

Chapter - 2

Operations on Fractions

Exercise-1

1. (a) $\frac{5}{9} + \frac{3}{9} = \frac{5+3}{9} = \frac{8}{9}$

(b) $\frac{1}{12} + \frac{7}{12} = \frac{1+7}{12} = \frac{8}{12}$. But $\frac{8}{12}$ is not in the lowest terms.

Now, $\frac{8}{12} = \frac{8 \div 4}{12 \div 4} = \frac{2}{3}$ (HCF of 8 and 12 = 4).

Thus, $\frac{1}{12} + \frac{7}{12} = \frac{2}{3}$

(c) $\frac{7}{16} + \frac{5}{24} = \frac{21}{48} + \frac{10}{48}$
 $= \frac{21+10}{48} = \frac{31}{48}$

$$\left[\begin{array}{l} \text{LCM of 16 and 24} = 48 \\ \frac{7}{16} = \frac{7 \times 3}{16 \times 3} = \frac{21}{48}, \\ \frac{5}{24} = \frac{5 \times 2}{24 \times 2} = \frac{10}{48} \end{array} \right]$$

Thus, $\frac{7}{16} + \frac{5}{24} = \frac{31}{48}$

(d) and (e) practice in your rough copy

2. (a) $\frac{5}{14} + \frac{7}{14} + \frac{1}{14} = \frac{5+7+1}{14} = \frac{13}{14}$

(b) $\frac{1}{12} + \frac{5}{9} + \frac{2}{36} = \frac{3}{36} + \frac{20}{36} + \frac{2}{36}$
 $= \frac{3+20+2}{36}$
 $= \frac{25}{36}$

$$\left[\begin{array}{l} \because \text{LCM of 12, 9, 36} = 36 \\ \frac{1}{12} = \frac{1 \times 3}{12 \times 3} = \frac{3}{36}, \\ \frac{5}{9} = \frac{5 \times 4}{9 \times 4} = \frac{20}{36}, \\ \frac{2}{36} = \frac{2 \times 1}{36 \times 1} = \frac{2}{36} \end{array} \right]$$

Thus, $\frac{1}{12} + \frac{5}{9} + \frac{2}{36} = \frac{25}{36}$

(c) practice in your rough copy



$$3. \text{ (a) } 3\frac{2}{3} + \frac{2}{3} = \frac{11}{3} + \frac{2}{3} = \frac{11+2}{3} = \frac{13}{3} = 4\frac{1}{3}$$

$$\text{(b) } 2\frac{3}{8} + 1\frac{5}{12} = \frac{19}{8} + \frac{17}{12} = \frac{57}{24} + \frac{34}{24} \\ = \frac{57+34}{24} \\ = \frac{91}{24} = 3\frac{19}{24}$$

$$\left[\begin{array}{l} \text{LCM of 8 and 12} = 24 \\ \frac{19}{8} = \frac{19 \times 3}{8 \times 3} = \frac{57}{24}, \\ \frac{17}{12} = \frac{17 \times 2}{12 \times 2} = \frac{34}{24} \end{array} \right]$$

(c) and (d) practice in your rough copy

Exercise-2

$$1. \text{ (a) } \frac{3}{11} - \frac{2}{11} = \frac{3-2}{11} = \frac{1}{11}$$

$$\text{(b) } \frac{5}{17} - \frac{3}{17} = \frac{5-3}{17} = \frac{2}{17}$$



(c) $\frac{11}{14} - \frac{7}{14} = \frac{11-7}{14} = \frac{4}{14}$

Now, $\frac{4}{14} = \frac{4 \div 2}{14 \div 2} = \frac{2}{7}$ (HCF of 4 and 14 = 2)

$\therefore \frac{11}{14} - \frac{7}{14} = \frac{2}{7}$

(d) $\frac{15}{24} - \frac{7}{24} = \frac{15-7}{24} = \frac{8}{24}$

Now, $\frac{8}{24} = \frac{8 \div 8}{24 \div 8} = \frac{1}{3}$ (HCF of 8 and 24 = 8)

$\therefore \frac{15}{24} - \frac{7}{24} = \frac{1}{3}$

(e), (f), (g) and (h) practice in your rough copy



$$2. \text{ (a) } \frac{3}{14} - \frac{1}{7} = \frac{3}{14} - \frac{2}{14}$$

$$= \frac{3-2}{14} = \frac{1}{14}$$

$$\left[\begin{array}{l} \text{LCM of 14 and 7} = 14 \\ \frac{1}{7} = \frac{1 \times 2}{7 \times 2} = \frac{2}{14} \end{array} \right]$$

$$\text{(b) } \frac{5}{8} - \frac{1}{4} = \frac{5}{8} - \frac{2}{8}$$

$$= \frac{5-2}{8} = \frac{3}{8}$$

$$\left[\begin{array}{l} \text{LCM of 8 and 4} = 8 \\ \frac{1}{4} = \frac{1 \times 2}{4 \times 2} = \frac{2}{8} \end{array} \right]$$

$$\text{(c) } \frac{3}{5} - \frac{4}{10} = \frac{6}{10} - \frac{4}{10}$$

$$= \frac{6-4}{10} = \frac{2}{10}$$

$$\left[\begin{array}{l} \text{LCM of 5 and 10} = 10 \\ \frac{3}{5} = \frac{3 \times 2}{5 \times 2} = \frac{6}{10} \end{array} \right]$$

$$\text{Now, } \frac{2}{10} = \frac{2 \div 2}{10 \div 2} = \frac{1}{5}$$

(HCF of 2 and 10 = 2)

$$\therefore \frac{3}{5} - \frac{4}{10} = \frac{1}{5}$$

$$\text{(d) } \frac{3}{4} - \frac{1}{6} = \frac{9}{12} - \frac{2}{12}$$

$$= \frac{9-2}{12}$$

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

$$\left[\begin{array}{l} \text{LCM of 4 and 6} = 12 \\ \frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}, \\ \frac{1}{6} = \frac{1 \times 2}{6 \times 2} = \frac{2}{12} \end{array} \right]$$

(e), (f), (g) and (h) practice in your rough copy



$$3. \text{ (a) } 2\frac{3}{4} - 1\frac{1}{4} = \frac{11}{4} - \frac{5}{4} = \frac{11-5}{4} = \frac{6}{4} \\ = \frac{6 \div 2}{4 \div 2} = \frac{3}{2} = 1\frac{1}{2} \quad (\because \text{HCF of 6 and 4} = 2)$$

$$\text{(b) } 3\frac{5}{6} - 1\frac{1}{3} = \frac{23}{6} - \frac{4}{3} \\ = \frac{23}{6} - \frac{8}{6} = \frac{23-8}{6} = \frac{15}{6} \\ = \frac{15 \div 3}{6 \div 3} = \frac{5}{2} = 2\frac{1}{2} \\ \left[\begin{array}{l} \text{LCM of 6 and 3} = 6 \\ \frac{4}{3} = \frac{4 \times 2}{3 \times 2} = \frac{8}{6} \end{array} \right] \\ (\because \text{HCF of 15 and 6} = 3)$$

(c) and (d) practice in your rough copy

Exercise-3

$$1. 3 \times \frac{3}{4} = \frac{3 \times 3}{4} = \frac{9}{4} = 2\frac{1}{4} \quad 2. \frac{2}{3} \times 7 = \frac{2 \times 7}{3} = \frac{14}{3} = 4\frac{2}{3}$$

$$14. \frac{12}{17} \times \frac{17}{21} = \frac{12 \times 17}{17 \times 21} = \frac{4}{7}$$

$$15. 2\frac{3}{5} \times \frac{5}{9} = \frac{13}{5} \times \frac{5}{9} = \frac{13 \times 5}{5 \times 9} = \frac{13}{9} = 1\frac{4}{9}$$

$$16. 2\frac{2}{3} \times 1\frac{2}{3} = \frac{8}{3} \times \frac{5}{3} = \frac{8 \times 5}{3 \times 3} = \frac{40}{9} = 4\frac{4}{9}$$

$$17. 2\frac{5}{6} \times 3\frac{3}{4} = \frac{17}{6} \times \frac{15}{4} = \frac{17 \times 15}{6 \times 4} = \frac{85}{8} = 10\frac{5}{8}$$



3,4,5,6,7,8,9,10,11,12,13 and 18 practice in your rough copy

Exercise-4

1. (a) $\frac{9}{7}$ (b) $\frac{17}{9}$ (c) 3 (d) $\frac{11}{6}$
2. (a) $6 \div 8 = \frac{6}{8} = \frac{3}{4}$ (b) $\frac{1}{3} \div 4 = \frac{1}{3} \times \frac{1}{4} = \frac{1}{3 \times 4} = \frac{1}{12}$
- (c) $\frac{5}{9} \div 15 = \frac{5}{9} \times \frac{1}{15} = \frac{5 \times 1}{9 \times 15} = \frac{1}{27}$
- (d) $77 \div \frac{11}{3} = 77 \times \frac{3}{11} = \frac{77 \times 3}{11} = 21$

(e) and (f) practice in your rough copy

3. (a) $3\frac{5}{6} \div 1\frac{1}{3} = \frac{23}{6} \div \frac{4}{3} = \frac{23}{6} \times \frac{3}{4} = \frac{23 \times 3}{6 \times 4} = \frac{23}{8} = 2\frac{7}{8}$
- (b) $4\frac{3}{8} \div 3\frac{4}{7} = \frac{35}{8} \div \frac{25}{7} = \frac{35}{8} \times \frac{7}{25} = \frac{35 \times 7}{8 \times 25} = \frac{49}{40} = 1\frac{9}{40}$

(c) practice in your rough copy

Exercise - 5

1. Manu bought $\frac{2}{5}$ m of ribbon and Sonal bought $\frac{1}{2}$ m of ribbon. Who bought longer ribbon and by how much?



1. $\frac{2}{5}$ and $\frac{1}{2}$ are unlike fractions, so, we convert them into like fractions.

LCM of 5 and 2 = 10.

$$\frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{4}{10}, \quad \frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10}$$

$$\frac{5}{10} \text{ is greater than } \frac{4}{10}. \quad \frac{5}{10} - \frac{4}{10} = \frac{5-4}{10} = \frac{1}{10}$$

\therefore Sonal bought $\frac{1}{10}$ m longer ribbon than Manu.

2. Jyoti completed her maths homework in $\frac{1}{6}$ hour and Science homework in $\frac{3}{10}$ hour. How much time did she take in all to complete both?

2. Jyoti completed her Maths homework in $\frac{1}{6}$ hour and Science homework in $\frac{3}{10}$ hour.

$$\begin{aligned} \text{Total time taken by Jyoti} &= \left(\frac{1}{6} + \frac{3}{10}\right) \text{ hour} \\ &= \left(\frac{5}{30} + \frac{9}{30}\right) \text{ hour} \\ &= \left(\frac{5+9}{30}\right) \text{ hour} \\ &= \frac{14}{30} \text{ hour} \\ &= \frac{7}{15} \text{ hour} \end{aligned} \quad \left[\begin{array}{l} \text{LCM of 6 and 10 = 30} \\ \frac{1}{6} = \frac{1 \times 5}{6 \times 5} = \frac{5}{30}, \\ \frac{3}{10} = \frac{3 \times 3}{10 \times 3} = \frac{9}{30} \end{array} \right]$$

Thus, Jyoti took $\frac{7}{15}$ hour in all to complete her homework.

3. I bought 10 packets of snacks each packet weighed $\frac{3}{5}$ kg. what was the total weight of the packets of snacks?



3. Total weight of the packets of snacks = $\left(10 \times \frac{3}{5}\right)$ kg

Now, $10 \times \frac{3}{5} = \frac{10 \times 3}{5} = \frac{30}{5} = 6$

∴ Total weight of the packets of snacks is 6 kg.

4. A milkman has three vessels which contain $1\frac{1}{4}$ litres, $2\frac{3}{8}$ litres and $1\frac{9}{16}$ litres of milk respectively. Find the total milk with the milkman.

$$\begin{aligned}
 4. \text{ Total quantity of milk} &= \left(1\frac{1}{4} + 2\frac{3}{8} + 1\frac{9}{16}\right) \ell && \left[\begin{array}{l} \text{LCM of } 4, 8, 16 = 16 \\ \frac{5}{4} = \frac{5 \times 4}{4 \times 4} = \frac{20}{16} \\ \frac{19}{8} = \frac{19 \times 2}{8 \times 2} = \frac{38}{16} \end{array} \right] \\
 &= \left(\frac{5}{4} + \frac{19}{8} + \frac{25}{16}\right) \ell \\
 &= \left(\frac{20}{16} + \frac{38}{16} + \frac{25}{16}\right) \ell \\
 &= \left(\frac{20+38+25}{16}\right) \ell = \frac{83}{16} \ell \\
 &= 5\frac{3}{16} \ell
 \end{aligned}$$

Hence, total quantity of milk with the milkman is $5\frac{3}{16} \ell$.

5. Find the cost of 1 kg of apples if the cost of $3\frac{1}{2}$ kg of apples is ₹ $246\frac{3}{4}$.



5. Cost of $3\frac{1}{2}$ kg of apples = ₹ $246\frac{3}{4}$

∴ Cost of 1 kg of apples = ₹ $246\frac{3}{4} \div 3\frac{1}{2}$

$$= ₹ \frac{987}{4} \div \frac{7}{2} = ₹ \frac{987}{4} \times \frac{2}{7} = ₹ \frac{141}{2} = ₹ 70\frac{1}{2}$$

Thus, the cost of 1 kg of apples is ₹ $70\frac{1}{2}$.

