Unit 8 (Ratio & Proportion)

Multiple Choice Questions (MCQs)

Question 1:

The ratio of 8 books to 20 books is

(a) 2 : 5 (b) 5 : 2

(c) 4 : 5 (d) 5 : 4

Solution:

=8 books/20 books = 8/20

= 2:5

[on dividing numerator and denominator by 4]

Hence, (a) is the correct option.

Question 2:

The ratio of the number of sides of a square to the number of edges of a cube is

(a) 1 : 2 (b) 3 : 2 (c) 4 : 1 (d) 1 : 3

Solution:

(d) Number of sides in a square =4 Number of edges in a cube =12

Ratio of the number of sides of a square to number of edges =4/12

=1/3 =1:3 [on dividing numerator and denominator by 4]

Hence, (d) is the correct option.

Question 3:

A picture is 60 cm wide and 1.8 m long. The ratio of its width to its perimeter in lowest form is

(a) 1 :2 (b) 1 : 3 (c) 1 :4 (d) 1 :8

Solution:

(d) Given,

Width of picture (b) = 60 cm Length of picture (l) = 1.8 m

= (1.8 x 100) cm

= (18/10) x 100= 180 cm

Perimeter of picture = 2 x (1+ b)

= 2 x (180+ 60) cm

= (2 x 240) cm= 480 cm

Ratio of width to its perimeter = 60/480

=1 [on dividing numerator and denominator by 60]

=1:8

Hence, (d) is the correct option.

Question 4:

Neelam's annual income is Rs. 288000. Her annual saving amount is Rs. 36000. The ratio of her savings to her expenditure is

(a) 1 : 8 (b) 1 : 7

(c) 1 : 6 (d) 1 : 5

Solution:

(b) Given,

Neelam's annual income =Rs. 288000

Her annual saving =Rs. 36000

Her expenditure = Income – Savings = Rs. 288000 – Rs. 36000 =Rs. 252000

∴ Ratio of her savings to her expenditure = 36000/252000

=1/7 [on dividing numerator and denominator by 36000]

=1:7

Hence, (b) is the correct option.

Question 5:

Mathematics textbook for class VI has 320 pages. The chapter 'symmetry' runs from page 261 to page 272. The ratio of the number of pages of this chapter to the total number of pages of the book is

(a) 11 : 320

(b) 3 : 40

(c) 3 : 80

(d) 272 : 320

Solution:

(c) Given,

Mathematics textbook for class VI has pages =320 The chapter symmetry runs from page 261 to page 272.

∴ Number of pages of chapter 'symmetry' = 272 -260 =12

Ratio of the number of pages of chapter 'symmetry' to the total number of pages

= 12/320

3/80 [on dividing numerator and denominator by 4]

= 3:80

Hence, (c) is the correct option.

Question 6:

In a box, the ratio of red marbles to blue marbles is 7 : 4. Which of the following could be the total number of marbles in the box?

(a) 18 (b) 19 (c) 21 (d) 22

Solution:

(d) Given,

The ratio of red marbles to blue marbles = 7:4

Let the number of red marbles = 7x

and blue marbles = 4x

Then, total number of marbles = 7x + 4x

= 11x

Total number of marbles must be multiple of 11.

By observation,

∴ 11x =22

=> 11x = 11 x 2

Hence, (d) is the correct option.

Question 7:

On a shelf, books with green cover and that with brown cover are in the ratio 2 : 3. If there are 18 books with green cover, then the number of books with brown cover is

(a) 12 (b) 24 (c) 27 (d) 36

Solution:

(c) Given,

Ratio of books with green cover to books with brown cover = 2:3 Books with green cover = 18

Let the books with green cover and brown cover are 2x and 3x respectively.

According to the question,

2x = 18

=> x = 18/2

=> x = 9

Thus, the books with brown cover = 3x

= 3 x 9=27

Hence, (c) is the correct option.

Question 8:

The greatest ratio among the ratios 2 : 3, 5 : 8, 75 : 121 and 40 : 25 is

(a) 2 : 3 (b) 5 : 8

(c) 75: 121 (d) 40:25

Solution:

(d) Given, ratios 2 : 3, 5 : 8, 75 :121 and 40 : 25.

2:3 =2/3 = 0.66

5:8 = 5/8 = 0.62

75:121 = 75/121= 0.61

40:25 = 40/25 = 1.6

Hence, 40 : 25 is the greatest. Hence, (d) is the correct option.

Question 9:

There are ‘b’ boys and ‘g’ girls in a class. The ratio of the number of boys to the total number of students in the class is

(a) b/(b + g) (b) g/(b+g) (c) b/g (d) (b+g)/g

Solution:

(a) Given,

Number of boys in the class =b and number of girls in the class = g

∴Total number of students = Number of boys + Number of girls = b + g

Ratio of boys to the total number of students = b : b+g

b/(b+g)

Hence, (a) is the correct option.

Question 10:

If a bus travels 160 km in 4 h and a train travels 320 km in 5 h at uniform speeds, then the ratio of the distances travelled by them in one hour is

(a) 1 : 2 (b) 4 : 5 (c) 5 : 8 (d) 8 : 5

Solution:

(c) Given,

Bus travels in 4 h = 160 km and Train travels in 5 h = 320 km Ratio of the distance travelled and time is Distance

Speed = Distance/Time

Speed of bus=160/40

Speed of train = 320/5

Ratio of speed of bus to train = 40/64

= 5/8 [on dividing numerator and denominator by 8]

= 5:8

Hence, (c) is the correct option.

In questions 11 to 15, find, the missing number in the box in each of the proportions.

Question 11:

$\frac{3}{5} = \frac{\square}{20}$

Solution:

We have,

$\frac{3}{5} = \frac{?}{20} \Rightarrow \frac{3\times 4}{5\times 4} = \frac{?}{20}$

$\Rightarrow \frac{12}{20} = \frac{?}{20}$

On comparing, we get $? = 12$

Question 12:

$\frac{\square}{18} = \frac{2}{9}$

Solution:

We have,

$\frac{?}{18} = \frac{2}{9} \Rightarrow \frac{?}{18} = \frac{2\times 2}{9\times 2}$

$\Rightarrow \frac{?}{18} = \frac{4}{18}$

On comparing, we get $? = 4$

Question 13:

$\frac{8}{\square} = \frac{3.2}{4}$

Solution:

$\frac{8}{?} = \frac{3.2}{4}$

$\Rightarrow \frac{8}{?} = \frac{3.2\times 2.5}{4\times 2.5}$

$\Rightarrow \frac{8}{?} = \frac{8}{10}$

On comparing, we get $? = 10$

Question 14:

$\frac{\square}{45} = \frac{16}{40} = \frac{24}{\square}$

Solution:

We have, $\frac{?}{45} = \frac{16}{40} = \frac{24}{?}$

For first 2 ratios, $\frac{16}{40} = \frac{2\times8}{5\times8} = \frac{2\times9}{5\times9} = \frac{18}{45}$

Hence, missing number = 18

For last 2 ratios,

$\frac{16}{40} = \frac{2\times8}{5\times8} = \frac{2\times12}{5\times12} = \frac{24}{60}$

Hence, missing number = 60

Question 15:

$\frac{16}{36} = \frac{\square}{63} = \frac{36}{\square} = \frac{\square}{117}$

Solution:

We have, $\frac{16}{36} = \frac{?}{63} = \frac{36}{?} = \frac{?}{117}$

For first two ratios, $\frac{16}{36} = \frac{4\times4}{9\times4} = \frac{4\times7}{9\times7} = \frac{28}{63}$

Hence, missing number = 28

For middle two ratios, $\frac{28}{63} = \frac{36}{?}$

$\frac{28}{63} = \frac{4\times7}{9\times7} = \frac{4\times9}{9\times9} = \frac{36}{81}$

Hence, missing number = 81

For last two ratios $\frac{36}{81} = \frac{?}{117}$

$\frac{36}{81} = \frac{4\times9}{9\times9} = \frac{4\times13}{9\times13} = \frac{52}{117}$

Hence, missing number = 52

True/False

In questions 16 to 34, State whether the given statements are True or False.

Question 16:

3/8 = 15/40

Solution:

True

3 15

Given, 3/8 = 15/40

Simplest form of 15/40 = 3/8 [on dividing numerator and denominator by 5]

Question 17:

4:7 = 20:35

Solution:

True

Given, 4 : 7 = 20 : 35

Simplest form of 20/35 = 4/7 [on dividing numerator and denominator by 5]

Question 18:

0.2:5 = 2:0.5

Solution:

False

Given, 0.2:5 = 2:05

$$\frac{0.2}{5} \neq \frac{2}{0.5} \Rightarrow \frac{2}{50} \neq \frac{20}{5}$$

Question 19:

3:33 = 33:333

Solution:

False

Given, 3: 33 = 33 : 333

3/33 = 33/333

Simplest form of 3/33 = 1/11 [on dividing numerator and denominator by 3]

Simplest form of 33/333 = 11/111 [on dividing numerator and denominator by 3]

$$\frac{1}{11} \neq \frac{11}{111}$$

Question 20:

15m : 40m = 35m : 65m

Solution:

False

Given, 15 m : 40 m = 35 m : 65 m 15 = 35

15/40 = 35/65

Simplest form of 15/40 = 5/8 [on dividing numerator and denominator by 5]

Simplest form of 35/65 = 7/13 [on dividing numerator and denominator by 5]

$$\frac{3}{8} \neq \frac{7}{13}$$

Question 21:

27cm2 : 57cm2 = 18cm : 38cm

Solution:

True

Given, 27 cm2 : 57 cm2 = 18 cm : 38 cm

27/57 = 18/38

Simplest form of 27/57 = 9/19 [on dividing numerator and denominator by 3]

Simplest form of 18/57 = 9/19 [on dividing numerator and denominator by 2]

9/19 = 9/19

Question 22:

5 kg : 7.5 kg = Rs.7.50 : Rs.5

Solution:

False

Given, 5 kg :7.5 kg = Rs.7.50: Rs. 5 => 5/7.5 = 7.50/5

Simplest form of 5/7.5 = 1/1.5 [on dividing numerator and denominator by 5]

Simplest form of 7.5/5 = 1.5/1 [on dividing numerator and denominator by 5]

$$\frac{1}{1.5} \neq \frac{1.5}{1}$$

Question 23:

20 g : 100 g = 1m : 500 cm

Solution:

True

Given, 20g : 100g = 1 m : 500cm

20/100 = 100/500

Simplest form of 20/100 = 1/5

Simplest form of 100/500 = 1/5

1/5 = 1/5

Question 24:

12h : 30h = 8km : 20 km

Solution:

True

Given, 12 h : 30 h = 8 km : 20 km

12/30 =8/20

Simplest form of 12/30 = 2/5 [on dividing numerator and denominator by 6]

Simplest form of 8/20 = 2/5 [on dividing numerator and denominator by 4]

2/5 = 2/5

Question 25:

The ratio of 10 kg to 100 kg is 1 : 10.

Solution:

True

Ratio of 10 kg to 100 kg

$$= \frac{10\text{ kg}}{100\text{ kg}}$$

$$= \frac{1}{10} \quad \text{[on dividing numerator and denominator by 10]}$$

$$= 1:10$$

Question 26:

The ratio of 150 cm to 1 m is 1 : 15.

Solution:

False

Ratio of 150 cm to 1 m

$$= \frac{150\text{ cm}}{1\text{ m}} = \frac{150\text{ cm}}{100\text{ cm}} \quad [\because 1\text{ m} = 100\text{ cm}]$$

$$= \frac{3}{2} \quad \text{[on dividing numerator and denominator by 50]}$$

$$= 3:2$$

Question 27:

25kg :20g = 50kg :40g

Solution:

Given, $25\text{ kg} : 20\text{ g} = 50\text{ kg} : 40\text{ g}$

$\Rightarrow \quad \frac{25\text{ kg}}{20\text{ g}} = \frac{50\text{ kg}}{40\text{ g}}$

$\Rightarrow \quad \frac{25000\text{ g}}{20\text{ g}} = \frac{50000\text{ g}}{40\text{ g}} \quad [\because 1\text{ kg} = 1000\text{ g}]$

Simplest form of $\frac{25000}{20} = \frac{1250}{1}$ [on dividing numerator and denominator by 20]

Simplest form of $\frac{50000}{40} = \frac{1250}{1}$ [on dividing numerator and denominator by 40]

$1250 = 1250$

Question 28:

The ratio of 1 h to one day is 1 : 1.

Solution:

False

$$\text{Ratio of 1 h to one day} = \frac{1\text{ h}}{1\text{ day}} = \frac{1\text{ h}}{24\text{ h}} \quad [\because 1\text{ day} = 24\text{ h}]$$
$$= \frac{1}{24}$$
$$= 1:24$$
$$= 1:24 \neq 1:1$$

Question 29:

The ratio of 4 : 16 is in its lowest form.

Solution:

False

Ratio of 4 : 16 in lowest form is

= 4/16

= 1:4

Question 30:

The ratio of 5 : 4 is different from the ratio 4 : 5.

Solution:

True

Ratio of 5:4 = 5/4 = 1.25 => Ratio of 4:5 = 4/5 = 0.80

Hence, the ratio of 5 : 4 is different from the ratio 4 : 5.

Question 31:

A ratio will always be more than 1.

Solution:

False

A ratio can be equal to 1, more than 1 and less than 1. e.g. 3/2 = 1.5(> 1), 2/2 = 1 (= 1)and 3/4 = 0.75(< 1)

Question 32:

A ratio can be equal to 1.

Solution:

True

A ratio can be equal to 1, if both quantities are same.

e.g. ratio of 50 g to 50 g is = 50/50 = 1

Question 33:

If b:a=c:d, then a,b,c and d are in the proportion.

Solution:

False

If b:a=c:d => b/a=c/d

If a, to, c and d are in proportion, then

a/b=c/d

= ad:bc

Question 34:

The two terms of a ratio can be in two different units.

Solution:

False

For a ratio, the two quantities must be in the same unit.

Fill in the Blanks

In questions 35 to 46, fill in the blanks to make the true statements.

Question 35:

A ratio is a form of comparison by ……

Solution:

A ratio is a form of comparison by division.

Question 36:

20m : 70m = Rs. 8 : Rs. …….

Solution:

$20\text{ m} : 70\text{ m} = ₹\ 8 : ₹....$

$$\frac{20\text{ m}}{70\text{ m}} = \frac{₹8}{x\,(\text{let})} \Rightarrow \frac{20}{70} = \frac{8}{x}$$

$\Rightarrow \quad 20 \times x = 70 \times 8$ [by cross multiplication]

$$\Rightarrow \quad x = \frac{70 \times 8}{20} = 28$$

$20\text{ m} : 70\text{ m} = ₹\ 8 : ₹\ 28$

Question 37:

There is a number in the box □ such that, □, 24, 9,12 are in proportion. The number in the box is …….

Solution:

Let the number in box is x, then x, 24, 9 and 12 are in proportion.

$\therefore \quad x : 24 :: 9 : 12$

$$\Rightarrow \quad \frac{x}{24} = \frac{9}{12} \quad \left[\because \text{If } a,b,c \text{ and } d \text{ are in proportion, then } \frac{a}{b} = \frac{c}{d}\right]$$

$\Rightarrow \quad x \times 12 = 24 \times 9$ [by cross multiplication]

$$\Rightarrow \quad x = \frac{24 \times 9}{12}$$

$\Rightarrow \quad x = 2 \times 9$

$\therefore \quad x = 18$

The number in the box is 18.

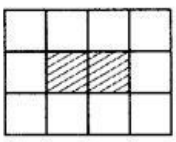
Question 38:

If two ratios are equal, then they are in ……..

Solution:

If two ratios are equal, then they are in proportion.

Use following figure (in which each square is unit of length) for questions 39 and 40 :



Question 39:

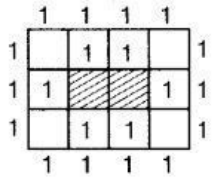
The ratio of the perimeter of the boundary of the shaded portion to the perimeter of the whole figure is …….

Solution:

The perimeter of whole figure = 14 units

The perimeter of shaded figure = 6 units

Ratio of perimeter of shaded portion to whole figure = $\frac{6 \text{ units}}{14 \text{ units}}$



$= \frac{3}{7}$ [on dividing numerator and denominator by 2]

$= 3:7$

Question 40:

The ratio of the area of the shaded portion to that of the whole figure is …….

Solution:

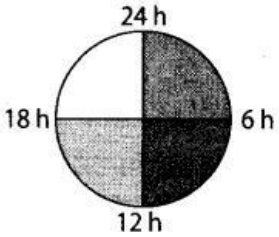
Area of shaded portion = Length x Breadth = 2 x 1 = 2 sq units

Area of shaded figure = Length x Breadth = 4 x 3 = 12 sq units Ratio of shaded portion to whole figure

= 2/12 = 1/6 = 1:6

Question 41:

Sleeping time of a python in a 24 h clock is represented by the shaded portion in figure.



The ratio of sleeping time to awaking time is ……

Solution:

By observing above figure, we have sleeping time of python =18 h Awaking time of python = (24-18) = 6 h

18 h

Ratio of sleeping time to awaking time =18h/6h

= 3/1 [on dividing numerator and denominator by 6] = 3:1

Question 42:

A ratio expressed in lowest form has no common factor other than in its terms……..

Solution:

it a ratio expressed in lowest form, then their common factor should be one (1).

Question 43:

To find the ratio of two quantities, they must be expressed in units……..

Solution:

For a ratio, the two quantities must be in the same units.

Question 44:

Ratio of 5 paise to 25 paise is the same as the ratio of 20 paise to ……..

Solution:

Ratio of 5 paise to 25 paise is same as the ratio of 20 paise to x (let).

$$\frac{5 \text{ paise}}{25 \text{ paise}} = \frac{20 \text{ paise}}{x}$$

$$\Rightarrow \quad \frac{5}{25} = \frac{20}{x}$$

$$\Rightarrow \quad 5 \times x = 25 \times 20 \qquad \text{[by cross multiplication]}$$

$$\Rightarrow \quad x = \frac{25 \times 20}{5}$$

$$\Rightarrow \quad x = 100$$

$$= 100 \text{ paise or } ₹ 1$$

Question 45:

Saturn and Jupiter take 9 h 56 min and 10 h 40 min, respectively for one spin on their axes. The ratio of the time taken by Saturn and Jupiter in lowest form is ……

Solution:

Saturn takes time for one spin = 9 h 56 min

= (9 x 60 + 56) min [1 h = 60 min]

= 596 min

Jupiter takes time for one spin = 10 h 40 min

= (10 x 60 + 40) min

= 640 min

Ratio of time taken by Saturn to Jupiter 596/640 =149/160

= 149 :160

Question 46:

10 g of caustic soda dissolved in 100 mL of water makes a solution of caustic soda. Amount of caustic soda needed for 1 L of water to make the same type of solution is ……

Solution:

Given, 10 g of caustic soda dissolved in 100 mL water.

The ratio of caustic soda to water should be in proportion.

10 g : 100 mL : : x g : 1 L

$$\frac{10 \text{ g}}{100 \text{ mL}} = \frac{x \text{ g}}{1000 \text{ mL}} \qquad [\because 1 \text{ L} = 1000 \text{ mL}]$$

$$\Rightarrow \quad x \text{ g} \times 100 \text{ mL} = 10 \text{ g} \times 1000 \text{ mL} \qquad \text{[by cross multiplication]}$$

$$x = \frac{10 \text{ g} \times 1000 \text{ mL}}{100 \text{ mL}}$$

$$x = 100 \text{ g}$$

Question 47:

The marked price of a table is Rs. 625 and its sale price is Rs. 500. What is the ratio of the sale price to the marked price?

Solution:

Given, marked price of a table = ₹ 625

Sale price of a table = ₹ 500

$$\text{Ratio of sale price to marked price} = \frac{₹ 500}{₹ 625} = \frac{500}{625}$$

$$= \frac{20}{25} \qquad \text{[on dividing numerator and denominator by 25]}$$

$$= \frac{4}{5} \qquad \text{[on dividing numerator and denominator by 5]}$$

$\therefore$ Required ratio $= 4 : 5$

Question 48:

Which pair of ratios are equal? and why?

(i) $\frac{2}{3}, \frac{4}{6}$ (ii) $\frac{8}{4}, \frac{2}{1}$

(iii) $\frac{4}{5}, \frac{12}{20}$

Solution:

Given,

(i) $\frac{2}{3}, \frac{4}{6}$

Simplest form of $\frac{4}{6} = \frac{2}{3}$

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

Hence, $\frac{2}{3}, \frac{4}{6}$ ratios are equal.

(ii) $\frac{8}{4}, \frac{2}{1}$

Simplest form of $\frac{8}{4} = \frac{2}{1}$

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

Hence, $\frac{8}{4}, \frac{2}{1}$ ratios are equal.

(iii) $\frac{4}{5}, \frac{12}{20}$

Simplest form of $\frac{12}{20} = \frac{3}{5}$

$\frac{4}{5} \neq \frac{3}{5}$

Hence, $\frac{4}{5}, \frac{12}{20}$ ratios are not equal.

Question 49:

Which ratio is larger 10 : 21 and 21 : 93?

Solution:

Given, ratios are

10 : 21 and 21 : 93

$\frac{10}{21}$ and $\frac{21}{93}$ [by cross multiplication]

10×93 and 21×21 = 930 and 441

Hence, 10:21 > 21:93

10 : 21 is larger than the ratio 21:93.

Question 50:

Reshma prepared 18 kg of Burfi by mixing Khoya with sugar in the ratio 7 : 2. How much Khoya did she use?

Solution:

Given,

Quantity of Burfi = 18 kg and Khoya : Sugar = 7:2

Total of ratio =7+2 = 9

Quantity of Khoya = (18/9) x 7 = 14kg

So, Reshma used 14 kg Khoya.

Question 51:

A line segment 56 cm long is to be divided into two parts in the ratio of 2 : 5. Find the length of each part.

Solution:

Given,

Length of the line segment = 56 cm Ratio of two parts = 2:5 Sum of ratios = 2 + 5 = 7

Length of first part = (2/7) x 56 = 16 cm

Length of second part = (5/7) x 56 = 40 cm

Question 52:

The number of milk teeth in human beings is 20 and the number of permanent teeth is 32. Find the ratio of the number of milk teeth to the number of permanent teeth.

Solution:

Number of milk teeth in human beings = 20

Number of permanent teeth in human beings = 32

Ratio of the number of milk teeth to the number of permanent teeth = 20/32

= 5/8 [on dividing numerator and denominator by 4]

= 5:8

Quantity 53:

Sex ratio is defined as the number of females per 1000 males in the population. Find the sex ratio, if there are 3732 females per 4000 males in a town.

Solution:

$$\text{Sex ratio} = \frac{\text{Number of females}}{\text{Number of males}} = \frac{3732}{4000} = \frac{933}{1000}$$

[on dividing numerator and denominator by 4]

Hence, sex ratio is 933 in the town.

Question 54:

In a year, Ravi earns Rs. 360000 and paid Rs. 24000 as income tax.

Find the ratio of his

(a) income to income tax.

(b) income tax to income after paying income tax.

Solution:

Given,

Ravi earns = ₹360000

Paid income tax = ₹24000

(a) Ratio of income to income tax $= \frac{₹\ 360000}{₹24000} = \frac{15}{1} = 15:1$

(b) Income of Ravi after paying income tax = ₹(360000 – 24000) = ₹336000

Ratio of income tax to income after paying income tax $= ₹\frac{24000}{336000} = \frac{1}{14} = 1:14$

[on dividing numerator and denominator by 24000]

Question 55:

Ramesh earns Rs. 28000 per month. His wife Rama earns Rs. 36000 per month. Find the ratio of

(a) Ramesh's earning to their total earning.

(b) Rama's earning to their total earning.

Solution:

Given, Ramesh earns = ₹ 28000 per month

His wife Rama's earns = ₹ 36000 per month

Total earning = ₹ (28000 + 36000) = ₹ 64000 per month

(a) Ratio of Ramesh's earing to their total earning $= \frac{₹28000}{₹64000} = \frac{7}{16} = 7:16$

[on dividing numerator and denominator by 4000]

(b) Ratio of Rama's earning to their total earning $= \frac{₹36000}{₹64000} = \frac{9}{16} = 9:16$

[on dividing numerator and denominator by 4000]

Question 56:

Of the 288 persons working in a company, 112 are men and the remaining are women. Find the ratio of the number of

(a) men to that women.

(b) men to the total number of persons.

(c) women to the total number of persons.

Solution:

Total person working in company, $m = 288$

$Number\ of\ men = 112$

$\therefore$ Number of women = Total persons − Number of men = 288 − 112 = 176

(a) Ratio of men to women $= \frac{112}{176} = \frac{7}{11} = 7:11$

[on dividing numerator and denominator by 16]

(b) Ratio of men to the total number of persons $= \frac{112}{288} = \frac{7}{18} = 7:18$

[on dividing numerator and denominator by 16]

(c) Ratio of women to the total number of persons $= \frac{176}{288} = \frac{11}{18} = 11:18$

[on dividing numerator and denominator by 16]

Question 57:

A rectangular sheet of paper is of length 1.2 m and width 21 cm. Find the ratio of width of the paper to its length.

Solution:

Given,

Length of rectangular sheet = 1.2 m [v 1 m = 100 cm]

= 1.2 x 100cm= 120cm Width of rectangular sheet = 21 cm

Ratio of width to length = 21 cm/120 cm

= 7/40 = 7:40 [on dividing numerator and denominator by 3]

Question 58:

A scooter travels 120 km in 3 h and a train 120 km in 2 h.

Find the ratio of their speeds.

$$Speed = \frac{Distance\ travelled}{Time\ taken}$$

Solution:

Scooter travels in 3 h = 120 km

Speed of scooter = distance = 120/3 = 40 km/h

Time 3

Train travels in 2 h = 120 km

Speed of train = 120/2 = 60 km/h

Ratio of their speeds = 40/60 = 2/3 = 2:3

Question 59:

An office opens at 9 AM and closes at 5:30 PM with a lunch break of 30 min. What is the ratio of lunch break to the total period in the office?

Solution:

Office opens at = 9 AM

Office closes at = 5 : 30 PM

Total hours of office = 5:30 PM – 9 AM = 17:30 – 9 = 8:30 h = 8 h 30 min

Lunch break = 30 min

Ratio of lunch break to the total period

$$= \frac{30 \text{ min}}{8 \text{ h } 30 \text{ min}}$$

$$= \frac{30 \text{ min}}{(8 \times 60 + 30) \text{ min}} = \frac{30 \text{ min}}{510 \text{ min}} \qquad [\because 1 \text{ h} = 60 \text{ min}]$$

$$= \frac{1}{17} = 1:17$$

[on dividing numerator and denominator by 30]

Question 60:

The shadow of a 3m long stick is 4m long. At the same time of the day, if the shadow of a flagstaff is 24 long, how tall is the flagstaff?

Solution:

Let the length of flagstaff is x.

Shadow : Length : : Shadow : Length

$$4 \text{ m} : 3 \text{ m} :: 24 \text{ m} : x$$

$$\frac{4}{3} = \frac{24}{x} \qquad \left[\text{if } a,b,c \text{ and } d \text{ are in proportion } \frac{a}{b} = \frac{c}{d}\right]$$

$$4 \times x = 3 \times 24 \qquad \text{[by cross multiplication]}$$

$$x = \frac{3 \times 24}{4}$$

$$x = 18$$

Hence, the flagstaff is 18 m tall.

Question 61:

A recipe calls for 1 cup of milk for every 2 ½ cups of flour to make a cake that would feed 6 persons. How many cups of both flour and milk will be needed to make a similar cake for 8 persons?

Solution:

Given, milk needed for making cake = 1 cup

and floor needed for making cake $= 2\frac{1}{2}$ cups

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

Then, total amount needed = Milk + Flour

$$= \left(1 + \frac{5}{2}\right) = \frac{7}{2} \text{ cups}$$

So, $\frac{7}{2}$ cups of milk and flour are needed to make cake for 6 persons.

Let the needed amount of cups of milk and flour to make cake for 8 persons $= x$ (where, x is multiple of cups)

So, Cups : Persons :: Cups : Persons

$$\frac{7}{2}: 6 :: x : 8$$

$$\frac{7/2}{6} = \frac{x}{8}$$

$$6 \times x = \frac{7}{2} \times 8 \quad \text{[by cross-multiplication]}$$

$$x = \frac{7}{2} \times 8 \times \frac{1}{6}$$

$$x = \frac{14}{3} = 4\frac{2}{3}$$

Hence, the cups needed for 8 persons is $4\frac{2}{3}$.

Question 62:

In a school, the ratio of the number of large classrooms to small classrooms is 3:4. If the number of small rooms is 20, then find the number of large rooms.

Solution:

Given, ratio of number of large classrooms to small classrooms = 3:4 Number of small classrooms = 20 Let the classrooms are multiple of x.

So, large classrooms = 3x Small classrooms = 4x

According to the question, 4x = 20 => x=20/4 = 5 .

Hence, number of large classrooms = 3x

= 3 x 5 = 15

Question 63:

Samira sells newspapers at Janpath crossing daily. On a particular day, she had 312 newspapers out of which 216 are in English and remaining in Hindi. Find the ratio of

(a) the number of English newspapers to the number of Hindi newspapers.

(b) the number of Hindi newspapers to the total number of newspapers.

Solution:

Given, total newspapers = 312 English newspapers = 216

Hindi newspapers = Total number of newspapers – Newspapers in English = 312 – 216 = 96

(a) Ratio of number of English newspapers to number of Hindi newspapers = 216/96

= 9/4 = 9:4 [on dividing numerator and denominator by 24]

(b) Ratio of number of Hindi newspapers to the total number of newspapers = 96/312

= 4/13 = 4:13.

Question 64:

The students of a school belong to different religious backgrounds. The number of Hindu students is 288, the number of Muslim students is 252, the number of Sikh students is 144 and the number of Christian students is 72. Find the ratio of

(a) the number of Hindu students to the number of Christian students.

(b) the number of Muslim students to the total number of students.

Solution:

Given, number of Hindu students = 288 Number of Muslim students = 252 Number of Sikh students = 144 Number of Christian students = 72 Total number of students = 288+252+144+72 =756

(a) Ratio of number of Hindu students to the number of Christian students = 288/72

= 4/1 = 4:1 [on dividing numerator and denominator by 72]

(b) Ratio of number of Muslim students to the total number of students = 252/756

= 1/3 =1:3 [on dividing numerator and denominator by 252]

Question 65:

When Chinmay visited Chowpati at Mumbai on a holiday, he observed that the ratio of North Indian food stalls to South Indian food stalls is 5:4. If the total number of food stalls is 117, find the number of each type of food stalls.

Solution:

Given, ratio of North Indian food stalls to South Indian food stalls = 5:4

Total number of food stalls =117

Total ratio = 5+4 = 9

North Indian food stalls = (5/9) x 117 = 65

South Indian food stalls = (4/9) x 117 = 52

Question 66:

At the parking stand of Ramleela ground, Kartik counted that there are 115 cycles, 75 scooters and 45 bikes. Find the ratio of the number of cycles to the total number of vehicles.

Solution:

Given, at parking stand, number of Cycles = 115

Scooters = 75

Bikes = 45

Total number of vehicles = 115+75+ 45 = 235

Ratio of number of cycles to the total number of vehicles = 115/235

= 23/47 =23:47

[on dividing numerator and denominator by 5]

Question 67:

A train takes 2 h to travel from Ajmer to Jaipur, which are 130 km apart. How much time will it take to travel from Delhi to Bhopal which are 780 km apart, if the train is travelling at the uniform speed?

Solution:

Time taken by train to travel from Ajmer to Jaipur = 2 h

Distance between Ajmer and Jaipur = 130 km

Distance between Delhi and Bhopal = 780 km

The train is travelling at the uniform speed.

Therefore, distance : time : : distance : time

$\Rightarrow$ $130 : 2 :: 780 : x$ (let)

$\Rightarrow$ $\frac{130}{2} = \frac{780}{x}$

$\Rightarrow$ $130 \times x = 2 \times 780$ [by cross multiplication]

$\Rightarrow$ $x = \frac{2 \times 780}{130} = 12$

Hence, the train will take 12 h from Delhi to Bhopal.

Question 68:

The length and breadth of a school ground are 150 m and 90 m respectively, while the length and breadth of a mela ground are 210 m and 126 m respectively. Are these measurements in proportion?

Solution:

Given, length of school ground = 150 m

Breadth of school ground = 90 m

Length of mela ground = 210 m

Breadth of mela ground = 126 m

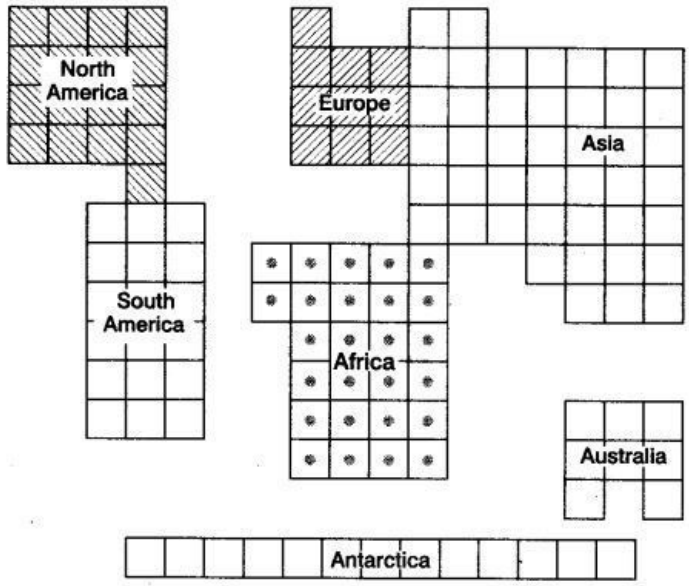
If measurements are in proportion, then

$$\frac{\text{Length of school ground}}{\text{Breadth of school ground}} = \frac{\text{Length of mela ground}}{\text{Breadth of mela ground}}$$

$$\Rightarrow \quad \frac{150}{90} = \frac{210}{126} \quad \Rightarrow \quad \frac{5}{3} = \frac{5}{3}$$

Hence, the measurements are in proportion.

Question 69:



What is the ratio of the areas of

(a) Africa to Europe?

(b) Australia to Asia?

(c) Antarctica to combined area of North America and South America?

Solution:

Area of North America = 17 sq units

Area of Europe = 10 sq units

Area of South America = 18 sq units

Area of Africa = 26 sq units

Area of Asia = 44 sq units

Area of Australia = 8 sq units

Area of Antarctica = 13 sq units

(a) Ratio of area of Africa to Europe

$$= \frac{26}{10} = \frac{13}{5} = 13:5$$

[on dividing numerator and denominator by 2]

(b) Ratio of area of Australia to Asia

$$= \frac{8}{44}$$

$$= \frac{2}{11} = 2:11$$ [on dividing numerator and denominator by 4]

(c) Ratio of Antarctica to combined area of North America and South America

$$= \frac{13}{17+18} = \frac{13}{35} = 13:35$$

Question 70:

A tea merchant blends two varieties of tea costing it Rs. 234 and Rs. 130 per kg in the ratio of their costs. If the weight of the mixture is 84 kg, then find the weight of each variety of tea.

Solution:

Given, cost of two varities of tea = Rs. 234 and Rs. 130

Ratio of their costs = 234/130 = 9/5 = 9:5

[on dividing numerator and denominator by 26]

Total weight of mixture = 84 kg Total ratio = 9+5 = 14

Weight of first variety tea = (9/14) x 84

= 54 kg

Weight of second variety tea = (5/14) x 84

= 30 kg

Question 71:

An alloy contains only Zinc and Copper and they are in the ratio of 7:9. If the weight of the alloy is 8 kg, then find the weight of Copper in the alloy.

Solution:

Given, the ratio of Zinc and Copper in alloy = 7:9 and weight of alloy = 8 kg

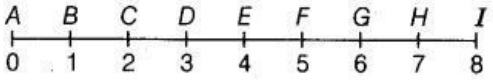
Let the weight of Zinc and Copper in alloy be 7x and 9x respectively, where x is multiple of weight.

Then, total weight =7x+9x = 6x

16x = 8 kg => x = ½ kg

Weight of copper = 9x = 9 x (1/2) = 4 ½ kg Hence, the weight of copper is 4 ½ kg.

Question 72:



Express numerically the ratios of the following distances

(i) AC:AF (ii) AG:AD

(iii) BF : AI (iv) CE : DI

Solution:

(i) AC:AF = 2:5

(ii) AG:AD= 2:1

(iii) BF:AI= 1:2

(iv) CE :DI= 2:5

Question 73:

Find two numbers, whose sum is 100 and whose ratio is 9:16.

Solution:

Let the two numbers are 9x and 16x, whose sum is 100.

=> 9x +16x = 100

=> 25x = 100

=> x = 4

Question 74:

In Fig. (i) and Fig. (ii), find the ratio of the area of the shaded portion to that of the whole figure.

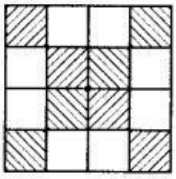


Fig (i)

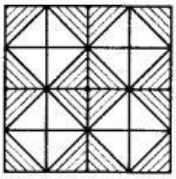


Fig (ii)

Solution:

From fig (i),

Area of shaded portion = 8 sq units .

Area of whole figure = 16 sq units

Ratio of area of the shaded portion to the whole figure = 8/16 = 1/2 = 1:2

From fig (ii),

Area of shaded portion = 8 sq units Area of whole figure =16 sq units

Ratio of area of the shaded portion to the whole figure = 8/16 = 1/2 = 1:2

Question 75:

A typist has to type a manuscript of 40 pages. She has typed 30 pages of the manuscript. What is the ratio of the number of pages typed to the number of pages left?

Solution:

Total pages of manuscript to type = 40

Typed pages of manuscript = 30

Left pages = 40 – 30 = 10

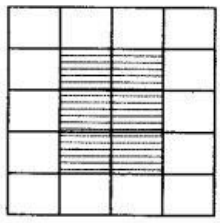
Ratio of the number of pages to the types pages to the number of left pages = 30/10 = 3/1 = 3:1 .

Question 76:

In a floral design made from tiles each of dimensions 40 cm by 60 cm (See figure), find the ratios of

(a) thd perimeter of shaded portion to the perimeter of the whole design.

(b) the area of the shaded portion to the area of the unshaded portion.



Solution:

Perimeter of shaded portion=10 units Perimeter of whole design=18 units Area of shaded portion=6 sq units Area of whole design=20 sq units

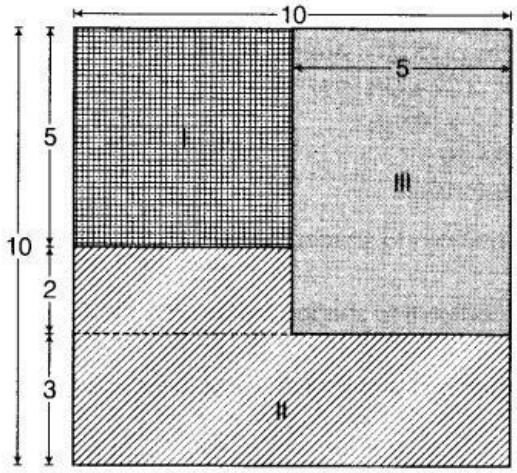
(a) Ratio of perimeter of shaded portion to the perimeter of the whole design = 10/18 = 5/9 = 5:9

(b) Ratio of area shaded portion to the area of unshaded portion = 6/(20-6) = 6/14 = 3/7 = 3:7

Question 77:

In figure, what is the ratio of the areas of

(a) shaded portion I to shaded portion II?



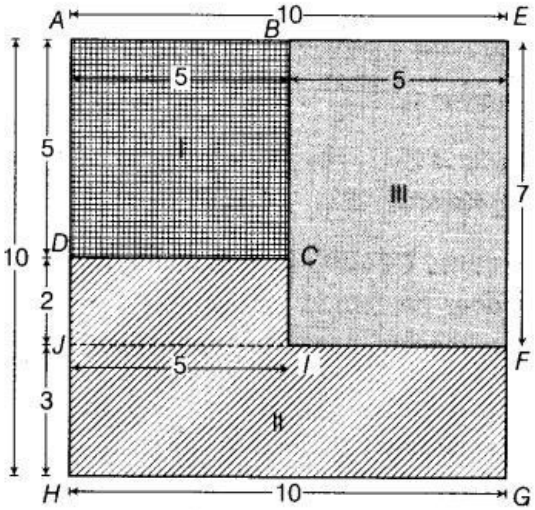
(b) shaded portion II to shaded portion III?

(c) shaded portions I and II taken together and shaded portion III?

Solution:

Area of square= Side × Side

Area of Rectangle = Length × Breadth



From the above figure, we can say that

$$AB = AE - BE = 10 - 5 = 5$$

$$BI = EF = AJ = AD + DJ = 5 + 2 = 7$$

$$FG = HJ = 3$$

$$FI = BE = 5$$

$$DC = IJ = AB = 5$$

$$CI = DJ = 2$$

$$BC = AD = 5$$

Now, area of I portion = Area of $ABCD$

$$= AB \times BC$$

$$= 5 \times 5$$

$$= 25 \text{ sq units}$$

Area of III portion = Area of $BEFI$

$= BF \times EF$

$= 5 \times 7$

$= 35$ sq units

Area of II portion = Area of $DCIJ$ + Area of $FGHI$

$= DC \times CI + GH \times HJ$

$= 5 \times 2 + 10 \times 3$

$= 10 + 30$

$= 40$ sq units

(a) Ratio of shaded portion I to shaded portion II $= \frac{25}{40} = \frac{5}{8} = 5:8$

(b) Ratio of shaded portion II to shaded portion III $= \frac{40}{35} = \frac{8}{7} = 8:7$

(c) Ratio of shaded portion I and II taken together to shaded portion III $= \frac{25+40}{35}$

$= \frac{65}{35} = \frac{13}{7}$

$= 13:7$

Question 78:

A car can travel 240 km in 15 L of petrol. How much distance will it travel in 25 L of petrol?

Solution:

Given,

Distance travel by a car in 15 L = 240 km

Distance travel by a car in 1L = 240/15 = 16 km

∴ Distance travel by a car in 25 L = 16 x 25 = 400 km

Hence, a car will travel 400 km in 25 L.

Question 79:

Bachhu Manjhi earns Rs. 24000 in 8 months. At this rate,

(a) how much does he earn in one year?

(b) in how many months does he earn Rs. 42000

Solution:

Given,

(a) Earning of Bachhu Manjhi in 8 months = Rs. 24000

Earning of Bachhu Manjhi in 1 month = = Rs. 3000

He will earn in 1 yr (12 months) = Rs. 3000 x 12 = Rs. 36000

(b) Bachhu Manjhi earns Rs. 3000 = 1 month

He earn Rs. 1 =1/3000 month

He will earn Rs. 42000 = (1/3000) x 42000

= 14 months

Question 80:

The yield of wheat from 8 hec of land is 360 quintals. Find the number of hectares of land required for a yield of 540 quintals.

Solution:

∴360 quintals, wheat is yielded by = 8 hec

∴ 1 quintal wheat is yielded by = 8/360 hec

∴540 quintals wheat will be yielded by = (8/360) x 540

=12 hec

Hence, 540 quintals will be yielded by 12 hec.

Question 81:

The earth rotates 360° about its axis in about 24 h. By how much degree will it rotate in 2 h?

Solution:

∴ Earth rotates in 24 h = 360°

∴ Earth rotates in 1 h = 360°/24

∴ Earth will rotate in 2 h = (360°/24) x 2 = 30°

Hence, Earth will rotate by 30° in 2 h.

Question 82:

Shivangi is suffering from anaemia as haemoglobin level in her blood is lower than the normal range. Doctor advised her to take one iron tablet two times in a day. If the cost of 10 tablets is Rs. 17, then what amount will she be required to pay for her medical bill for 15 days?

Solution:

Shivangi has to take iron tablets two times in a day.

Number of iron tablets she has to take in one day = 2 .Total iron tablets for 15 days =15 x 2 = 30 tablets

∴ Cost of 10 tablets = Rs. 17

∴ Cost of 1 tablet = Rs. 17/10

∴ Cost of 30 tablets = (Rs. 17/10) x 30

= Rs. 51

Hence, she has to pay Rs. 51 for her medical bill.

Question 83:

The quarterly school fee in Kendriya Vidyalaya for Class VI is Rs. 540. What will be the fee for seven months?

Solution:

Quarterly means = 3 months

∴ The fee for 3 months = Rs. 540

∴ The fee for 1 month = Rs. 540/3

∴ The fee for 7 months = (Rs.540/3) x 7

= Rs. 1260

Hence, fee for seven months is Rs. 1260.

Question 84:

In an election, the votes cast for two of the candidates were in the ratio 5:7. If the successful candidates received 20734 votes, how many votes did his opponents receive?

Solution:

Given, ratio of votes for two candidates = 5:7

Let the votes are 5x and 7x.

For successful candidates votes are greater.

Hence, 7x = 20734 => x= 2962

Number of votes of his opponent = 5x

= 5 x 2962 =14810

Question 85:

A metal pipe 3 m long was found to weight 7.6 kg. What would be the weight of the same kind of 7.8 m long pipe?

Solution:

Weight of 3 m long pipe = 7.6 kg

Weight of 1 m long pipe = 7.6/3 kg

∴ Weight of 7.8 m long pipe = (7.6/3) x 7.8 = 19.76 kg

Hence, the weight of 7.8 m long pipe is 19.76 kg.

Question 86:

A recipe for raspberry jelly calls for 5 cups of raspberry juice and 2 ½ cups of sugar. Find the amount of sugar needed for 6 cups of the juice.

Solution:

For a recipe of raspberry jelly.

If 5 cups of raspberry juice, then sugar needed =2 ½ cups

= 5/2 cups

If 1 cup of raspberry juice, then sugar needed = (5/2) x (1/5) cups

If 6 cups of raspberry, then sugar needed =(5/2) x (1/2) x 6=3 cups. Hence, 3 cups of sugar needed for 6 cups of the juice.

Question 87:

A farmer planted 1890 tomato plants in a field in rows each having 63 plants. A certain type of worm destroyed 18 plants in each row. How many plants did the worm destroy in the whole field?

Solution:

Farmer planted total plants = 1890

Plants in each row = 63

Number of rows = 1890/63 = 30

Worm destroys plants in 1 row =18

∴ Worm destroys plants in 30 rows = 18x 30

= 540

Hence, the worm destroyed 540 plants in the whole field

Question 88:

Length and breadth of the floor of a room are 5 m and 3 m respectively.

Forty tiles, each with area 1/16 m^2 are used to cover the floor partially.

Find the ratio of the tiled the non-tiled portion of the floor.

Solution:

Given, length of the floor of a room = 5 m

Breadth of the floor of a room = 3 m

Area of the room = Length × Breadth

$= 5 \times 3 = 15\ m^2$

$\because$ Area of 1 tile $= \frac{1}{16} m^2$

$\therefore$ Area of 40 tiles $= \frac{1}{16} \times 40$

$= 2.5\ m^2$

Area covered by tiles $= 2.5\ m^2$

Area not covered by tiles $= (15 - 2.5)$

$= 12.5\ m^2$

Ratio of the tiled to non-tiled portion

$$= \frac{2.5\ m^2}{12.5\ m^2} = \frac{25}{125} = \frac{1}{5} = 1:5$$

Question 89:

A carpenter had a board which measured 3m x 2m. She cut out a rectangular piece of 250 m x 90 cm. What is the ratio of the area of cut out piece and the remaining piece?

Solution:

Given, board measure = 3 m × 2 m

Area of board = Length × Breadth

$= 3 \times 2 = 6\,m^2$

She cut out a rectangular piece = 250 cm × 90 cm

Area of the piece $= 250 \times 90\,cm^2$

$= 22500\,cm^2$

$= \frac{22500}{10000}\,m^2$ $[\because 1m^2 = 10000\,cm^2]$

$= 2.25\,m^2$

Remaining area of board $= (6 - 2.25)\,m^2$

$= 3.75\,m^2$

Ratio of the area of cut out piece to the remaining piece $= \frac{2.25\,m^2}{3.75\,m^2}$

$= \frac{225}{375} = \frac{3}{5}$

$= 3:5$