Ratio, Proportion and Unitary Method

Exercise 9.1

Q.1

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

(ii) Ratio of number of students passing a mathematics test to that of total students appearins in test is 2 : 3.

Q.2

(i) The number of bad pencils produced in a factory is 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.

Q.3

(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 ration by the H.C.F of its terms i.e. 12 we get

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

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 ration 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 = 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 186: 403 is 6:23.

Q.4

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

= 75 paise : 300 paise

= 1 : 4.

[∵ IRS = 100 paise]

[Dividing the first and second term by their H.C.R = 75]

(ii) 35 minutes to 45 minutes

= 35 min : 45 min

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

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

= 8000 gm : 400 gm

= 20 : 1.

[dividing the first and second terms 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 35 cm = 2 met: 35 cm

= 200 cm : 35 cm

[1m = 100 cm]

= 40 : 7

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

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

(vi) 35 minutes to 45 seconds = 35 min : 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 day: 3days

[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 35 cm = 3m 5 cm : 35 cm

= 305 cm : 35 cm

[dividing the first and second terms by their H.C.F = 5] = 61 : 7

Exercise 9.2

Q.1

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

Writing the given ratios as fractions, we have

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

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

Making the denominaator of each fraction

equal to 16, we have

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

Clearly 12 >9

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

(ii) 15 : 16 or 24 : 24

Writing the given ratio as fractions, we have

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

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

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

$$\frac{15}{16} = \frac{15\times 25}{16\times 25} = \frac{375}{400} \text{ and } \frac{24}{25} = \frac{24\times 16}{25\times 16} = \frac{384}{400}$$

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.

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

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

$\frac{9}{20}=\frac{9\times 13}{20\times 13}=\frac{117}{260}$ and $\frac{8}{13}=\frac{8\times 20}{20\times 13}=\frac{160}{260}$

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

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

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

Q.2

i.e. have.

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

∴ 3 : 4 is an equivalent ratio of 6 : 15

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

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

Q.3

$$\frac{12}{20}=\frac{\square}{5}=\frac{9}{\square}$$

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

LCM of 20 and 5 is 20.

We have 20 ÷ 4 = 4.

So, we divide the Nr or of 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 3/5

To find the second missing number, we consider

$$\frac{2}{3}+\frac{3}{5}=\frac{9}{\square}$$

We have 9 ÷ 3 = 3, so we multiply the nr Δ or of 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

Q.1

(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)

$$\frac{40 \text{ men}}{200 \text{ men}} = \frac{1}{5} \text{ (or) } \frac{40 \text{ men} \div 40}{200 \text{ men} \div 40} = \frac{\text{Rs } 5 \div 5}{\text{Rs } 25 \div 5}$$

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

True

(vi)

$$\frac{99 \text{ kg}}{45 \text{ kg}} = \frac{\text{Rs } 44}{\text{Rs } 20}$$

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

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

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

True.

Q.2

(i) 8, 16, 6, 12.

We have,

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

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

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

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

(ii) 6, 2, 4, 3

We have

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

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

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

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

(iii) 150, 250, 200, 300.

We have

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

∴ Hence 150, 250 200, 300 are not in proportion.

Exercise 9.4

Q.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

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

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

$\Longrightarrow$ x = 5 × 79.50

$\Longrightarrow$ x = Rs 397.50

Q.2

Cost of 17 chairs = Rs 9605

$$\text{Cost of one chair } = \frac{\text{Rs } 9605}{17} = 565$$

Number of chairs purchased

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

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

= 100 chairs.

Q.3

Three ferry loads carry = 150 people

one ferry load carry = 150/3 people

= 50 people

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

= 200 people.

Q.4

9 kg rice cost 120.60

50 kg cost = ?

1 kg rice cost = 120.60/9

= 13.4

50 kg rice cost = 13.4 × 50

= 670

∴ 50 kg rice cost = Rs. 670

Q.5

Train runs 200 km in 5 hours.

Train runs in one hour = 200/5 km

= 40 km

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

= 280 km

Q.6

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 = 120 hrs

8 boys can dig pitch in = 120/8

= 15 hrs.

Q.7

Daily 8 hours → work finishes in 72 days.

6 hrs daily → ?

Daily one hour = 12 × 8 = 96 days

No of day will take 6 hrs daily works = 96/6 = 16 days.