CHAPTER - 2
FRACTIONS.

EXERCISE 2.1

1. Multiply.

a) $\frac{3}{4} \times \frac{1}{2}$

Sol'n: $\frac{3 \times 1}{4 \times 2}$

$= \frac{3}{8}$ //

c) $\frac{27}{40} \times \frac{20}{21}$

Sol'n: $\frac{\cancel{27}^{9}}{\cancel{40}_{2}} \times \frac{\cancel{20}^{1}}{\cancel{21}_{7}}$

$= \frac{9 \times 1}{2 \times 7}$

$= \frac{9}{14}$ //

* Numerators & Denominators closed by multiplication can be divided by the same number

d) $\frac{16}{35} \times \frac{21}{48}$

Sol'n: $\frac{\cancel{16}^{4}}{\cancel{35}_{5}} \times \frac{\cancel{21}^{3}}{\cancel{48}_{12}}$

$= \frac{\cancel{4}^{1}}{5} \times \frac{\cancel{3}^{1}}{\cancel{12}_{4}}$

$= \frac{1 \times 1}{5 \times 1} = \frac{1}{5}$ //

Here, 21 and 35 are divided by 7.
And, 16 and 48 are divided by 4.
Next we divide 4 and 12 by 4 again.
Then, we divide 3 & 3 by 3.

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f) $\frac{81}{100} \times \frac{25}{36}$.

Sol^n $\frac{\overset{9}{\cancel{81}}}{\underset{4}{\cancel{100}}} \times \frac{\overset{1}{\cancel{25}}}{\underset{4}{\cancel{36}}}$. { here, we divide 25 & 100 by 25. And, we divide 81 & 36 by 9 }.

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

$= \frac{9}{16}$.

2. Multiply :

a) $5 \times 4\frac{3}{10}$

Sol^n $\frac{\overset{1}{\cancel{5}}}{} \times \frac{43}{\underset{2}{\cancel{10}}}$.

$= \frac{1 \times 43}{2}$.

$= \frac{43}{2}$.

$= 21\frac{1}{2}$ //.

* First, we convert $4\frac{3}{10}$ into improper fraction by multiplying 10 & 4 then adding 3 to it. i.e., $10 \times 4 + 3 = 43$.

$\therefore 4\frac{3}{10} = \frac{10 \times 4 + 3}{10}$.

$= \frac{40 + 3}{10}$.

$= \frac{43}{10}$.

$2\overline{)43}$ (21)
4↓
×3
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d) $\frac{1}{3} \times 6\frac{3}{10}$.

Sol'n $\frac{1}{\cancel{3}_1} \times \frac{63}{10}^{21}$.

$= \frac{1 \times 21}{1 \times 10}$.

$= \frac{21}{10}$.

$= 2\frac{1}{10}$ //.

* here, $6\frac{3}{10} = \frac{10 \times 6 + 3}{10}$.

$= \frac{63}{10}$.

$10 \overline{)21}$ (2, -20, 1)

g) $4\frac{1}{3} \times 3\frac{1}{2}$.

Sol'n $\frac{13}{3} \times \frac{7}{2}$.

$= \frac{13 \times 7}{3 \times 2}$.

$= \frac{91}{6}$.

$= 15\frac{1}{6}$ //.

* Here, $4\frac{1}{3} = \frac{3 \times 4 + 1}{3}$

$= \frac{13}{3}$

and $3\frac{1}{2} = \frac{2 \times 3 + 1}{2}$.

$= \frac{7}{2}$

$6 \overline{)91}$ (15, $-6\downarrow$, 31, -30, 1)

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3.

Sol: Total students = 50.

a). No. of students who play basketbal.

$= 50 - (10 + 30)$

$= 50 - 40.$

$= 10$ students.

b) No. of students who play football

$= \frac{1}{5}$ of 50 students.

$= \frac{1}{\cancel{5}_1} \times \cancel{50}^{10}.$

$= 10$ students.

c) No. of students who play cricket

$= \frac{3}{5}$ of 50 students

$= \frac{3}{\cancel{5}_1} \times \cancel{50}^{10}.$

$= 30$ students.

* In this type of questions, reduce the fraction to its lowest terms.

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4.

a) $\frac{1}{3}$ of

(i) 27.

Sol: $\frac{1}{3}$ of 27.

$= \frac{1}{\cancel{3}_1} \times \cancel{27}^{9}$

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

$= \frac{9}{1}$

$= 9.$

(ii) 39.

Sol^n: $\frac{1}{3}$ of 39.

$= \frac{1}{\cancel{3}_1} \times \cancel{39}^{13}$

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

$= \frac{13}{1}$

$= 13.$

b) $\frac{4}{5}$ of

(i) 50.

Sol^n $\frac{4}{\cancel{5}_1} \times \cancel{50}^{10}$

$= \frac{4 \times 10}{1}$

$= \frac{40}{1}$

$= 40.$

(iii) 255.

Sol^n $\frac{4}{\cancel{5}_1} \times \cancel{255}^{51}$

$= \frac{4 \times 51}{1}$

$= \frac{201}{1}$

$= 201.$

* Fractions with denominator as 1 can be written without it. i.e., $\frac{40}{1} = 40.$

5.

Sol?

Given,

Part of book read in 1 hr $= \frac{1}{4}$.

$\therefore$ Part of book he will read in $3\frac{1}{5}$ hours $= 3\frac{1}{5} \times \frac{1}{4}$.

$= \frac{5 \times 3 + 1}{5} \times \frac{1}{4}$.

$= \frac{15+1}{5} \times \frac{1}{4}$.

$= \frac{4}{\frac{16}{5}} \times \frac{1}{\cancel{4}_1}$

$= \frac{4 \times 1}{5 \times 1}$

$= \frac{4}{5}$ //.

EXERCISE : 2.2.

1.

a) $\frac{3}{5}$

Sol? $\frac{5}{3}$.

d) 5.

Sol? $\frac{1}{5}$ { because $5 = \frac{5}{1}$ }.

{ * Reciprocal means interchanging the numerator and the denominator. }

(2)

2. Find :

* To solve division of fractions, we change the sign into multiply, followed by reciprocal of the second fraction

a) $7 \div \frac{2}{5}$

Sol:- $7 \times \frac{5}{2}$

$= \frac{7 \times 5}{2}$

$= \frac{35}{2}$

$= 17\frac{1}{2}$.

$2\overline{)35}$ → 17, -2, 15, -14, 1

c) $2 \div \frac{10}{11}$

Sol:- $\frac{1}{\cancel{2}} \times \frac{11}{\cancel{10}5}$

$= \frac{1 \times 11}{5}$

$= \frac{11}{5}$

$= 2\frac{1}{5}$

$5\overline{)11}$ → 2, -10, 1

d) $\frac{3}{5} \div \frac{1}{4}$

Sol:- $\frac{3}{5} \times \frac{4}{1}$

$= \frac{3 \times 4}{5 \times 1}$

$= \frac{12}{5} = 2\frac{2}{5}$ //

$5\overline{)12}$ → 2, -10, 2.

f) $2\frac{1}{2} \div \frac{3}{5}$.

Sol:

$$\frac{2\times2+1}{2} \div \frac{3}{5}.$$

$$= \frac{5}{2} \div \frac{3}{5}.$$

$$= \frac{5}{2} \times \frac{5}{3}.$$

$$= \frac{5\times5}{2\times3}$$

$$= \frac{25}{6}.$$

$$= 4\frac{1}{6} //.$$

$$\begin{array}{r} 4 \\ 6\overline{)25} \\ -24 \\ \hline 1 \end{array}$$

3

a) $6 \div 2 =$ 3 and $\overset{3}{\cancel{6}} \times \frac{1}{\cancel{2}_1} =$ 3.

b) $2 \div \frac{1}{2} =$ ___ and $2\times2 = 4$.

$\Rightarrow 2 \times \frac{2}{1}$

$\Rightarrow \frac{2\times2}{1}$

$\Rightarrow \frac{4}{1}$

$= 4.$

$\therefore 2 \div \frac{1}{2} = 4.$

c) $3 \div \frac{1}{3} =$ ____ and $3 \times 3 =$ 9. ____

Sol^n $\Rightarrow 3 \times \frac{3}{1}$

$\Rightarrow \frac{3 \times 3}{1}$

$= \frac{9}{1}$

$= 9.$

$\therefore 3 \div \frac{1}{3} = 9$

d) $5 \div \frac{5}{3} =$ ____ and $\cancel{5}^{1} \times \frac{3}{\cancel{5}_{1}} =$ ____

Sol^n $\cancel{5}^{1} \times \frac{3}{\cancel{5}_{1}}$

$\Rightarrow \frac{1 \times 3}{1}$

$\Rightarrow \frac{3}{1}$

$= 3.$

$\Rightarrow \frac{1 \times 3}{1}$

$\Rightarrow \frac{3}{1}$

$= 3.$

$\therefore 5 \div \frac{5}{3} = 3$ and $5 \times \frac{3}{5} = 3.$

4.

a) $\frac{2}{3} \div \frac{1}{5}$.

$$3\overline{)10}\ (3,\ -9,\ 1)$$

Sol:n $\frac{2}{3} \times \frac{5}{1}$

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

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

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

c) $\frac{3}{8} \div \frac{3}{4}$.

Sol:n $\frac{\cancel{3}^{1}}{\cancel{8}_{2}} \times \frac{\cancel{4}^{1}}{\cancel{3}_{1}}$

$= \frac{1 \times 1}{2 \times 1}$

$= \frac{1}{2}$.

$$9\overline{)14}\ (1,\ -9,\ 5)$$

f) $\frac{4}{9} \div \frac{2}{7}$

Sol:n $\frac{\cancel{4}^{2}}{9} \times \frac{7}{\cancel{2}_{1}}$

$= \frac{2 \times 7}{9 \times 1}$

$= \frac{14}{9}$.

$= 1\frac{5}{9}$

5.

a) $\frac{3}{32}, \frac{3}{16}, \frac{3}{8}, \frac{3}{4}, \frac{3}{2}, 3,$

b) $25, 10, 4, \frac{8}{5}$

6.

a) $\frac{2}{3} \div \frac{2}{1}$

Sol:n $\frac{\cancel{2}^{1}}{3} \times \frac{1}{\cancel{2}_{1}}$

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

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

b) $\frac{7}{10} \div \frac{2}{3}$.

Sol:n $\frac{7}{10} \times \frac{3}{2}$.

$= \frac{7 \times 3}{10 \times 2}$

$= \frac{21}{20}$.

$= 1\frac{1}{20} > 1$

$20\overline{)21}^{1}$
-20
1

c) $\frac{8}{9} \div \frac{7}{10}$.

Sol:n $\frac{8}{9} \times \frac{10}{7}$

$= \frac{8 \times 10}{9 \times 7}$.

$= \frac{80}{63}$.

$= 1\frac{17}{63} > 1$

$63\overline{)80}^{1}$
-63
17

d) $\frac{2}{3} \div \frac{4}{3}$.

Sol:n $\frac{\cancel{2}^{1}}{\cancel{3}_{1}} \times \frac{\cancel{3}^{1}}{\cancel{4}_{2}}$.

$= \frac{1 \times 1}{1 \times 2}$

$= \frac{1}{2} < 1$

e) $\frac{2}{3} \div \frac{1}{2}$.

Sol:- $\frac{2}{3} \times \frac{2}{1}$

$3\overline{)4}$ (1), -3, 1

$= \frac{2 \times 2}{3 \times 1}$

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

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

f) $\frac{1}{6} \div \frac{1}{5}$.

Sol:- $\frac{1}{6} \times \frac{5}{1}$

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

7.

a) $\left(\frac{3}{7} + \frac{1}{6}\right) + 1\frac{2}{3} = \frac{3}{7} + \left(\frac{1}{6} + 1\frac{2}{3}\right)$.

b) $\left(\frac{4}{5} \div \frac{3}{8}\right) + \frac{1}{4} \neq \frac{4}{5} \div \left(\frac{3}{8} + \frac{1}{4}\right)$.

c) $\left(\frac{7}{8} \times \frac{6}{7}\right) \times \frac{3}{2} = \frac{7}{8} \times \left(\frac{6}{7} \times \frac{3}{2}\right)$.

d) $\left(\frac{7}{3} - \frac{2}{6}\right) - \frac{1}{2} \neq \frac{7}{3} - \left(\frac{2}{6} - \frac{1}{2}\right)$.

8.

a) $\left(\frac{2}{3} - \frac{4}{9}\right) \times 3\frac{2}{5}$.

Sol:n $\left(\frac{\frac{2}{3_1} \times 9^3 - \frac{4}{9_1} \times 9^1}{9}\right) \times \frac{17}{5}$.

$= \left(\frac{6 - 4}{9}\right) \times \frac{17}{5}$.

$= \frac{2}{9} \times \frac{17}{5}$.

$= \frac{2 \times 17}{9 \times 5}$.

$= \frac{34}{45}$.

$3 \mid 3, 9$
$1, 3$.

LCM of 3 & 9.
$= 3 \times 3$
$= 9$.

* Solve the sum inside the bracket first, then only we open the bracket.

b) $\frac{2}{3} \div \left(1\frac{2}{5} - 2\frac{1}{15}\right)$.

Sol:n $\frac{2}{3} \div \left(\frac{7}{5} - \frac{31}{15}\right)$

$= \frac{2}{3} \div \left(\frac{\frac{7}{5_1} \times 15^3 - \frac{31}{15_1} \times 15^1}{15}\right)$

$= \frac{2}{3} \div \left(\frac{21 - 31}{15}\right)$

$= \frac{2}{3} \div \frac{-10}{15}$.

$5 \mid 5, 15$
$1, 3$.

LCM of 5 & 15
$= 5 \times 3$
$= 15$.

* We find the LCM of fractions that are closed by addition and subtraction

$$= \frac{2}{2} \times \frac{-15}{10}$$

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

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

$$= -1.$$

c) $\frac{3}{10} - \frac{14}{8} \div \frac{56}{9}$

Sol:) $\frac{3}{10} - \frac{14}{8} \times \frac{9}{56}$

$$= \frac{3}{10} - \frac{1 \times 9}{8 \times 4}$$

$$= \frac{3}{10} - \frac{9}{32}$$

$$= \frac{\frac{3}{10} \times 160 - \frac{9}{32} \times 160}{160}$$

$$= \frac{48 - 45}{160}$$

$$= \frac{3}{160}.$$

2 | 10, 32
5, 16.

LCM of 10 & 32
$= 2 \times 5 \times 16.$
$= 160.$

4th step:

$$\frac{\frac{3}{10} \times 160 - \frac{9}{32} \times 160}{160}$$

e) $\frac{1}{13} \times 3\frac{1}{3} + 2\frac{2}{3} \div 4\frac{1}{3}$.

Sol^n: $\frac{1}{13} \times \frac{10}{3} + \frac{8}{3} \div \frac{13}{3}$.

$= \frac{1}{13} \times \frac{10}{3} + \frac{8}{\cancel{3}_1} \times \frac{\cancel{3}^1}{13}$.

$= \frac{1 \times 10}{13 \times 3} + \frac{8 \times 1}{1 \times 13}$.

$= \frac{10}{39} + \frac{8}{13}$.

$= \frac{\frac{10}{\cancel{39}_1} \times \cancel{39}^1 + \frac{8}{\cancel{13}_1} \times \cancel{39}^3}{39}$.

$= \frac{10 + 24}{39}$.

$= \frac{34}{39}$.

13 | 39, 13
3, 1

Lcm of 39 & 13.
$= 13 \times 3$
$= 39$.

EXERCISE 2.3

1.

Sol:n Given,

Total length of the road = 440 m.

length of road repaired = $\frac{3}{4}$ of 440 m.

$= \frac{3}{\cancel{4}_1} \times \overset{110}{\cancel{440}}\ m$

$= 330\ m.$

∴ length of the road left unrepaired = 440 m − 330 m

= 100 m.

2.

Sol:n Given,

Total no. of students = 48.

No. of students who watch a TV programme regularly = $\frac{1}{4}$ of 48.

$= \frac{1}{\cancel{4}_1} \times \cancel{48}^{12}$

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

$= \frac{12}{1}$

= 12 students.

∴ No. of students who do not regularly watch the programme = 48 - 12
= 36 students.

3.

Sol:- Given,
No. of Pranav's collection of stamps = 320.

∴ No of stamps Rohan has = $3\frac{3}{4}$ of 320.

$= \frac{15}{\cancel{4}_1} \times \cancel{320}^{80}$.

= 1200 stamps.

4.

Sol:- Given,
Total no. of fruits in the cart = 6 dozen
= 6 × 12
= 72.

No. of apples in the cart = $\frac{1}{3}$ of 72.

$= \frac{1}{\cancel{3}_1} \times \cancel{72}^{24}$

= 24 apples.

No. of oranges in the cart = $\frac{1}{4}$ of 72

$= \frac{1}{\cancel{4}_1} \times \cancel{72}^{18}$

= 18 oranges.

∵ rest of the fruits are bananas,

no. of bananas in the cart = 72 - (24 + 18).

= 72 - 42.

= 30 bananas.

= $\frac{30}{12}$ dozen.

= 2.5 dozen.

$$\begin{array}{r} 2.5 \\ 12\overline{)30} \\ -24 \\ \hline 60 \\ -60 \\ \hline xx \end{array}$$

Given,

Length of the green ribbon = 12m 50 cm.

= 12 x 100 cm + 50 cm.

= 1200 cm + 50 cm.

= 1250 cm.

∴ Length of the red ribbon = $\frac{3}{5}$ of 1250 cm.

= $\frac{3}{\cancel{5}_1} \times \overset{250}{\cancel{1250}}$ cm

= $\frac{3 \times 250}{1}$ cm.

= $\frac{750}{1}$ cm

= 750 cm.

P.T.O.

And, length of the yellow ribbon = $2\frac{1}{2}$ of 750 cm

$= \frac{5}{2}$ of 750 cm

$= \frac{5}{2_1} \times \overset{375}{\cancel{750}}$ cm.

$= \frac{5 \times 375}{1}$ cm.

$= 1875$ cm.

or.

18 m 75 cm.

6.

Sol.^{n} Given,

Total no. of people who attended the wedding reception = 1800.

No. of men $= \frac{7}{18}$ of 1800.

$= \frac{7}{\cancel{18}_1} \times \overset{100}{\cancel{1800}}$.

$= \frac{7 \times 100}{1}$

$= \frac{700}{1}$

$= 700$ men

No. of women $= \frac{11}{24}$ of 1800. $\overset{75}{\cancel{150}}$.

$= \frac{11}{\cancel{24}_{12}} \times \overset{\overset{300}{\cancel{900}}}{\cancel{1800}}$.

$4 \times 2_1$

$= \frac{11 \times 75}{1}$

$= \frac{825}{1}$

$= 825$ women

$\begin{array}{r} 11 \\ \times\ 75 \\ \hline 055 \\ +\ 77 \\ \hline 825 \end{array}$

∵ remaining were children, no. of children who attended $= 1800 - (700 + 825)$.

$= 1800 - 1525$.

$= 275$ children.

$\begin{array}{r} 1800. \\ -\ 1525. \\ \hline 275. \end{array}$

and fraction of children $= \frac{\cancel{275}\ 55}{\cancel{1800}\ 360\ 72}$ (11)

$= \frac{11}{72}$.

Sol.) Let the required fraction be x.

First, Sum of $5\frac{1}{3}$ and $6\frac{1}{3}$

$\Rightarrow 5\frac{1}{3} + 6\frac{1}{3}$.

$= \frac{16}{3} + \frac{19}{3}$.

$= \frac{16 + 19}{3}$.

$= \frac{35}{3}$.

7.

Sol^n Let the required fraction be x.

First, Sum of $5\frac{1}{3}$ and $6\frac{1}{3}$.

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

$$= \frac{16}{3} + \frac{19}{3}$$

$$= \frac{35}{3}$$

Now, A.P.Q.

$$\frac{35}{3} \times x = 3.$$

$$\Rightarrow \frac{35x}{3} = 3.$$

$\Rightarrow 35x = 3 \times 3$ (by cross multiplication)

$\Rightarrow 35x = 9$

$\Rightarrow x = \frac{9}{35}$

$\therefore$ the required fraction $= \frac{9}{35}$.