Chapter - 8
Ratio and Proportion

Exercise

In questions 1 to 10, only one of the four options is correct. Write the correct one.

1. The ratio of 8 books to 20 books is

(A) 2: 5 (B) 5: 2 (C) 4: 5 (D) 5: 4

Solution:

Ratio of 8 books to 20 books is = $\frac{8}{20}$

$= \frac{2}{5}$

So, option (A) is correct.

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:

Here, no. of sides of square = 4

No. of edges of cube = 12

Ratio of the number of sides of a square to the number of edges of a cube is = $\frac{4}{12}$

$= \frac{1}{3}$

So, option (D) is correct.

3. A picture is 60cm wide and 1.8m 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:

Perimeter of a picture = 2(l + b)

= 2(180 + 60)

= 480 cm

Now, ratio of its width to its perimeter in lowest form is = $\frac{60}{480}$

$= \frac{1}{8}$

So, option (D) is correct.

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

(A) 1 : 8 (B) 1 : 7 (C) 1 : 6 (D) 1 : 5

Solution:

As per given information, Neelam's expenditure = Rs. (288000 − 36000)

= Rs. 252000

Now, Ratio of her savings to her expenditure is = $\frac{36000}{252000}$

$= \frac{1}{7}$

So, option (B) is correct.

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:

As per given information, number of pages in symmetry chapter

= (272 − 261) + 1

= 12

Now, ratio of the number of pages of this chapter to the total number of pages of the book

$= \frac{12}{320}$

$= \frac{3}{80}$

So, option (D) is correct.

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:

Total number of marbles in a box will be the multiple of = 7 + 4

= 11

So, option (D) is correct.

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:

As per given information, Let the common multiple of 2 and 3 be x.

Now ratio = 2x : 3x

Also given that books with green color are 18 in number, this gives:

2x = 18

$x = \frac{18}{2}$

= 9

If x= 9, the books with green cover = 3x

$= 3 \times 9$

$= 27$

So, option (C) is correct.

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:

Value of 40: 25 is the greatest among all and hence it is the greatest ratio.

So, option (D) is correct.

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)/b

Solution:

As per given information, total no. of students in a class are b + g.

Now, ratio of the number of boys to the total number of students in the class is = $\frac{b}{b+g}$

So, option (A) is correct.

10. If a bus travels 160 km in 4 hours and a train travels 320km in 5 hours 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:

According to given information,

Distance travelled by Bus in 4 hours = 160 km

Distance travelled by Bus in 1 hour = $\frac{160}{4}$

$= 40\,\text{km}$

Now, Distance travelled by Train in 5 hours = 320 km

Distance travelled by Bus in 1 hour = $\frac{320}{5}$

$= 64\,\text{km}$

Ratio of the distances travelled by them in one hour will be $\frac{40}{64} = \frac{5}{8}$

So, option (C) is correct.

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

11. 3/5 = □/20

Solution:

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

$= \frac{12}{20}$

So,

$\frac{3}{5} = \frac{12}{20}$

12. □/18 = 2/9

Solution:

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

$= \frac{4}{18}$

So,

$$\frac{4}{18}=\frac{2}{9}$$

13. 8/□ = 3.2/4

Solution:

$$\frac{3.2}{4}=\frac{3.2\times 2.5}{4\times 2.5}$$
$$=\frac{8}{10}$$

So,

$$\frac{8}{10}=\frac{3.2}{4}$$

14. □/45 = 16/40 = 24/□

Solution:

$$\frac{16}{40}=\frac{16\times 1.5}{40\times 1.5}$$
$$=\frac{24}{60}$$
$$\frac{16}{40}=\frac{16\times 1.125}{40\times 1.125}$$
$$=\frac{24}{45}$$

So,

$$\frac{18}{45}=\frac{16}{40}=\frac{24}{60}$$

15. 16/36 = □/63 = 36/□ = □/117

Solution:

$$\frac{16}{36}=\frac{16\times1.75}{36\times1.75}$$
$$=\frac{28}{63}$$
$$\frac{16}{36}=\frac{16\times2.25}{36\times2.25}$$
$$=\frac{36}{81}$$
$$\frac{16}{36}=\frac{16\times3.25}{36\times3.25}$$
$$=\frac{52}{117}$$

So,

$$\frac{16}{36}=\frac{28}{63}=\frac{36}{81}=\frac{52}{117}$$

In questions 16 to 34, state whether the given statements are true (T) or false (F).

16. 3/8=15/40

Solution:

If we multiply and divide $\frac{3}{8}$ by 5,

We get $\frac{15}{40}$.

So, given statement is **true**.

17. 4: 7 = 20 : 35

Solution:

If we multiply and divide $\frac{4}{7}$ by 5,

We get $\frac{20}{35}$.

So, given statement is **True**.

18. 0.2 : 5 = 2 : 0.5

Solution:

$$\frac{0.2}{5} = \frac{2}{50}$$
$$= \frac{1}{25}$$
$$\frac{2}{0.5} = \frac{20}{5}$$
$$= 4$$

Therefore, $\frac{0.2}{5} \neq \frac{2}{0.5}$

The given equality is not equal as given.

So, given statement is **False**.

19. 3 : 33 = 33 : 333

Solution:

$$\frac{3}{33} = \frac{1}{11}$$

And, $\frac{33}{333} = \frac{11}{111}$

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

The given equality is approximately equal but not exactly.

So, given statement is **False**.

20. 15m : 40m = 35m : 65m

Solution:

$$\frac{15\text{m}}{40\text{m}} = \frac{3}{8}$$
$$\frac{35\text{m}}{65\text{m}} = \frac{7}{13}$$
$$\frac{3}{8} \neq \frac{7}{13}$$

The given equality is not equal as given.

So, given statement is **False**.

21. 27cm2 : 57cm2 = 18cm : 38cm

Solution:

$$\frac{27\text{cm}^2}{57\text{cm}^2} = \frac{9}{19}$$
$$\text{And, } \frac{18\text{cm}}{38\text{cm}} = \frac{9}{19}$$
$$\text{Therefore, } \frac{27\text{cm}^2}{57\text{cm}^2} = \frac{18\text{cm}}{38\text{cm}}$$

The given equality can be reduced to $\frac{9}{19}$.

So given statement is **True**.

22. 5kg : 7.5kg = Rs 7.50 : Rs 5

Solution:

$$\frac{5\text{kg}}{7.5\text{kg}} = \frac{50}{75}$$

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

And, $$\frac{\text{Rs } 7.50}{\text{Rs } 5} = \frac{750}{500}$$

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

$$\frac{2}{3} \neq \frac{3}{2}$$

The given equality is not equal as given.

So, given statement is **False**.

23. 20g : 100g = 1metre : 500cm

Solution:

$$\frac{20\text{g}}{100\text{g}} = \frac{1}{5}$$

And, $$\frac{1\text{m}}{500\text{cm}} = \frac{100\text{cm}}{500\text{cm}}$$

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

Therefore, $$\frac{20\text{g}}{100\text{g}} = \frac{1\text{m}}{500\text{cm}}$$

So, given statement is **true**.

24. 12 hours: 30 hours = 8km: 20km

Solution:

$$\frac{12\text{hours}}{30\text{hours}} = \frac{2}{5}$$

$$\text{And, } \frac{8\text{km}}{20\text{km}} = \frac{2}{5}$$

$$\text{Therefore, } \frac{12\text{hours}}{30\text{hours}} = \frac{8\text{km}}{20\text{km}}$$

So, given statement is **True**.

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

Solution:

Yes, the ratio of 10kg to 100kg is 1:10.

So, given statement is **True**.

26. The ratio of 150cm to 1metre is 1:1.5.

Solution:

The given equality is not equal as given.

So, given statement is **False**.

27. 25kg: 20g = 50kg : 40g

Solution:

The given equality reduces to $\frac{1250}{1}$.

So, given statement is **True**.

28. The ratio of 1 hour to one day is 1:1.

Solution:

No, the ratio of 1 hour to one day is $\frac{1}{24}$.

So, given statement is **False**.

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

Solution:

No, the ratio 4:16 is not in its lowest form.

So, given statement is **False**.

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

Solution:

Yes, the ratio 5: 4 is different from the ratio 4: 5.

So, given statement is **True**.

31. A ratio will always be more than 1.

Solution:

No, a ratio will not always be more than 1.

So, given statement is **False**.

32. A ratio can be equal to 1.

Solution:

Yes, a ratio can be equal to 1 for example, 2:2

So, given statement is **True**.

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

Solution:

No, if b: a = c : d, then a, b, c, d are not in proportion.

So, given statement is **False**.

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

Solution:

Yes, the two terms of a ratio can be in two different units.

So, given statement is **True**.

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

35. A ratio is a form of comparison by _____.

Solution:

It is known that, a comparison by division is called ratio.

A ratio is a form of comparison by division.

36. 20m: 70m = Rs 8: Rs _____.

Solution:

Let us assume the missing number be P.

Then, 20m: 70m = ₹ 8: ₹ P

20/70 = 8/p

P = (70 × 8)/20

P = 560/20

P = 56/2

P = 28

Therefore, 20m : 70m = Rs 8 : Rs 28.

20m: 70m = Rs 8: Rs 28.

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

Solution:

Let us assume the missing number be ‘P’,

Then, P, 24, 9, 12

P: 24 = 9: 12

P/24 = 9/12

9/12 is further simplified by dividing both numerator and denominator by ¾.

So, P/24 = 3//4

P = (3 × 24)/4

P = 72/4

P = 18

Therefore, the missing number is 18.

There is a number in the box □ such that □, 24, 9, 12 are in proportion. The number in the box is 18.

38. If two ratios are equal, then they are in _____. Use Fig. 8.2 (In which each square is of unit length) for questions 39 and 40:

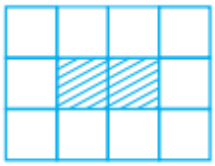


Fig. 8.2

Solution:

It is obvious that, if If two ratios are equal, then they are in proportion.

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

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

Solution:

The ratio of the perimeter of the boundary of the shaded portion to the perimeter of the whole figure is 3: 7.

From the figure, perimeter of shaded portion = 1 + 2 + 1 + 2 = 6 units

Perimeter of whole figure = 3 + 4 + 3 + 4 = 14 units

Then, ratio of the perimeter of the boundary of the shaded portion to the perimeter of the whole figure = 6/14

= 3/7

= 3: 7

The ratio of the perimeter of the boundary of the shaded portion to the perimeter of the whole figure is 3:7.

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

Solution:

The ratio of the area of the shaded portion to that of the whole figure is 1: 6.

Area of the shaded figure = 2 × 1

= 2 sq. Units

Area of whole figure = 3 × 4 = 12 sq. Units

The ratio of the area of the shaded portion to that of the whole figure is = 2: 12

= 2/12

= 1/6

= 1: 6

The ratio of the perimeter of the boundary of the shaded portion to the perimeter of the whole figure is 1:6.

41. Sleeping time of a python in a 24 hour clock is represented by the shaded portion in Fig. 8.3.

The ratio of sleeping time to awaking time is _____.

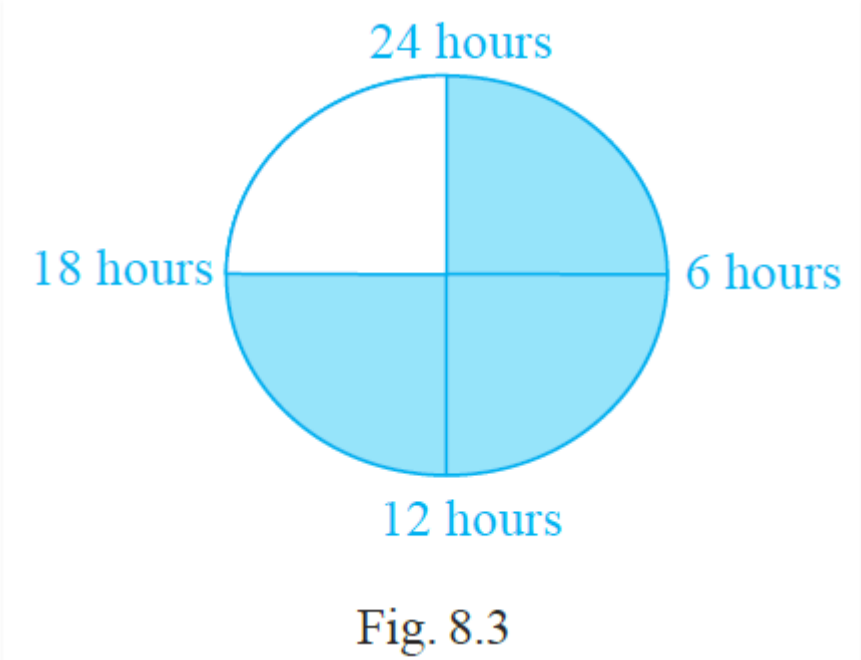


Fig. 8.3

Solution:

The ratio of sleeping time to awaking time is 3: 1.

From the figure, sleeping time = 18 hours

Then, awaking time = 24 – 18 = 6 hours

Therefore, the ratio of sleeping time to awaking time is 18/6

= 3/1

= 3: 1

The ratio of sleeping time to awaking time is 1:6.

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

Solution:

A ratio expressed in lowest form has no common factor other than 1 in its terms.

43. To find the ratio of two quantities, they must be expressed in _____units.

Solution:

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

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 the same as the ratio of 20 paise to 100 paise.

From the question,

5 paise : 25 paise = 20 paise: [ ]

Let us assume the missing number be Q,

5 paise : 25 paise = 20 paise: Q

5/25 = 20/Q

Q = (20 × 25)/5

Q = 500/5

Q = 100

Ratio of 5 paise to 25 paise is the same as the ratio of 20 paise to 100 paise.

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

Solution:

Ratio of time taken by Saturn and Jupiter for one spin on their axes is given by

$$= \frac{(9 \times 60) + 56}{(10 \times 60) + 40}$$

$$= \frac{149}{160}$$

Saturn and Jupiter take 9 hours 56 minutes and 10 hours 40 minutes, respectively for one spin on their axes. The ratio of the time taken by Saturn and Jupiter in lowest form is $\frac{149}{160}$.

46. 10g of caustic soda dissolved in 100mL of water makes a solution of caustic soda. Amount of caustic soda needed for 1 litre of water to make the same type of solution is _____.

Solution:

As per given, for 100 ml of water caustic soda required = 10g

So, amount of caustic soda required for 1000 ml of water = $\frac{10}{100} \times 1000$

$$= 100 \text{ g}$$

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

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:

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

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

So, ratio of the sale price to the marked price is 4:5.

48. Which pair of ratios are equal? And why?

(i) 2/3,4/6 (ii) 8/4,2/1 (iii) 4/5,12/20

Solution:

(i) The given pair is equivalent as lowest form of $\frac{4}{6}$ is $\frac{2}{3}$ and other ratio is $\frac{2}{3}$.

(ii) The given pair is equivalent as lowest form of $\frac{8}{4}$ is $\frac{2}{1}$ and other ratio is $\frac{2}{1}$.

(iii) The given pair is not equivalent as lowest form of $\frac{12}{20}$ is $\frac{3}{5}$ and other ratio is $\frac{4}{5}$.

49. Which ratio is larger 10: 21 or 21: 93?

Solution:

Ratio 10:21 is larger as it approximates to 0.476 and 21:93 approximates to 0.225.

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

Solution:

As per given, ratio of khoya and sugar = 7:2

Total amount of barfi = 18 kg

Now total ratio = 9

So, amount of khoya used in barfi = $\frac{7}{9} \times 18$

= 14g

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

Solution:

Let x be common factor between the two
This implies,

$2x+5x = 56$

$7x = 56$

$x = \frac{56}{7}$

$= 8$

Now, length of each part is given as,
$2x = 2 \times 8$

$= 16$

And

$5x = 5 \times 8$

$= 40$

Thus, the lengths are 40cm and 16cm.

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:

Total no. of teeth in human beings are 32, so the number of permanent teeth is 32.

No. of milk teeth = 20

No. of permanent teeth = 32

Now, ratio of the number of milk teeth to the number of permanent teeth = $\frac{20}{32}$

$= \frac{5}{8}$

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:

Sex ratio if there are 3732 females per 4000 males in a town is given as,

$= \frac{3732}{4000}$

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:

(a) Ratio of income to income tax is $= \frac{360000}{24000}$

$= \frac{15}{1}$

(b) Ratio of income tax to income after paying income tax

$= \frac{24000}{336000}$

$= \frac{3}{42}$

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

(a) Ramesh's earnings to their total earnings

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

Solution:

(a) Ratio of Ramesh's earnings to the total earnings of Ramesh and Rama

$= \frac{28000}{64000}$

$= \frac{9}{16}$

(b) Ratio of Rama's earnings to the total earnings of Ramesh and Rama

$= \frac{36000}{64000}$

$= \frac{7}{16}$

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 of women.

(b) men to the total number of persons.

(c) women to the total number of persons.

Solution:

No. of people working in a company = 288

Total no. of men in the company = 112

Total no. of women in the company = 176

(a) Ratio of the number of men to that of women = $\frac{112}{176}$

$= \frac{7}{11}$

(b) Ratio of the number of women to the total number of persons

$= \frac{176}{228}$

$= \frac{44}{57}$

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

Solution:

Given, length of rectangular sheet = 1.2m

= 120cm

Width of rectangular sheet = 21cm

Now, ratio of width of the paper to its length = $\frac{21}{120}$

$= \frac{7}{30}$

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

Find the ratio of their speeds.

(Hint: Speed = distance travelled/time taken)

Solution:

Speed of scooter = $\frac{120}{3}$

$= 40\,\text{km/h}$

Speed of train = $\frac{120}{2}$

$= 60\,\text{km/h}$

Now, ratio of speed of scooter to speed of train = $\frac{40}{60}$

$= \frac{2}{3}$

59. An office opens at 9 a.m. and closes at 5.30 p.m. with a lunch break of 30 minutes. What is the ratio of lunch break to the total period in the office?

Solution:

As per given information, total period in office = 9 a.m. to 12 p.m. and 12 p.m. to 5 p.m.

This implies total period = 3 hours + 5 hours

= 8 hours

Since 1 hour = 60 minutes

So, 8 hours = 8 × 60

= 480 minutes

Now, Ratio of lunch interval to total period = $\frac{30}{480}$

$= \frac{1}{16}$

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 24m long, how tall is the flagstaff?

Solution:

Here given, length of shadow of stick = 4m

Length of stick = 3m

Also, length of shadow of flagstaff = 24m

Now, length of flagstaff = $\frac{3 \times 24}{4}$

$= 18\,\text{m}$

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

Solution:

As given, 1 cup of milk and 2 1/2 cup of flour to make cake for six persons.

For one person, the ingredients required will be, Milk = $\frac{1}{6}$ cup

Flour = $\frac{5}{12}$ cups

Now, for 8 people, milk = $8 \times \frac{1}{6}$

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

Flour = $\frac{10}{3}$ cups

Therefore, we need $\frac{4}{3}$ cups of milk and $\frac{10}{3}$ cups of flour to make cake for eight people.

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 the number of large classrooms to small classrooms is

= 3:4

Total ratio = 4 + 3

= 7

No. of small rooms = 20

Firstly total no. of large rooms = $\frac{20}{7} \times 4$

$= 35$

Now, no. of large rooms $= \frac{3}{7} \times 35$

$= 15$

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:

Total no. of newspapers = 312

No. of English newspapers = 216

No. of Hindi newspapers = 96

(a) Now, ratio of the number of English newspapers to the number of Hindi newspapers

$= \frac{216}{96}$

$= \frac{9}{4}$

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

$= \frac{96}{312}$

$= \frac{4}{13}$

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:

No. of Hindu students = 288

No. of Muslim students = 252

No. of Sikh students = 144

No. of Christian students = 72

(a) Ratio of the number of Hindu students to the number of Christian students = $\frac{288}{72}$

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

= $\frac{252}{756}$

65. When Chinmay visted 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:

Consider the no. of food stalls to be 5x and 4x.

This implies,

$5x + 4x = 117$

$9x = \frac{117}{9}$

$x = 13$

Thus, no. of North Indian stalls are = 5×13

$= 65$

Also, no. of South Indian stalls are = 4×13

$= 42$

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:

No. of cycles = 115

No. of scooters = 75

No. of bikes = 45

Now, ratio of number of cycles to the total number of vehicles

$= \frac{115}{235}$

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

Solution:

Time taken to travel from Ajmer to Jaipur = 2 hours

Distance between Ajmer and Jaipur = 130 km

Also, Distance between Delhi and Bhopal = 780km

Now, speed of train = $\frac{130}{2}$ km/h

$= 65$ km/h

Thus, time taken by train to travel from Delhi to Bhopal = $\frac{780}{65}$

= 12 hours

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

Solution:

Ratio of length and breadth of a school ground = $\frac{150}{90}$

$= \frac{5}{3}$

Also, ratio of length and breadth of a mela ground = $\frac{210}{126}$

$= \frac{5}{3}$

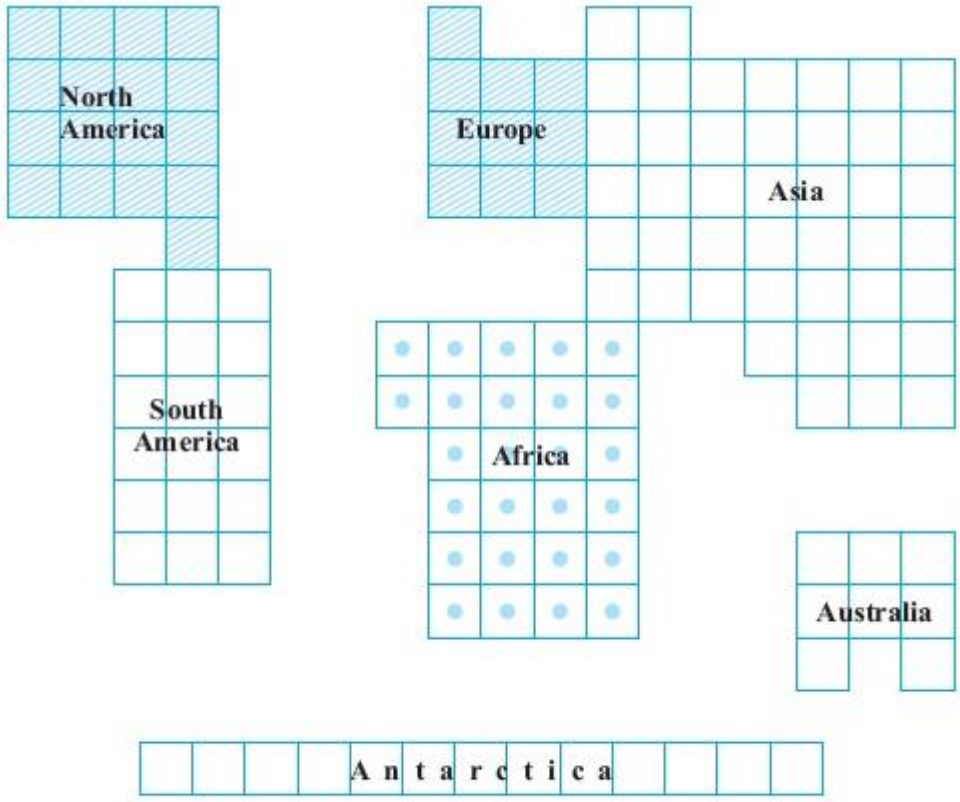
Thus, the given measurements are in proportion.

69. In Fig. 8.4, the comparative areas of the continents are given: 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.



(Comparative areas of the continents)

Fig. 8.4

Solution:

(a) From given figures, ratio of areas of Africa to Europe = $\frac{13}{5}$

(b) From given figures, ratio of areas of Australia to Asia = $\frac{2}{11}$

(c) From given figures, ratio of areas of Antarctica to Combined area of North America and South America = $\frac{13}{35}$

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

Solution:

Ratio of blending n terms of cost = $\frac{234}{130}$

$= \frac{9}{5}$

Let x be the common factor, this implies total weight is = 9x + 5x

= 14x kg

Also, weight of mixture = 84kg

Thus we have 14x = 84

x = $\frac{84}{14}$

x = 6

So, weight of tea which costs 234 per kg = 9x

$= 9 \times 6$

= 54kg

Weight of tea which costs 130 per kg = 5x

$= 5 \times 6$

= 30kg

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

Solution:

Ratio of zinc and copper in an alloy = $\frac{7}{9}$

Sum of ratio = 7 + 9

= 16

Also, weight of alloy = 8kg

Now weight of copper in the alloy = $\frac{9}{16} \times 8$

= 4.5kg

72. In the following figure, each division represents 1cm:

Fig. 8.5

Express numerically the ratios of the following distances:

(i) AC : AF (ii) AG : AD (iii) BF : AI (iv) CE : DI

Solution:

(i) $\frac{AC}{AF} = \frac{2}{5}$

(ii) $\frac{AG}{AD} = \frac{2}{1}$

(iii) $\frac{BF}{AI} = \frac{1}{2}$

(iv) $\frac{CE}{DI} = \frac{2}{5}$

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

Solution:

Ratio of two numbers = 9:16

Sum of two numbers = 100

Let two numbers be 9x and 16x.

Now, $9x + 16x = 100$

$25x = 100$

$x = 4$

This implies one number $= 9 \times 4$

$= 36$

Another number $= 16 \times 4$

$= 64$

74. In Fig. 8.6 (i) and Fig. 8.6 (ii), find the ratio of the area of the shaded portion to that of the whole figure:

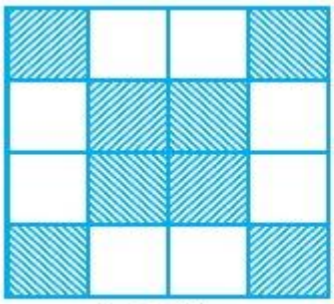


Fig. 8.6 (i)

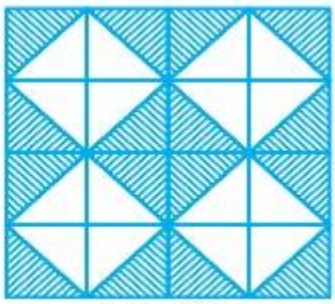


Fig. 8.6 (ii)

Solution:

(i) Ratio of the area of the shaded portion to that of the whole figure

$= \frac{8}{16}$

$= \frac{1}{2}$

(ii) Ratio of the area of the shaded portion to that of the whole figure

$= \frac{16}{32}$

$= \frac{1}{2}$

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 to be typed in manuscript = 40

Pages of manuscript typed = 30

Pages of manuscript left from typing = $40 - 30$

$= 10$

Now, ratio of the number of pages typed to the number of pages left

$= \frac{30}{10}$

76. In a floral design made from tiles each of dimensions 40cm by 60cm (See Fig. 8.7), find the ratios of:

(a) the 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.

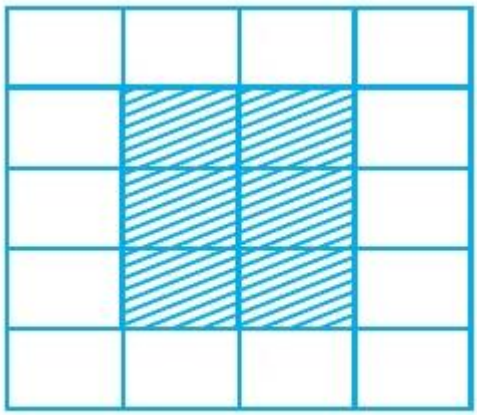


Fig. 8.7

Solution:

(a) Perimeter of shaded region = 2(20 + 36)

= 112cm

Also, perimeter of whole design = 2 (40 + 60)

$= 200\text{cm}$

Now, ratio of the perimeter of shaded portion to the perimeter of the whole design $= \frac{112}{200}$

$= \frac{14}{25}$

(b) Area of shaded portion $= 20 \times 36$

$= 720$ sqcm

Area of unshaded portion $= (40 \times 60) - 720$

$= 1680$ sqcm

Now, ratio of the area of the shaded portion to the area of the unshaded portion $= \frac{720}{1680}$

$= \frac{3}{7}$

77. In Fig. 8.8, 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?

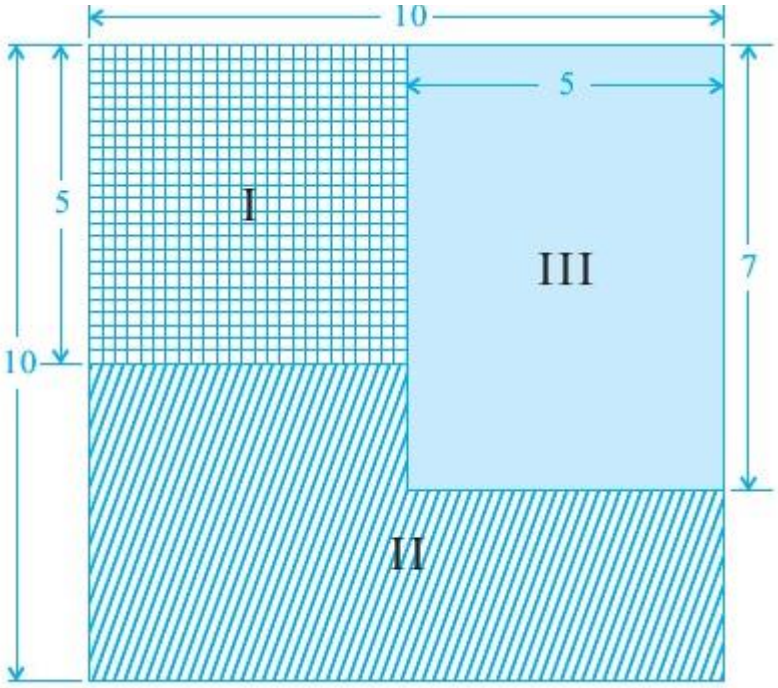


Fig. 8.8

Solution:

(a) Ratio of the areas of shaded portion I to shaded portion II is $= \frac{5}{8}$

(b) Ratio of the areas of shaded portion II to shaded portion III $= \frac{8}{7}$

(c) Ratio of the areas of shaded portions I and II taken together and shaded portion III $= \frac{13}{7}$

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

Solution:

Distance travelled by car in 15 litres of petrol = 240km

Distance travelled by car in 25 litres of petrol $= \frac{240}{15} \times 25$

= 400km

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:

Money earned by Bachhu Manjhi in 8 months = Rs 24000

(a) Money earned by Bachhu Manjhi in 12 months = $\frac{24000}{8} \times 12$

= Rs 36000

(b) Rs 24000 earned by Bachhu Manjhi in = 8 months

Rs 42000 earned by Bachhu Manjhi in = $\frac{8}{24000} \times 42000$

= 16 months

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

Solution:

360 quintals yield of wheat is obtained from = 8 hectares

540 quintals yield of wheat is obtained from = $\frac{8}{360} \times 540$

= 12 hectares

81. The earth rotates 360o about its axis in about 24 hours. By how much degree will it rotate in 2 hours?

Solution:

In 24 hours, Earth rotates by = 360 degrees

In 2 hours. Earth rotates by = $\frac{360}{24} \times 2$

= 30 degrees

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 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:

Tablets required per day = 2

Tablets required for 15 days = 15×2

= 30

Now cost of 10 tablets = Rs 17

Cost of 30 tablets = $\frac{17}{10} \times 30$

= 51

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

Solution:

Quarterly fee for class VI = Rs 540

Fee for seven months = $\frac{540}{4} \times 7$

= Rs 945

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

Solution:

As given, votes cast for two of the candidates were in the ratio = 5:7

Let votes received by the two candidates = 5x and 7x

Also, votes received by successful candidates = 20734

This implies, 7x = 20734

$x = 2962$

Votes received by the opponent = 5×2962

$= 14810$

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

Solution:

Weight of 3 metre long pipe = 7.6kg

Weight of 7.8 m long pipe = $\frac{7.6}{3} \times 7.8$

$= 19.76$ kg

86. A recipe for raspberry jelly calls for 5 cups of raspberry juice and 2(1/2) cups of sugar. Find the amount of sugar needed for 6 cups of the juice?

Solution:

5 cups of raspberry juice requires sugar = $\frac{5}{2}$ cups

6 cups of raspberry juice requires sugar = $\frac{5}{2\times5}\times6$

$= 3$ cups

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:

Consider the number of rows = x

This implies, total no. of plants = (number of plant in each row) $\times$ (number of rows)

$1890 = 63x$

$x = 1890/63$

$= 30$

So, no. of rows = 30

Plants destroyed by worm in each row = 18

Thus total plants destroyed by worm = 18×30

$= 540$

88. Length and breadth of the floor of a room are 5m and 3m, respectively. forty tiles, each with area 1/16 m^2 are used to cover the floor partially. Find the ratio of the tiled and the non-tiled portion of the floor.

Solution:

Given, length and breadth of the floor of a room = 5m and 3m

So area of the floor = 3×5

$= 15$sqm

Also area of one tile = $\frac{1}{16}$sqm

So, area of floor covered by 40 tiles = $\frac{1}{16} \times 40$

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

Area of floor not covered by tiles = $15 - \frac{5}{2}$

$= \frac{25}{2}$ sqm

Now, ratio of the tiled and the non-tiled portion of the floor

$= \frac{5}{2} \times \frac{2}{25}$

$= \frac{1}{5}$

= 1:5

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

Solution:

Measurement of the board = $3\text{m} \times 2\text{m}$

So, area of the board = $300\text{cm} \times 200\text{cm}$

= 60000sqm

Measurement of rectangular piece cut down from board = 250cm × 90cm

So, area of rectangular piece cut down from board = 22500 sqcm

Area of remaining portion of the board = $60000 - 22500$

= 37500 sqcm

Now, ratio of the area of cut out piece and the remaining piece

$= \frac{22500}{37500}$

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