frac{34}{28} = \frac{49 + 76 - 34}{28} = \frac{91}{28}$$

$$= 3\frac{7}{28} = \mathbf{3\frac{1}{4}}$$

(*vii*) $4 + 3\frac{1}{8} - 3\frac{1}{6}$

$$= \frac{4}{1} + \frac{25}{8} - \frac{19}{6}$$

$$= \frac{4 \times 24}{1 \times 24} + \frac{25 \times 3}{8 \times 3} - \frac{19 \times 4}{6 \times 4}$$

(LCM of 8, 6 = 24)

$$= \frac{96}{24} + \frac{75}{24} - \frac{76}{24}$$

$$= \frac{96 + 75 - 76}{24} = \frac{95}{24} = 3\frac{23}{24}$$

(*viii*) $6 - 3\frac{1}{2} - 2\frac{1}{5}$

$$= \frac{6}{1} - \frac{7}{2} - \frac{11}{5}$$

$$= \frac{6 \times 10}{1 \times 10} - \frac{7 \times 5}{2 \times 5} - \frac{11 \times 2}{5 \times 2}$$

(LCM of 2, 5 = 10)

$$= \frac{60}{10} - \frac{35}{10} - \frac{22}{10}$$

$$= \frac{60 - 35 - 22}{10} = \frac{60 - 57}{10} = \frac{3}{10}$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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*) $\frac{7}{6}$ of $\frac{3}{14}$

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

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

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

Solution:

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

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

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

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

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

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

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

[Using Bodmas $\frac{1}{2}$ of $\frac{1}{3} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$]

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

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

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

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

Question 2.

Simplify :

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

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

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

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

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

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

Solution:

(*i*)

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

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

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

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

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

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

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

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

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

Question 3.
Simplify:

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

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

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

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

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

Solution:

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

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

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

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

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

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

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

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

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

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

$$\left[\frac{2}{7} \text{ of } 1\frac{1}{3} = \frac{2}{7} \times \frac{4}{3} = \frac{8}{21}\right]$$

$$= \frac{9}{4} \div \frac{8}{21} \times \frac{2}{3}$$

$$= \frac{9}{4} \times \frac{21}{8} \times \frac{2}{3} = \frac{63}{16} = \mathbf{3\frac{15}{16}}$$

(*vi*) $\left(\frac{3}{7} \div \frac{1}{2}\right) \text{ of } 1\frac{1}{7} = \frac{3}{7} \times \frac{2}{1} \text{ of } \frac{8}{7}$

$$\left[\frac{2}{1} \text{of} \frac{8}{7} = \frac{2 \times 8}{7 \times 1} = \frac{16}{7}\right]$$

$$= \frac{3}{7} \times \frac{16}{7} = \mathbf{\frac{48}{49}}$$

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

$$= \left(\frac{15}{8} \div \frac{3}{2}\right) \text{ of } \left(\frac{25}{3} \div \frac{3}{2}\right)$$

$$= \frac{15}{8} \times \frac{2}{3} \text{ of } \frac{25}{3} \times \frac{2}{3}$$

$$= \frac{5}{4} \text{ of } \frac{50}{9} = \frac{5}{4} \times \frac{50}{9} = \frac{125}{18} = \mathbf{6\frac{17}{18}}$$

(*viii*) $\frac{1}{3} \text{ of } 60 \div 60 = \frac{1}{3} \times \frac{60}{1} \div \frac{60}{1}$

$$= 20 \times \frac{1}{60} = \frac{20}{60} = \mathbf{\frac{1}{3}}$$

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

Solution:

(*i*) $5-\left(\frac{8}{11}-3\frac{3}{11}\right)=5-\left(\frac{8}{11}-\frac{36}{11}\right)$

$=5-\frac{8}{11}+\frac{36}{11}=\frac{55-8+36}{11}$

$=\frac{55+36-8}{11}=\frac{83}{11}=7\frac{6}{11}$

(*ii*) $\frac{1}{2}\div\left(\frac{7}{8}-\frac{3}{5}\right)=\frac{1}{2}\div\left(\frac{5\times 7-8\times 3}{40}\right)$

$=\frac{1}{2}\div\left(\frac{35-24}{40}\right)=\frac{1}{2}\div\left(\frac{11}{40}\right)$

$=\frac{1}{2}\times\frac{40}{11}=\frac{20}{11}=1\frac{9}{11}$

(*iii*) $2\frac{1}{3} \div \left(5\frac{1}{2} + 3\frac{3}{4}\right) = \frac{7}{3} \div \left(\frac{11}{2} + \frac{15}{4}\right)$

$= \frac{7}{3} \div \left(\frac{2 \times 11 + 1 \times 15}{4}\right)$

$= \frac{7}{3} \div \left(\frac{22 + 15}{4}\right) = \frac{7}{3} \div \left(\frac{37}{4}\right)$

$= \frac{7}{3} \times \frac{4}{37} = \mathbf{\frac{28}{111}}$

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

$= \left(\frac{31}{8} - \frac{18}{5}\right) \div \frac{1}{2}$

$= \left(\frac{31 \times 5}{8 \times 5} - \frac{18 \times 8}{5 \times 8}\right) \div \frac{1}{2}$

$= \left(\frac{155}{40} - \frac{144}{40}\right) \div \frac{1}{2}$

$= \frac{11}{40} \div \frac{1}{2} = \frac{11}{40} \times \frac{2}{1} = \frac{11}{20}$

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

$= \frac{4}{7} \div \left(\frac{1}{3} \times \frac{14}{5}\right) = \frac{4}{7} \div \left(\frac{14}{15}\right)$

$= \frac{4}{7} \times \frac{15}{14} = \frac{60}{98} = \mathbf{\frac{30}{49}}$

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

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

$= \frac{3}{4} \times \frac{3}{1} = \frac{9}{4} = \mathbf{2\frac{1}{4}}$

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

$= \left(\frac{3-2}{12}\right)$ of $\left(\frac{8-5}{12}\right) \times \left(\frac{15-14}{24}\right)$

$= \left(\frac{1}{12}\right)$ of $\left(\frac{3}{12}\right) \times \left(\frac{1}{24}\right)$

$= \frac{1}{12}$ of $\frac{3}{12} \times \frac{1}{24}$

$= \frac{1}{12} \times \frac{1}{96} = \mathbf{\frac{1}{1152}}$

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

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

(v) $\mathbf{2\frac{1}{2}-3\frac{1}{2}\times1\frac{3}{4}+2\frac{1}{2}}$

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

(vii) $\frac{2}{5}$ of $\left(\frac{1}{7}-\frac{1}{12}\right)$ 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) $4\frac{2}{3}\div\left(3-\frac{1}{2}\right)+\left(\frac{2}{5}\div1\frac{1}{5}\right)$

(xi) $\frac{1}{2}$ of $40+1\frac{3}{4}$ of $2\frac{2}{9}+2\frac{1}{5}\times0$

(xii) $\left(1\div2\frac{1}{5}\right)\div2\frac{1}{5}$ of $2\frac{1}{2}-2$

(xiii) $2\frac{6}{11}$ of $1\frac{2}{7}\div2\frac{2}{11}$

Solution:

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

$=\left(\frac{3+2}{6}\right)\div\left(\frac{3-2}{12}\right)=\left(\frac{5}{6}\right)\div\left(\frac{1}{12}\right)$

$=\frac{5}{6}\times\frac{12}{1}=\mathbf{10}$

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

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

$=\left(\frac{36+25}{45}\right)\times\frac{3}{4}$

$=\frac{61}{45}\times\frac{3}{4}=\frac{61}{60}=\mathbf{1\frac{1}{60}}$

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

$=\frac{3}{4}$ of $\frac{49}{8}-\frac{2}{3}$ of $\frac{9}{4}$

$=\frac{3}{4}\times\frac{49}{8}-\frac{2}{3}\times\frac{9}{4}$

$=\frac{147}{32}-\frac{3}{2}=\frac{147-48}{32}=\frac{99}{32}$

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

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

$=\frac{7}{30}$ of $\left(\frac{5+7}{15}\right)\div\left(\frac{25-18}{30}\right)$

$=\frac{7}{30}\times\frac{12}{15}\div\left(\frac{7}{30}\right)$

$=\frac{7}{30}\times\frac{12}{15}\times\frac{30}{7}=\frac{12}{15}=\mathbf{\frac{4}{5}}$

(v) $\mathbf{2\frac{1}{2}-3\frac{1}{2}\times1\frac{3}{4}+2\frac{1}{2}}$

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

$=\frac{5}{2}-\frac{49}{8}+\frac{5}{2}=\frac{5}{2}+\frac{5}{2}-\frac{49}{8}$

$=\frac{20+20-49}{8}=-\frac{9}{8}=\mathbf{-1\frac{1}{8}}$

(vi) $4\frac{5}{7}\left(3\frac{1}{8}\div\frac{11}{12}\right)=\frac{33}{7}\left(\frac{25}{8}\div\frac{11}{12}\right)$

$=\frac{33}{7}\left(\frac{25}{8}\times\frac{12}{11}\right)=\frac{33}{7}\left(\frac{75}{22}\right)$

$=\frac{33}{7}\times\frac{75}{22}=\frac{225}{14}=\mathbf{16\frac{1}{14}}$

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

$=\frac{2}{5}$ of $\left(\frac{12-7}{84}\right)$ of $\frac{7}{5}$

$=\frac{2}{5}$ of $\left(\frac{5}{84}\right)$ of $\frac{7}{5}$

$=\frac{2}{5}\times\frac{5}{84}\times\frac{7}{5}=\mathbf{\frac{1}{30}}$

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

$=\left(\frac{3-2}{6}\right)\left(\frac{15-16}{20}\right)\div\left(\frac{35-28+10}{70}\right)$

$=\left(\frac{1}{6}\right)\left(\frac{-1}{20}\right)\div\left(\frac{17}{70}\right)=\frac{1}{6}\times\frac{-1}{20}\div\frac{17}{70}$

$=\frac{1}{6}\times\frac{-1}{20}\times\frac{70}{17}=-\mathbf{\frac{7}{204}}$

(*ix*) $\frac{5}{6}-\frac{3}{5}\left(\frac{1}{3}+\frac{2}{11}\right)=\frac{5}{6}-\frac{3}{5}\left(\frac{11+6}{33}\right)$

$=\frac{5}{6}-\frac{3}{5}\times\frac{17}{33}=\frac{5}{6}-\frac{17}{55}$

$=\frac{275-102}{330}=\mathbf{\frac{173}{330}}$

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

$=\frac{14}{3}\div\left(3-\frac{1}{2}\right)+\left(\frac{2}{5}\div\frac{6}{5}\right)$

$=\frac{14}{3}\div\left(\frac{6-1}{2}\right)+\left(\frac{2}{5}\times\frac{5}{6}\right)$

$=\frac{14}{3}\div\left(\frac{5}{2}\right)+\frac{1}{3}$ $=\frac{14}{3}\times\frac{2}{5}+\frac{1}{3}$

$=\frac{28}{15}+\frac{1}{3}=\frac{28+5}{15}=\frac{33}{15}=\frac{11}{5}=\mathbf{2\frac{1}{5}}$

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

$=\frac{1}{2}\times 40+\frac{7}{4}\times\frac{20}{9}+\frac{11}{5}\times 0$

$=20+\frac{35}{9}+0=\frac{180+35}{9}=\frac{215}{9}$

$=\mathbf{23\frac{8}{9}}$

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

$=\left(1\div\frac{11}{5}\right)\div\frac{11}{5}$ of $\frac{5}{2}-2$

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

$=\frac{5}{11}\div\frac{11}{5}\times\frac{5}{2}-2=\frac{5}{11}\div\frac{11}{2}-2$

$=\frac{5}{11}\times\frac{2}{11}-2=\frac{10}{121}-2$

$=\frac{10-242}{121}=-\frac{232}{121}=\mathbf{-1\frac{111}{121}}$

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

$$= \frac{28}{11} \text{ of } \frac{9}{7} \div \frac{24}{11}$$

$$= \frac{28}{11} \times \frac{9}{7} \div \frac{24}{11} = \frac{36}{11} \div \frac{24}{11}$$

$$= \frac{36}{11} \times \frac{11}{24} = \frac{3}{2} = \mathbf{1\frac{1}{2}}$$

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:

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

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

$$\text{Remaining rope} = \left(10\frac{1}{2} m - 4\frac{5}{8} m\right)$$

$$= \frac{21}{2} m - \frac{37}{8} m$$

$$= \frac{84-37}{8} = \frac{47}{8} = \mathbf{5\frac{7}{8}\ m.}$$

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:

Length of a piece of cloth = 5 m

After washing, it is shrinked

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

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)

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

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

$\therefore$ Money returned by shopkeeper

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

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

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

Bad oranges $= \frac{3}{25}$ of $500 = \frac{3}{25} \times 500$

$= 60$

Kept for guests $= \frac{1}{5}$ of 500

$= \frac{1}{5} \times 500 = 100$

$\therefore$ No of oranges which can be used

$= 500 - 60 - 100 = 500 - 160 = \mathbf{340.}$

Question 5.

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

Solution:

Total weight = 96 g

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

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

$\therefore$ Weight of gold = Total weight – weight of copper = 96g – 8g = **88g**

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

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

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

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

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

Question 7.

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

Solution:

Let a man has money = Re. 1

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

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

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

$$\therefore \quad \text{Total money} = \text{Rs. } \frac{720 \times 8}{5}$$

$$= \text{Rs. } 144 \times 8 = \text{Rs. } 1152$$

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,

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

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

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

$\therefore$ Number of boys = total strength – girls

$= 500 - 100 = \mathbf{400}.$

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 $= \frac{3}{4} = 12\text{km}$

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

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

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

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

$\therefore$ Total amount spent = Rs. (2160 + 1800 + 720 + 576) = Rs. 5256

$\therefore$ 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

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

$\therefore \frac{2}{5} = \frac{2\times7}{5\times7} = \frac{14}{35}$

$\frac{3}{7} = \frac{3\times5}{7\times5} = \frac{15}{35}$

and $\frac{5}{7} = \frac{5\times5}{7\times5} = \frac{25}{35}$

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

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

$\frac{3}{7}$ 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

$$\therefore \frac{3}{4} = \frac{3\times15}{4\times15} = \frac{45}{60}$$

$$\frac{4}{5} = \frac{4\times12}{5\times12} = \frac{48}{60}$$

$$\frac{5}{6} = \frac{5\times10}{6\times10} = \frac{50}{60}$$

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

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

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*) $\frac{3}{4}$ of $1\frac{1}{2} \div 4\frac{1}{2}$

(*iii*) $\frac{5}{6}$ 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*) $1\frac{4}{13}$ 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*) $\frac{3}{4}$ of $1\frac{1}{2} \div 4\frac{1}{2}$

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

$$= \frac{9}{8} \div \frac{9}{2}$$ (first remove 'of')

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(remove bracket)

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

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

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

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

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

(*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

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

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

$\therefore$ Remaining money given to his wife

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

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

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

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

$\therefore$ Total money = Rs. $\frac{91000 \times 15}{7}$

= Rs. 13,000 × 15 = Rs. 1,95,000

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

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

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

$\therefore$ C gets remaining money

$\therefore$ C's share = Rs. 84,000 – (Rs. 21,000 + Rs. 16,800)

= Rs. 84,000 – (37,800) = 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:

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

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

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

$= \frac{17}{2} = 8\frac{1}{2}$ 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:

Length of string = 84 m

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

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 emit of the shirt

Solution:

Let total money in the pocket = 1

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

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

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

(*i*) $\therefore$ Total money = Rs. $540 \times \frac{5}{3} = 180 \times 5$

= Rs. 900

(*ii*) Cost of shirt = $\frac{2}{5}$ of Rs. 900 = Rs. 2×180

= Rs. 360

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 x 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 x $\frac{1}{3}$ = Rs. 24,000

Question 10.

Simplify :

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

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

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

Solution:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$= \frac{8}{9}$