

Exercise 6.9

Q.1 Add:

(i) $\frac{3}{4}$ and $\frac{5}{6}$

(ii) $\frac{7}{10} + \frac{2}{15}$

(iii) $\frac{8}{13}$ and $\frac{2}{3}$

(iv) $\frac{4}{5}$ and $\frac{7}{15}$

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

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

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

$$= \frac{19}{12}$$

[$\because$ LCM of 4 and 6 is 12, Convert each fraction with denominator 12]

(ii) $\frac{7}{10} + \frac{2}{15}$

$$\Rightarrow \frac{7 \times 3}{10 \times 3} + \frac{2 \times 2}{15 \times 2}$$

$$\Rightarrow \frac{21}{30} + \frac{4}{30} = \frac{25}{30}$$

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

($\because$ LCM of 10 and 15 is 30, Convert each fraction with denominator 30)

$$(iii) \frac{8}{13} + \frac{2}{3}$$

($\because$ LCM of 13 and 3 is 39, so we convert each fraction with denominator 39)

$$= \frac{8 \times 3}{13 \times 3} + \frac{2 \times 13}{3 \times 13}$$

$$\Rightarrow \frac{24}{39} + \frac{26}{39} = \frac{24+26}{39} = \frac{50}{39}$$

$$(iv) \frac{4}{5} + \frac{7}{15} =$$

($\because$ LCM of 5 and 15 is 15, we convert each fraction with denominator 15)

$$\therefore \frac{4 \times 3}{5 \times 3} + \frac{7 \times 1}{15 \times 1}$$

$$= \frac{12}{15} + \frac{7}{15} = \frac{12+7}{15} = \frac{19}{15}$$

Q 2 Subtract: (i) $\frac{2}{7}$ from $\frac{19}{21}$ (ii) $\frac{21}{25}$ from $\frac{18}{20}$

(iii) $\frac{7}{16}$ from 2 (iv) $\frac{4}{15}$ from $2\frac{1}{5}$

Solution (i) $\frac{2}{7}$ from $\frac{19}{21}$

$$\Rightarrow \frac{19}{21} - \frac{2}{7}$$

$$= \frac{19}{21} - \frac{2 \times 3}{7 \times 3}$$

$$= \frac{19}{21} - \frac{6}{21} = \frac{19-6}{21} = \frac{13}{21}$$

($\because$ LCM of 21 and 7 is 21)
Convert each fraction with denominator 21)

(ii) $\frac{21}{25}$ from $\frac{18}{20}$

$$\Rightarrow \frac{18}{20} - \frac{21}{25}$$

here LCM of 20 and 25 is 100

so,

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

$$\Rightarrow \frac{90}{100} - \frac{84}{100} = \frac{90-84}{100} \\ = \frac{6}{100} = \frac{3}{50}$$

(iii) $\frac{7}{16}$ from 2

$$\Rightarrow 2 - \frac{7}{16}$$

$\therefore$ LCM of 2 and 16 is 16

$$\Rightarrow \frac{2 \times 16}{1 \times 16} - \frac{7}{16}$$

$$= \frac{32}{16} - \frac{7}{16} = \frac{32-7}{16} = \frac{25}{16}$$

(iv) $\frac{4}{15}$ from $2\frac{1}{5}$

$$\Rightarrow 2\frac{1}{5} - \frac{4}{15}$$

$$\Rightarrow \frac{11}{5} - \frac{4}{15}$$

($\therefore$ LCM of 5 and 15 is 15)

$$= \frac{11 \times 3}{5 \times 3} - \frac{4}{15} = \frac{33}{15} - \frac{4}{15} = \frac{33-4}{15} \\ = \frac{29}{15}$$

Q3 Find the difference of:

(i) $\frac{13}{24}$ from $\frac{7}{16}$ (ii) $\frac{5}{18}$ from $\frac{4}{15}$

(iii) $\frac{1}{12}$ and $\frac{3}{4}$ (iv) $\frac{2}{3}$ and $\frac{6}{7}$

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

$\Rightarrow \because \text{LCM} = 2 \times 2 \times 2 \times 3 \times 2$
 $= 48$

$\therefore$ we convert denominators as 48

$$\begin{array}{r|l} 2 & 24, 16 \\ \hline 2 & 12, 8 \\ \hline 2 & 6, 4 \\ \hline & 3, 2 \end{array}$$

$\therefore \frac{13 \times 2}{24 \times 2} - \frac{7 \times 3}{16 \times 3}$

$= \frac{26}{48} - \frac{21}{48} = \frac{26-21}{48} = \frac{5}{48}$

(ii) $\frac{5}{18}$ and $\frac{4}{15} \Rightarrow \frac{5}{18} - \frac{4}{15}$

$\therefore \text{LCM} = 3 \times 2 \times 3 \times 5$
 $= 90$

$$\begin{array}{r|l} 3 & 18, 15 \\ \hline 2 & 6, 5 \\ \hline & 3, 5 \end{array}$$

By converting each fraction as denominator 90,

$\frac{5 \times 5}{18 \times 5} - \frac{4 \times 6}{15 \times 6}$

$= \frac{25}{90} - \frac{24}{90} = \frac{25-24}{90} = \frac{1}{90}$

(iii) $\frac{1}{12}$ and $\frac{3}{4} \Rightarrow \frac{3}{4} - \frac{1}{12}$ $\left\{ \because \text{LCM of 4 and 12} = 12 \right\}$
 Convert each fraction with denominator 12.

$$= \frac{3 \times 3}{4 \times 3} - \frac{1}{12}$$

$$= \frac{9}{12} - \frac{1}{12} = \frac{9-1}{12}$$

$$= \frac{8}{12} = \frac{2}{3}$$

(iv) $\frac{2}{3}$ and $\frac{6}{7} \Rightarrow \frac{6}{7} - \frac{2}{3}$

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

$$= \frac{18}{21} - \frac{14}{21}$$

$$= \frac{18-14}{21} = \frac{4}{21}$$
 $\left\{ \because \text{LCM of 7 and 3} = 21 \right\}$
 By converting each fraction with denominator 21

Q4 Subtract as indicated

(i) $\frac{8}{3} - \frac{5}{9}$ (ii) $4\frac{2}{5} - 2\frac{1}{5}$ (iii) $5\frac{6}{7} - 2\frac{2}{3}$

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

Solution: (i) $\frac{8}{3} - \frac{5}{9}$

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

$$= \frac{24}{9} - \frac{5}{9} = \frac{24-5}{9}$$

$$= \frac{19}{9}$$

$\left(\because \text{LCM of 3 and 9 is 9} \right)$
 Convert each fraction with denominator 9,

$$\text{(ii)} \quad 4\frac{2}{5} - 2\frac{1}{5} = \frac{22}{5} - \frac{11}{5} \\ = \frac{22-11}{5} = \frac{11}{5}$$

$$\text{(iii)} \quad 5\frac{6}{7} - 2\frac{2}{3} \\ = \frac{41}{7} - \frac{8}{3}$$

$\therefore$ LCM of 7 and 3 is 21. By converting each fraction with denominator 21,

$$= \frac{41 \times 3}{7 \times 3} - \frac{8 \times 7}{3 \times 7}$$

$$\Rightarrow \frac{123}{21} - \frac{56}{21}$$

$$= \frac{123-56}{21} = \frac{67}{21}$$

$$\text{(iv)} \quad 4\frac{3}{4} - 2\frac{1}{6} = \frac{19}{4} - \frac{13}{6}$$

$\therefore$ LCM of 4 and 6 is 12

Convert each fraction with denominator 12.

$$= \frac{19 \times 3}{4 \times 3} - \frac{13 \times 2}{6 \times 2}$$

$$= \frac{57}{12} - \frac{26}{12} = \frac{57-26}{12}$$

$$= \frac{31}{12}$$

Q.5 Simplify:

$$(i) \frac{2}{3} + \frac{3}{4} + \frac{1}{2}$$

$$(ii) \frac{5}{8} + \frac{2}{5} + \frac{3}{4}$$

$$(iii) \frac{3}{10} + \frac{7}{15} + \frac{3}{5}$$

$$(iv) \frac{3}{4} + \frac{7}{16} + \frac{5}{8}$$

$$(v) 4\frac{2}{3} + 3\frac{1}{4} + 7\frac{1}{2}$$

$$(vi) 7\frac{1}{3} + 3\frac{2}{3} + 5\frac{1}{6}$$

$$(vii) 7 + \frac{7}{4} + 5\frac{1}{6}$$

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

$$(ix) \frac{7}{18} + \frac{5}{6} + 1\frac{1}{12}$$

Solution (i) $\frac{2}{3} + \frac{3}{4} + \frac{1}{2}$

here LCM (3, 4, 2) = 12

By converting each fraction with denominator 12

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

$$= \frac{8}{12} + \frac{9}{12} + \frac{6}{12}$$

$$= \frac{8+9+6}{12} = \frac{23}{12}$$

$$(ii) \frac{5}{8} + \frac{2}{5} + \frac{3}{4}$$

here LCM (8, 5, 4) = 40. By converting each

fraction with denominator 40, we get

$$\frac{5}{8} \times \frac{5}{5} + \frac{2}{5} \times \frac{8}{8} + \frac{3}{4} \times \frac{10}{10}$$

$$\Rightarrow \frac{25}{40} + \frac{16}{40} + \frac{30}{40}$$

$$= \frac{25+16+30}{40} = \frac{71}{40}$$

$$(iii) \frac{3}{10} + \frac{7}{15} + \frac{3}{5}$$

here LCM (10, 15, 5) = 30, By converting each fraction with denominator 30, we get

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

$$= \frac{9}{30} + \frac{14}{30} + \frac{18}{30}$$

$$= \frac{9+14+18}{30} = \frac{41}{30}$$

$$(iv) \frac{3}{4} + \frac{7}{16} + \frac{5}{8}$$

here LCM (4, 16, 8) = 16, By converting each fraction with denominator 16, we get

$$\frac{3 \times 4}{4 \times 4} + \frac{7 \times 1}{16 \times 1} + \frac{5 \times 2}{8 \times 2}$$

$$= \frac{12}{16} + \frac{7}{16} + \frac{10}{16} = \frac{12+7+10}{16} = \frac{29}{16}$$

$$(v) \quad 4\frac{2}{3} + 3\frac{1}{4} + 7\frac{1}{2}$$

$$= \frac{14}{3} + \frac{13}{4} + \frac{15}{2}$$

$$\text{here LCM}(3, 4, 2) = 12$$

By converting each fraction with denominator 12, we get

$$\frac{14 \times 4}{3 \times 4} + \frac{13 \times 3}{4 \times 3} + \frac{15 \times 6}{2 \times 6}$$

$$= \frac{56}{12} + \frac{39}{12} + \frac{90}{12}$$

$$= \frac{56 + 39 + 90}{12} = \frac{185}{12}$$

$$(vi) \quad 7\frac{1}{3} + 3\frac{2}{3} + 5\frac{1}{6}$$

$$= \frac{22}{3} + \frac{11}{3} + \frac{31}{6}$$

$$\text{here LCM}(3, 3, 6) = 6$$

By converting each fraction with denominator 6, we get,

$$= \frac{22 \times 2}{3 \times 2} + \frac{11 \times 2}{3 \times 2} + \frac{31}{6}$$

$$= \frac{44}{6} + \frac{22}{6} + \frac{31}{6}$$

$$= \frac{44 + 22 + 31}{6} = \frac{97}{6}$$

$$(vi) \quad 7 + \frac{7}{4} + 5\frac{1}{6}$$

$$= \frac{7}{1} + \frac{7}{4} + \frac{31}{6}$$

here LCM (1, 4, 6) = 12

By converting each fraction with denominator 12, we get

$$\frac{7 \times 12}{1 \times 12} + \frac{7 \times 3}{4 \times 3} + \frac{31 \times 2}{6 \times 2}$$

$$= \frac{84}{12} + \frac{21}{12} + \frac{62}{12} = \frac{84+21+62}{12} = \frac{167}{12}$$

$$(vii) \quad \frac{5}{6} + \frac{3}{1} + \frac{3}{4}$$

here LCM (6, 1, 4) = 12, By converting each fraction with denominator 12, we get

$$\frac{5 \times 2}{6 \times 2} + \frac{3 \times 12}{1 \times 12} + \frac{3 \times 3}{4 \times 3}$$

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

$$(ix) \quad \frac{7}{18} + \frac{5}{6} + 1\frac{1}{12}$$

$= \frac{7}{18} + \frac{5}{6} + \frac{13}{12}$ here LCM (18, 6, 12) = 36, By converting each fraction with denominator 36, we get

$$= \frac{7 \times 2}{18 \times 2} + \frac{5 \times 6}{6 \times 6} + \frac{13 \times 3}{12 \times 3}$$

$$= \frac{14}{36} + \frac{30}{36} + \frac{39}{36} = \frac{14+30+39}{36} = \frac{83}{36}$$

Q.6 Replace $\square$ by the correct number:

$$(i) \square - \frac{5}{8} = \frac{1}{4} \quad (ii) \square - \frac{1}{5} = \frac{1}{2} \quad (iii) \frac{1}{2} - \square = \frac{1}{6}$$

Solution (i) $\square - \frac{5}{8} = \frac{1}{4}$

$$\Rightarrow \square = \frac{1}{4} + \frac{5}{8}$$

$\therefore$ LCM of 4 and 8 is 8, so by converting each fraction with denominator 8, we get

$$\begin{aligned} \square &= \frac{1 \times 2}{4 \times 2} + \frac{5}{8} = \frac{2}{8} + \frac{5}{8} \\ &= \frac{2+5}{8} = \frac{7}{8} \end{aligned}$$

hence, required fraction = $\frac{7}{8}$

$$(ii) \square - \frac{1}{5} = \frac{1}{2}$$

$$\Rightarrow \square = \frac{1}{2} + \frac{1}{5}$$

here LCM of 2 and 5 is 10, so by convert each fraction with denominator 10, we get

$$\begin{aligned} \square &= \frac{1 \times 5}{2 \times 5} + \frac{1 \times 2}{5 \times 2} \\ &= \frac{5}{10} + \frac{2}{10} = \frac{5+2}{10} = \frac{7}{10} \end{aligned}$$

$\therefore$ required fraction = $\frac{7}{10}$

$$(ii) \quad \frac{1}{2} - \square = \frac{1}{6}$$

$$\therefore \square = \frac{1}{2} - \frac{1}{6}$$

here LCM of 2 and 6 is 12

So, by converting each fraction with denominator 12, we get

$$\square = \frac{1 \times 6}{2 \times 6} - \frac{1 \times 2}{6 \times 2}$$

$$= \frac{6}{12} - \frac{2}{12}$$

$$= \frac{6-2}{12} = \frac{4}{12} = \frac{1}{3}$$

$$\therefore \text{required fraction} = \frac{1}{3}$$

Q.7 Savita bought $\frac{2}{5}$ m of ribbon and Kavita $\frac{3}{4}$ m of the ribbon. What was the total length of the ribbon they bought?

Sol: length of ribbon bought by Savita = $\frac{2}{5}$

length of ribbon bought by Kavita = $\frac{3}{4}$

$$\therefore \text{Total length of ribbon} = \frac{2}{5} + \frac{3}{4}$$

here LCM of 5 and 4 is 20

$$\Rightarrow \frac{2 \times 4}{5 \times 4} + \frac{3 \times 5}{4 \times 5} = \frac{8}{20} + \frac{15}{20}$$

$$= \frac{23}{20} \text{ m length of ribbon.}$$

Q.8 Ravish takes $2\frac{1}{5}$ minutes to walk across the school ground. Rahul takes $\frac{7}{4}$ minutes to do the same. Who takes less time and by what fraction.

Solution Time taken by Ravish = $2\frac{1}{5} = \frac{11}{5}$ Minutes.

Time taken by Rahul = $\frac{7}{4}$ Minutes.

To compare $\frac{11}{5}$ and $\frac{7}{4}$, we make their denominator same equals to LCM(5,4) = 20, we get

$$\frac{11 \times 4}{5 \times 4} = \frac{44}{20}$$

$$\frac{7 \times 5}{4 \times 5} = \frac{35}{20}$$

$$\begin{aligned} \text{Therefore Ravish takes more time by} &= \frac{44}{20} - \frac{35}{20} \\ &= \frac{44-35}{20} = \frac{9}{20} \end{aligned}$$

$\therefore$ Ravish takes more time by $\frac{9}{20}$ minutes.

Therefore Rahul takes less time by $\frac{9}{20}$ minutes.

Q.9 A piece of a wire $\frac{7}{8}$ metres long broke into two pieces. One piece was $\frac{1}{4}$ meter long. How long is the other piece?

Solution! Total length of wire = $\frac{7}{8}$ m
length of one piece = $\frac{1}{4}$ m.

$$\begin{aligned}
 \therefore \text{length of other piece} &= \frac{7}{8} - \frac{1}{4} \\
 &= \frac{7}{8} - \frac{1 \times 2}{4 \times 2} = \frac{7}{8} - \frac{2}{8} \\
 &= \frac{7-2}{8} \\
 &= \frac{5}{8} \text{ m.}
 \end{aligned}$$

Q.10 Shikha and Priya have bookshelves of the same size. Shikha's shelf is $\frac{5}{6}$ full of books and Priya's shelf is $\frac{2}{5}$ full. Whose book shelf is more full. By what fraction?

Solution:

Portion of Shikha's bookshelves filled = $\frac{5}{6}$

Portion of Priya's shelf filled = $\frac{2}{5}$

To compare, $\therefore \text{LCM}(6, 5) = 30$

We convert fractions with same denominator 30

$$\frac{5}{6} \times \frac{5}{5} = \frac{25}{30} \quad ; \quad \frac{2}{5} \times \frac{6}{6} = \frac{12}{30}$$

$$\therefore 25 > 12$$

$\therefore$ Shikha's book shelf is more full by

$$\frac{25}{30} - \frac{12}{30} = \frac{25-12}{30} = \frac{13}{30}$$

Q.11 Ravish's house is $\frac{9}{10}$ km from his school.

He walked some distance and then took a bus for $\frac{1}{2}$ km upto school. How far did he walk?

Solution : Distance of house from school = $\frac{9}{10}$ km.

Distance covered by Bus = $\frac{1}{2}$ km

$\therefore$ Distance covered by walk = $\frac{9}{10} - \frac{1}{2}$

$$= \frac{9}{10} - \frac{1 \times 5}{2 \times 5}$$

$$= \frac{9}{10} - \frac{5}{10}$$

$$= \frac{9-5}{10} = \frac{4}{10} = \frac{2}{5}$$

$\therefore$ Distance covered by Ravish by foot = $\frac{2}{5}$ km.