Ex 4.4

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Q1 Add the following

a) $\dfrac{5}{6}$ and $\dfrac{-1}{6}$

b) do your self

$= \dfrac{5}{6} + \dfrac{(-1)}{6}$

d) do your self

$= \dfrac{5-1}{6} \qquad \left[\because (+) \times (-) = - \right]$

$= \dfrac{\cancel{4}\,2}{\cancel{6}\,3} = \dfrac{2}{3}$

c) $\dfrac{-5}{7}$ and $\dfrac{-6}{7}$

$= \dfrac{-5}{7} + \dfrac{(-6)}{7}$

$= \dfrac{-5}{7} - \dfrac{6}{7} \qquad \left[\because (+) \times (-) = - \right]$

$= \dfrac{-5-6}{7}$

$= \dfrac{-11}{7}$

e) $\dfrac{5}{10}$ and $\dfrac{-1}{2}$

$\dfrac{5}{10} + \dfrac{(-1)}{2}$

$= \dfrac{5}{10} \times \dfrac{1}{1} = \dfrac{5}{10}$

LCM q
10, 2

2	10, 2
5	5, 1
	1, 1

$= \dfrac{-1}{2} \times \dfrac{5}{5} = \dfrac{-5}{10}$

LCM = 2×5
= 10

$= \dfrac{5}{10} + \dfrac{(-5)}{10}$

$= \dfrac{5-5}{10} = \dfrac{0}{10}$

Q2. Simplify

a) $\frac{7}{3} + \frac{-4}{9}$

Sol $\frac{7}{3} + \left(\frac{-4}{9}\right)$ L.C.M of 3 and 9

$$\begin{array}{c|cc} 3 & 3, & 9 \\ 3 & 1, & 3 \\ & 1 & 3 \end{array}$$ L.C.M = $3 \times 3 = 9$

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

$\frac{-4}{9} \times \frac{1}{1} = \frac{-4}{9}$

$= \frac{21}{9} + \frac{(-4)}{9}$

$= \frac{21}{9} - \frac{4}{9}$

$= \frac{21-4}{9} = \frac{17}{9}$ ans

b) $\frac{-2}{11} + \frac{-5}{7}$

$= \frac{-2}{11} + \left(\frac{-5}{7}\right)$

LCM of 11 and 7

$$\begin{array}{c|cc} 11 & 11, & 7 \\ 7 & 1, & 7 \\ & 1 & 1 \end{array}$$

LCM of 11 and 7 = $11 \times 7 = 77$

$\frac{-2}{11} \times \frac{7}{7} = \frac{-14}{77}$

$\frac{-5}{7} \times \frac{11}{11} = \frac{-55}{77}$

$= \frac{-14}{77} + \frac{(-55)}{77}$

$= \frac{-14 - 55}{77}$

$$= \frac{-69}{77} \quad \text{ans}$$

c | do your self

d | do your self

e | $\frac{1}{9} + \frac{4}{-27}$

$$= \frac{1}{9} + \frac{(-4)}{27}$$

L.C.M of 9 and 27

$$\begin{array}{c|cc}
3 & 9, & 27 \\
3 & 3, & 9 \\
3 & 1, & 3 \\
& 1 & 1
\end{array}$$

L.C.M = $3 \times 3 \times 3 \times 1$
$$= 27$$

$$= \frac{1}{9} \times \frac{3}{3} = \frac{3}{27}$$

$$= \frac{-4}{27} \times \frac{1}{1} = \frac{-4}{27}$$

$$= \frac{3}{27} + \frac{(-4)}{27}$$

$$= \frac{3-4}{27} = \frac{-1}{27}$$

f | do your self.

Qno3 Evaluate

$$\frac{-3}{5} + \frac{7}{5} + \frac{-2}{5}$$

$$= \frac{-3+7-2}{5} = \frac{-3-2+7}{5} = \frac{-5+7}{5}$$

$$= \frac{2}{5} \text{ ans}$$

b Do your self

c $\quad \frac{11}{-12} + \frac{3}{-8} + \frac{1}{4}$

$= \quad \frac{-11}{12} + \frac{(-3)}{8} + \frac{1}{4}$

LCM of 12, 8, 4

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

LCM of 12, 8, 4
$= 2 \times 2 \times 3 \times 2$
$= 24$

$= \quad \frac{-11}{12} \times \frac{2}{2} = \frac{-22}{24}$

$\quad \frac{-3}{8} \times \frac{3}{3} = \frac{-9}{24}$

$\quad \frac{1}{4} \times \frac{6}{6} = \frac{6}{24}$

$\quad \frac{-22}{24} + \frac{(-9)}{24} + \frac{6}{24}$

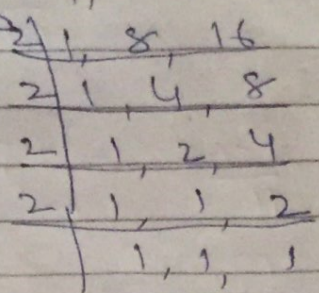$= \quad \frac{-22 - 9 + 6}{24} \quad = \frac{-31 + 6}{24}$

$\quad = \frac{-25}{24}$

d | Do your self

e | $-5 + \dfrac{1}{8} + \dfrac{-2}{16}$

$$= \dfrac{-5}{1} + \dfrac{1}{8} + \dfrac{(-2)}{16}$$

L.C.M of 1, 8 and 16

$$
\begin{array}{r|lll}
2 & 1, & 8, & 16 \\
2 & 1, & 4, & 8 \\
2 & 1, & 2, & 4 \\
2 & 1, & 1, & 2 \\
\hline
& 1, & 1, & 1
\end{array}
$$

L.C.M of 1, 8 and 16
$$= 2 \times 2 \times 2 \times 2 \times 1$$
$$= 16$$

$$= \dfrac{-5}{1} \times \dfrac{16}{16} = \dfrac{-80}{16}$$

$$= \dfrac{1}{8} \times \dfrac{2}{2} = \dfrac{2}{16}$$

$$= \dfrac{-2}{16} \times \dfrac{1}{1} = \dfrac{-2}{16}$$

$$= \dfrac{-80}{16} + \dfrac{2}{16} + \dfrac{(-2)}{16}$$

$$= \dfrac{-80 + 2 - 2}{16}$$

$$= \dfrac{-80}{16} \quad \dfrac{40}{8} \quad \dfrac{20}{4} \quad \dfrac{10}{2} \quad \dfrac{5}{1}$$

$$= -5$$

f | Do your self.

Qno4 Find the additive inverse of the following
rational numbers :

a $-\dfrac{5}{12}$

Sol let x be the additive inverse of $-\dfrac{5}{12}$

∴ $x + \dfrac{(-5)}{12} = 0$ $\Big[$As The sum of a rational
number and its additive
inverse is zero$\Big]$

or∗ $x - \dfrac{5}{12} = 0$

$x \neq \dfrac{8}{12}$ $x = 0 + \dfrac{5}{12}$ $=$ ∗

$x = \dfrac{5}{12}$

b. $\dfrac{1}{16}$

Let x be the additive inverse of $\dfrac{1}{16}$

∴ $x + \dfrac{1}{16} = 0$

$x = 0 - \dfrac{1}{16}$

$x = -\dfrac{1}{16}$

Ex 4.5

Qno 1 | Subtract

a $\frac{5}{7} - \frac{3}{7}$ b   Do your self

$= \frac{5-3}{7} = \frac{2}{7}$

c $\frac{-5}{11} - \frac{7}{11}$ d $\frac{-3}{5} - \frac{(-2)}{5}$

$\frac{-5-7}{11} = \frac{-12}{11}$ $\frac{-3}{5} + \frac{2}{5}$ $\left[\because (-) \times (-) = + \right]$

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

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

e, f do your self

Q2 $1 - \left[\frac{-11}{13} \right]$

$= \frac{1}{1} + \frac{11}{13}$ L c.m of 1, 13

$=$

$\frac{1}{1} \times \frac{13}{13} = \frac{13}{13}$

$\frac{11}{13} \times \frac{1}{1} = \frac{11}{13}$

$\frac{13}{13} + \frac{11}{13} = \frac{13+11}{13} = \frac{24}{13}$ ans

L.C.M of 1, 13
```
 1 | 1, 13
13 | 1, 13
   | 1, 1
```
L.C.M of 1 and 13
   $= 1 \times 13 = 13$

b. $\dfrac{-3}{8} - \dfrac{(-5)}{1}$

$= \dfrac{-3}{8} + \dfrac{5}{1}$ L.C.M. of 8 and 1 = 8

$= \dfrac{-3}{8} \times \dfrac{1}{1} = \dfrac{-3}{8}$

$= \dfrac{5}{1} \times \dfrac{8}{8} = \dfrac{40}{8}$

$= \dfrac{-3}{8} + \dfrac{40}{8}$

$= \dfrac{-3+40}{8} = \dfrac{37}{8}$

c. $0 - \left(\dfrac{-6}{17} \right)$

$= \dfrac{0}{1} + \dfrac{6}{17}$ L.C.M of 1 and 17 = 17

$\dfrac{0}{1} \times \dfrac{17}{17} = \dfrac{0}{17}$

$\dfrac{6}{17} \times \dfrac{1}{1} = \dfrac{6}{17}$

$\dfrac{0}{17} + \dfrac{6}{17} = \dfrac{6}{17}$

d. do your self

e $\quad \dfrac{-7}{24} - \dfrac{19}{36}$

$= $ L.C.M of 24 and 36

$$
\begin{array}{r|ll}
2 & 24, & 36 \\ \hline
2 & 12, & 18 \\ \hline
3 & 6, & 9 \\ \hline
2 & 2, & 3 \\ \hline
3 & 1, & 3 \\ \hline
  & 1, & 1
\end{array}
$$

L.C.M of 24 and 36
$= 2 \times 2 \times 3 \times 2 \times 3$
$= 72$

$= \dfrac{-7}{24} \times \dfrac{3}{3} = \dfrac{-21}{72}$

$= \dfrac{19}{36} \times \dfrac{2}{2} = \dfrac{38}{72}$

$= \dfrac{-21}{72} - \dfrac{38}{72}$

$= \dfrac{-21-38}{72} = \dfrac{-59}{72}$

Q3 Subtract the sum of $\dfrac{-24}{11}$ and $\dfrac{49}{22}$ from the sum of $\dfrac{22}{8}$ and $\dfrac{-19}{4}$

Sol $\left[\dfrac{22}{8} + \left(\dfrac{-19}{4} \right) \right] - \left[\dfrac{(-24)}{11} + \dfrac{49}{22} \right]$

$= \left[\dfrac{22}{8} - \dfrac{19}{4} \right] - \left[\dfrac{-24}{11} + \dfrac{49}{22} \right]$

$$= \left(\frac{22 - 38}{8}\right) - \left[\frac{-48 + 49}{22}\right] \qquad \left[\begin{array}{l} \therefore \ LCM\ of\ 8 + 4 = 8 \\ \therefore \ LCM\ of\ 11 + 22 = 22 \end{array}\right]$$

$$= \left(\frac{-16}{8 \, 1}\right) - \left(\frac{1}{22}\right)$$

$$= \frac{-2}{1} - \frac{1}{22} \qquad LCM\ of\ 22 + 1 = 22$$

$$= \frac{-44 - 1}{22} = \frac{-45}{22}$$

Qw 4 The sum of two rational numbers is $\frac{4}{21}$. If one of them is $\frac{3}{7}$, find the other

Sol Given = Sum of two rational number = $\frac{4}{21}$

given rational number = $\frac{3}{7}$

let The other rational number = x

$\therefore$ According to the given condition

$$\frac{3}{7} + x = \frac{4}{21}$$

$$x = \frac{4}{21} - \frac{3}{7}$$

$$x = \frac{4 - 9}{21} \qquad LCM\ of\ 21 + 7 = 21$$

$$x = \frac{-5}{21}$$

$\therefore$ other rational number = $-\frac{5}{21}$

Q5 The sum of What should be added to $-\frac{3}{8}$
to get $\frac{5}{12}$

Solⁿ Sum of two rational number = $\frac{5}{12}$
Given rational number = $-\frac{3}{8}$
let the other rational number = x
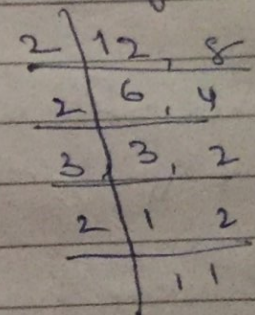∴ According to The given conditions

$$-\frac{3}{8} + x = \frac{5}{12}$$

$$x = \frac{5}{12} + \frac{3}{8}$$

$$x = \frac{10 + 9}{24}$$

$$x = \frac{19}{24}$$

LCm of 12 + 8

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

LCM = 2×2×3×2 = 24

other rational number = $\frac{19}{24}$

Q6 Do your self

$$Ex - 4.6$$

Qno1 Find the product

a) $\dfrac{3}{4} \times \dfrac{5}{7}$

$= \dfrac{15}{28}$

b) $\overset{1}{\underset{30}{\cancel{x}}} \times \overset{3}{\underset{8}{\cancel{x}}} y$

$= \dfrac{1}{1} \times \dfrac{1}{4}$

$= \dfrac{1}{4}$

c) $\dfrac{5}{-13} \times \dfrac{39}{25}$

$= \dfrac{-\overset{1}{\cancel{5}}}{\cancel{13}} \times \dfrac{\overset{3}{\cancel{39}}}{\underset{5}{\cancel{25}}}$

$= \dfrac{-1}{1} \times \dfrac{3}{5}$

$= \dfrac{-3}{5}$

f) $\dfrac{-32 \times -7}{36}$

$= \dfrac{\overset{8}{\cancel{-32}}}{1} \times \dfrac{-7}{\underset{9}{\cancel{36}}}$

$= \dfrac{-8}{1} \times \dfrac{-7}{9}$

$= \dfrac{56}{9} \qquad (- \times - = +)$

Qno2 Simplify

a) $\overset{1}{\underset{\underset{5}{\cancel{25}}}{\cancel{3}}} \times \overset{1}{\underset{3}{\cancel{\dfrac{5}{4}}}}$

$= \dfrac{1}{5} \times \dfrac{1}{3}$

$= \dfrac{1}{15}$

c) $\dfrac{-12}{7} \times \dfrac{(-1)}{1}$

$= \dfrac{12}{7}$

d) $\dfrac{-2}{5} \times \dfrac{10}{-12} \times \dfrac{7}{9}$

$\overset{-1}{\underset{1}{\cancel{\dfrac{-2}{5}}}} \times \dfrac{\overset{2}{\cancel{-10}}}{\underset{3}{\cancel{12}}} \times \dfrac{7}{9} = \dfrac{-1}{1} \times \dfrac{-1}{3} \times \dfrac{7}{9}$

$= \dfrac{7}{27}$

Q3 Simplify and express the result in standard form

a $\left[\dfrac{11}{18} \times (-9)\right] + \left[-\dfrac{3}{4} \times \dfrac{5}{6}\right]$

= $\left[\dfrac{11}{18} \times \dfrac{(-9)}{1}\right] + \left[\dfrac{-3}{4} \times \dfrac{5}{6}\right]$

= $\left[\dfrac{11}{2} \times \dfrac{(-1)}{1}\right] + \left[\dfrac{-1}{4} \times \dfrac{5}{2}\right]$

= $\dfrac{-11}{2} + \dfrac{(-5)}{8}$

= $\dfrac{-11}{2} - \dfrac{5}{8}$

= $\dfrac{-44 - 5}{8}$

= $\dfrac{-49}{8}$ Ans

L.C.M

2 | 2 , 8
2 | 1   4
2 | 1   2
   | 1   1   L.C.M 2×2×2
                  = 8

b $\left[-\dfrac{1}{7} \times \dfrac{2}{5}\right] + \left[\dfrac{4}{5} \times \dfrac{(-1)}{2}\right]$

= $\left[\dfrac{-1}{1} \times \dfrac{1}{5}\right] + \left[\dfrac{2}{5} \times \dfrac{(-1)}{1}\right]$

= $\left[\dfrac{-1}{5} + \dfrac{(-2)}{5}\right]$

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

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

c + d do your self

Q4 Sol cost of 1 litre of petrol = ₹ $55\frac{2}{3}$

$$= \frac{167}{3}$$

cost of $4\frac{1}{2}$ litre of petrol $= \frac{167}{3} \times 4\frac{1}{2}$

$$= \frac{167}{\cancel{3}} \times \frac{\cancel{9}^{3}}{2}$$

$$= \frac{167}{1} \times \frac{\cancel{3}^{1}}{2}$$

$$= \frac{501}{\cancel{2}}$$

$$= ₹ 250\frac{1}{2}$$

Ques 5 do your self