Chapter 9

Ex 9.1

Ratio Proportion and Unitary Method

VI 9. Ratio, Proportion and Unitary Method.

Solution-01

(i) Ratio of number of girls to that of boys in the merit List is 2 : 1.

(ii) Ratio of number of students passing a mathemat-ics test to that of total students appearing in test is 2 : 3.

Solution-02:-

(i) The number of bad pencils produced in a factory is $\frac{1}{9}$ of the number of good pencils produced in the factory.

(ii) The number of villages is 2000 times that of cities in india.

Solution-03:-

(i) 60 : 72.

To express this ratio in the simplest form, we will have to find the H.C.f of 60 and 72.

It is 12.

Dividing each term of the ratio by the H.C.F of its terms i.e. 12, we get

$$\frac{60}{72} = \frac{60 \div 12}{72 \div 12} = \frac{5}{6} \text{ or } 5 : 6$$

Hence, the simplest form of the ratio 60 : 72 is 5 : 6.

(ii) 324 : 144

To express this ratio in the simplest form, we will have to find the H.C.F of 324 & 144. It is 36.

Dividing each term of the ratio by the H.C.F of its terms i.e 36, we get

$$\frac{324}{144} = \frac{324 \div 36}{144 \div 36} = \frac{9}{4}.$$

Hence, the simplest form of the ratio 324:144 is 9:4.

(iii) 85 : 391.

To express this ratio in the simplest form we will have to find the H.C.F of 85 and 391. It is 17.

Dividing each term of the ratio by the H.C.F of its terms i.e 17, we get

$$\frac{85}{391} = \frac{85 \div 17}{391 \div 17}$$

$$= \frac{85/17}{391/17} = \frac{5}{23}.$$

Hence, the simplest form of the ratio 85:391 is 5:23

(iv) 186 : 403.

The given ratio is $186 : 403 = \frac{186}{403}$

To express this ratio in the simplest form, we will have to find the H.C.F of 186 and 403. It is 31.

Dividing each term of the ratio by the H.C.F of its terms i.e 31, we get

$$\frac{186}{403} = \frac{[186 \div 31]}{403 \div 31} = \frac{6}{23} \text{ (or) } 6 : 23$$

Hence, the simplest form of the ratio 186 : 403 is 6 : 23.

Solution-04

(i) 75 paise to Rs 3. = 75 paise : Rs 3

= 75 paise : 300 paise

= 8 % Vø 1 : 4.

[∵ 1 Rs = 100 paise]

[dividing the first and second term by their H.C.F = 75]

(ii) 35 minutes to 45 minutes

= 35 min : 45 min

= 7 : 9 [Dividing the first and second term by their H.C.F = 5]

(iii) 8kg to 400gm. = 8kg : 400gm

= 8000gm : 400gm

= 20 : 1.

[Dividing the first and second term by their H.C.F = 400]

(iv) 48 minutes to 1 hour. = 48 min : 1 hour

= 48 min : 60 min

[∵ 1 hour = 60 min]

= 4 : 5.

[Dividing the first and second term by their H.C.F = 12]

(v) 2 meters to 35cm. = 2met : 35cm

= 200cm : 35cm

[1 m = 100 cm]

= 40 : 7

[∵ Dividing the first and second term by their H.C.F = 5].

(VI) 35 minutes to 45 seconds = 35min : 45 sec

= 2100 sec : 45 sec

= 140 : 3

[H.C.F = 15]

(VII) 2 dozen to 3 scores = 2 dozen : 3 scores

= 24 : 60

[∵ 1 dozen = 12

score = 20]

= 2 : 5.

[Dividing the first and second term by their H.C.F = 12].

(VIII) 3 weeks to 3 days = 3 weeks : 3 days

= 21 days : 3 days

[1 week = 7 days]

= 3 × 7 : 3

= 7 : 1.

(ix) 48 min to 2 hours 40 min = 48 min : 160 min

[∵ 1 hour = 60 min]

= 3 : 10

[∵ dividing the first and second term by their H.C.F = 3 : 10

(X) 3m 5cm to 35cm = 3m5cm : 35cm

= 305cm : 35cm

[Dividing the first and second term by their H.C.F = 5]

= 61 : 7

Solution-05:-

(I) 3.2 meters to 56 meters = 3.2 : 56

= 2 : 35

[Dividing the first and second term by their H.C.F = 1.6]

(II) 10 meters to 25 cm = 10mel : 25cm

= 1000cm : 25cm

= 40 : 1

[H.C.F = 25]

(III) 25 paise to RS 60 = 25 paise : 60 Rs

= 25 paise : 6000 paise

= 1 : 240

[∵ HCF = 25 paise]

(IV) 10 litres to 0.25 litres = 10 : 0.25

= 40 : 1

[∵ H.C.F = 0.25]

Solution-06:

The number of boys = 1168.

The number of girls = 1095.

The number of boys to the number of girls

$$= \frac{1168}{1095}$$

[Dividing the Nr & Dr by their H.C.F = 73]

Solution-07:

(i) Given that,

Avinash Salary = Rs 12,000 per month.

Wife Salary = Rs 15,000 per month.

Avinash's income to wife income = $\frac{\text{Rs } 12,000}{\text{Rs } 15,000}$

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

(ii) Total income = 27,000 per month.

Avinash' sincome to the Total

income = $\frac{\text{Rs } 12,000}{\text{Rs } 27,000}$

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

on-08:

Total no.of workers = 72.

women = 28

women = 72-28

= 44.

men to that of women = 28 : 44

$$= \frac{28 \div 4}{44 \div 4}$$

[H.C.F = 4]

$$= \frac{7}{11}$$

men to the total no.of persons $= \frac{28 \div 4}{72 \div 4}$

$$= \frac{7}{18}$$

persons to women $= \frac{72}{44}$

$$= \frac{72 \div 4}{44 \div 4}$$

$$= \frac{18}{11}.$$

Solution - 09 :-

Length of steel tape = 10m

width = 2.4cm.

ratio of its length and width = $\frac{10m}{2.4cm}$

$= \frac{1000cm}{2.4cm}$

$= \frac{1250}{3}$

[HCF = 0.8 cm]

Solution-10:

Total period office = 9.a.m to 5:00 pm

= 8 hours.

Lunch interval = 30 min

Ratio = $\frac{30}{8 \times 60 \text{ mins}}$

$= \frac{30}{480}$

$= \frac{30 \div 30}{480 \div 30}$

$= \frac{1}{16}$.

Solution-11.

bullock-cart travels 24 km in 3 hours

Train travels 120 km in 2 hours

bullock-cart travels $\frac{24 km}{3}$ in One hour

i.e 8 km.

Train travels $\frac{120}{2}$ km on one hour

i.e 60 km.

$\therefore$ Ratio $= \frac{8 \div 4}{60 \div 4}$

$= \frac{2}{15}$

Solution-12

Margarette earns -955 per

savings - 185 per month

expenditure $= 955 - 185$

$= 770$.

(i) her savings to her income $= \frac{185 \div 5}{955 \div 5}$

$= \frac{37}{191}$

(ii) her income to her expenditure $= \frac{955}{770} = \frac{191}{154}$

(iii) her savings to her expenditure $= \frac{185}{770} = \frac{37}{154}$

Exercise 9.2

(i) 3:4 (or) 9:16

writing the given ratios as fractions, we have

$3:4 = \frac{3}{4}$ and $9:16 = \frac{9}{16}$.

Now L.C.M of 4 and 16 is 16

Making the denominator of each fraction equal to 16, we have

$\frac{3}{4} = \frac{3\times4}{4\times4} = \frac{12}{16}$ and $\frac{9}{16} = \frac{9}{16}$.

Clearly $12 > 9$

$\therefore \frac{12}{16} > \frac{9}{16} \Rightarrow \frac{3}{4} > \frac{9}{16}$

(ii) 15:16 or 24:25

writing the given ratio as fractions, we have

$15:16 = \frac{15}{16}$ and $24:25 = \frac{24}{25}$.

Making the denominator of each fraction equal to 400, we have

L.C.M of 25 & 16 is = 400

$\frac{15}{16} = \frac{15\times25}{16\times25} = \frac{375}{400}$ and $\frac{24}{25} = \frac{24\times16}{25\times16} = \frac{384}{400}$

clearly $384 > 375$

$\therefore \frac{384}{400} > \frac{375}{400} \Rightarrow \frac{24}{25} > \frac{15}{16}$.

(iii) 4:7 or 5:8

$4:7 = \frac{4}{7}$ and $5:8 = \frac{5}{8}$

Now, Lcm of 7 and 8 is 56.

$\frac{4}{7} = \frac{4\times8}{7\times8} = \frac{32}{56}$ and $5:8 = \frac{5\times7}{8\times7} = \frac{35}{56}$

clearly $35 > 32$

$\therefore \frac{35}{56} > \frac{32}{56} \Rightarrow \frac{5}{8} > \frac{4}{7}$.

(iv) 9:20 or 8:13

$9:20 = \frac{9}{20}$ and $8:13 = \frac{8}{13}$.

Now, Lcm of 20 and 13 is 260

$\frac{9}{20} = \frac{9\times13}{20\times13} = \frac{117}{260}$ and $\frac{8}{13} = \frac{8\times20}{20\times13} = \frac{160}{260}$.

Clearly $160 > 117$

$\therefore \frac{160}{260} > \frac{117}{260} \Rightarrow \frac{8}{13} > \frac{9}{20}$.

(v) 1:2 or 13:27

$1:2 = \frac{1}{2}$ and $13:27 = \frac{13}{27}$

Now, Lcm of 2 and 27 is 54

$\frac{27}{54}$ (or) $\frac{26}{54}$

$\therefore \frac{1}{2} > \frac{13}{27}$.

Solution-02:-

We have,

$\frac{6}{8} = \frac{6 \div 2}{8 \div 2} = \frac{3}{4}$

$\therefore$ 3:4 is an equivalent ratio of 6:15

Also, $\frac{6}{8} = \frac{6 \times 2}{8 \times 2} = \frac{12}{16}$

So, 12:16 is an equivalent ratios of 6:8.

Hence, 3:4 and 12:16 are equivalent ratios of 6:8.

Solution-03:-

$\frac{12}{20} = \frac{\square}{35} = \frac{\cancel{8}\,9}{\square}$

In order to find the first missing number, we consider the denominator 20 and 35

Lcm of 20 and 35 is 80.

We have, $20 \div 5 = 4$.

So, we divide the Nr & Dr of $\frac{12}{20}$ by 4 to

get $\frac{12}{20} = \frac{12 \div 4}{20 \div 4} = \frac{3}{5}$

Hence, first missing number is 3, Consequently the second ratio is $\frac{3}{5}$

To find the second missing number,

we consider $\frac{7}{\cancel{8}}\,7 \quad \frac{3}{5} = \frac{9}{\square}$

We have $9 \div 3 = 3$, so we multiply the Nr & Dr of $\frac{3}{5}$ by 3 to get

$\frac{3}{5} = \frac{3 \times 3}{5 \times 3} = \frac{9}{15}$.

Hence, the second missing number is 15.

Exercise 9.3

solution-01:-

(i) $16 : 24 = 20 : 30$

$$\Rightarrow \frac{16}{24} = \frac{20}{30}$$

$$\Rightarrow \frac{\frac{16}{24}}{\frac{4}{4}} = \frac{\frac{20}{30}}{\frac{5}{5}}$$

$$\Rightarrow \frac{4}{6} = \frac{4}{6}$$

$$\Rightarrow \frac{2}{3} = \frac{2}{3}$$

True

(ii) $21 : 6 = 35 : 10$

$$\frac{\frac{21}{6}}{\frac{3}{3}} = \frac{\frac{35}{10}}{\frac{5}{5}}$$

$$\Rightarrow \frac{7}{2} = \frac{7}{2}$$

True

(iii) $\frac{12}{18} = \frac{28}{12}$

$$\frac{6}{9} \neq \frac{14}{6}$$

False.

(iv) $51:58 = 85:102$.

$\frac{51}{58} \neq \frac{5}{6}$

False

(v) $\frac{40 \text{ men}}{200 \text{ men}} = \frac{Rs\ 5}{Rs\ 25}$ (or) $\frac{40 \text{ men} \div 40}{200 \text{ men} \div 40} = \frac{Rs\ 5 \div 5}{Rs\ 25 \div 5}$

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

True

(vi) $\frac{99 kg}{45 kg} = \frac{Rs\ 44}{Rs\ 20}$

$\Rightarrow \frac{99}{45} = \frac{44}{20}$

$\Rightarrow \frac{99 \div 9}{45 \div 9} = \frac{44 \div 4}{20 \div 4}$

$\Rightarrow \frac{11}{5} = \frac{11}{5}$.

True.

Solution-02

(i) 8, 16, 6, 12.

we have,

$8 : 16 = \frac{8}{16} = \frac{1}{2}$

and $\frac{6}{12} = \frac{1}{2}$

$\therefore \frac{8}{16} = \frac{6}{12}$

Hence 8, 16, 6, 12 are in proportion.

(ii) 6, 2, 4, 3

we have,

$\frac{6}{2} = \frac{3}{1}$

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

$\therefore \frac{3}{1} \neq \frac{4}{3}$

Hence, 6, 2, 4, 3 are not in proportion

(iii) 150, 250, 200, 300.

we have,

$\frac{150}{250} = \frac{3}{5}$ and $\frac{200}{300} = \frac{4}{6} = \frac{2}{3}$

$\therefore$ Hence 150, 250, 200, 300 are not in proportion.

Exercise 9.4

1. The price of 3 meters of cloth = RS 79.50

Let the price of 15m cloth be x

Then,

$$\frac{3}{15} = \frac{79.50}{x}$$

By cross multiplication. we get

$$\Rightarrow 3x = 15 \times 79.50$$

$$\Rightarrow x = \frac{15 \times 79.50}{3}$$

$$\Rightarrow x = 5 \times 79.50$$

$$\Rightarrow x = RS\ 397.50.$$

2. cost of 17 chairs = RS 9605

cost of one chair = $\frac{RS\ 9605}{17} = 565$

Number of chairs purchased by Rs 56500 = $\frac{56500}{\text{cost of one chair}}$

$$= \frac{56500}{565}$$

$$= 100 \text{ chairs}$$

solution - 03

Three ferry loads carry - 150 people

one ferryload carry = $\frac{150}{3}$ people

= 50 people.

Number of peoples can be carried by 4 ferryloads = 50 × 4

= 200 people.

Solution-04:-

9 kg rice cost 120.60

50kg cost = ?

1 Kg Rice cost = $\frac{120.60}{9}$

= 13.4

50 kg rice cost = 13.4 × 50

= 670

∴ 50 kg Rice cost = Rs. 670.

Solution -05

Train Runs 200km in 5 hours.

Train Runs in one hour = $\frac{200}{5}$ km

= 40km.

∴ No of kms does it run in 7hrs = 7×40km

= 280km

Solution-06:-

10 boys can dig a pitch in 12 hours.

8 boys can dig pitch in x hrs

one boy can dig pitch in = 12 × 10 = 120hrs

8 boys can dig pitch in = $\frac{120}{8}$

= 15hrs.

Solution-07

Daily 8hours → work finishes in 12 days.

6 hrs daily → ?

Daily one hour = $\frac{12 \times 8}{8}$

= 9.5 days. = 96 days

No of days will take 6 hrs daily works = $\frac{96}{6}$

= 16 days.