



Name : \_\_\_\_\_

Grade : VI

Subject : Mathematics

**Chapter: 12. Ration and proportion**

**Objective Type Questions**

**I. Multiple choice questions**

- The ratio of 6 books to 30 books is  
a. 5:1                      b. 2:3                      c. 1 : 5                      d. 2:5
- If  $66 : 72 :: X : 96$ , then X is equal to  
a. 108                      b. 78                      c. 88                      d. 48
- 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
- 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
- The ratio of the number of sides of a triangle to the number of edges of a cube is  
a. 4 : 1                      b. 1 : 4                      c. 1 : 3                      d. 2 : 3
- If  $7 : 30 :: x : 15$ , then the value of x is  
a.  $\frac{7}{2}$                       b.  $\frac{2}{7}$                       c. 6                      d. 7
- Margarette works in a factory and earns ₹ 955 per month. She saves ₹ 185 per month from her earnings. Find the ratio of her income to her expenditure.  
a. 154 : 37                      b. 191 : 37                      c. 191 : 154                      d. 37 : 191
- Avinash works as a lecturer and earns ₹ 12000 per month. His wife who is a doctor earns ₹ 15000 per month. Find the ratio of Avinash's income to their total income.  
a. 4 : 9                      b. 9 : 4                      c. 4 : 5                      d. 5 : 4
- 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



10. In a school library, the ratio of mathematics books to Science books is same as the ratio of science books to Hindi books. If there are 450 books of science and 300 books of Hindi, then find the number of books in mathematics.

- b. 720                      b. 675                      c. 300                      d. 450

1. c	2. c	3. c	4. d	5. b	6. a	7. c	8. a	9. c	10. b
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**II. Multiple choice questions**

- Which of the following is the ratio of one rupee to 50 paise?  
a. 1 : 1                      b. 2 : 1                      c. 1 : 2                      d. 1 : 50
- Which of the following is the equivalent ratio of 6 : 4  
a. 3 : 2                      b. 6 : 8                      c. 12 : 4                      d. 1 : 1
- If ₹ 60 is divided between X & Y in the ratio of 1 : 2, which of the following is the share of X?  
a. 50                      b. 20                      c. 40                      d. 80
- There are 100 teachers in a school for 3000 students. Which of the following is the teacher student ratio?  
a. 3 : 100                      b. 1 : 1                      c. 30 : 1                      d. 1 : 30
- If the cost of six pens is ₹ 60, which of the following is the cost of 10 such pens?  
a. 10                      b. 100                      c. 600                      d. 6
- If cost of 12 caps is ₹ 204, then the cost of 5 caps is  
a. ₹100                      b. ₹102                      c. ₹85                      d. ₹120
- The ratio of 8 hours to 2 days is  
a. 4 : 1                      b. 6 : 1                      c. 1 : 4                      d. 1 : 6
- The ratio of 90 cm to 2.5 m is  
a. 18 : 5                      b. 5 : 8                      c. 25 : 9                      d. 9 : 25
- The angles of a triangle are in the ratio 3 : 1 : 2. The measure of the largest angle is :  
a. 30°                      b. 60°                      c. 90°                      d. 120°
- Length and breadth of rectangular field are in the ratio 5 : 4. If the width of the field is 36 m, what is its length?  
a. 40 m                      b. 45 m                      c. 54 m                      d. 50 m

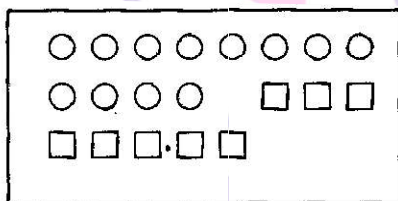
11. If a bus covers 195 km in 3 hours and a train covers 300 km in 4 hours, then the ratio of their speeds is:  
 a. 13 : 15                      b. 15 : 13                      c. 13 : 12                      d. 12 : 13
12. If the cost of 5 bars of soap is ₹ 82.50, then the cost of one dozen such bars is :  
 a. ₹ 208                      b. ₹ 192                      c. ₹ 198                      d. ₹ 204
13. If the cost of 30 packets of 8 pencils each is ₹ 600, what is the cost of 25 packets of 12 pencils each?  
 a. ₹ 725                      b. ₹ 750                      c. ₹ 480                      d. ₹ 720

1. b	2. a	3. b	4. d	5. b	6. c	7. d
8. d	9. c	10. b	11. a	12. c	13. b	

### III. Multiple choice questions

1. The cost of a pen is ₹ 10. The cost of a pencil is ₹ 2. How many times of the cost of a pencil is the cost of a pen?  
 a. 5 times                      b. 2 times                      c. 10 times                      d. none of these
2. The monthly salary of Hari Krishnan is ₹ 80000. The monthly salary of Manish is ₹ 40000. How many times of the salary of Manish is the salary of Hari Krishnan?  
 a. 2 times                      b. 4 times                      c. 3 times                      d. 8 times
3. There are 30 boys and 20 girls in a class. The ratio of the number of girls to the number of boys is  
 a. 2 : 3                      b. 3 : 2                      c. 2 : 5                      d. 3 : 2
4. There are 25 boys and 25 girls in a class. The ratio of the number of boys to the total number of students is  
 a. 1 : 2                      b. 1 : 3                      c. 2 : 3                      d. 3 : 2
5. The height of Apala is 150 cm. The height of pari is 120 cm. The ratio of the height of Apala to the height of pari is  
 a. 4 : 5                      b. 5 : 4                      c. 5 : 2                      d. 4 : 1
6. The cost of a car is ₹ 3, 00, 000. The cost of a motorbike is ₹ 50, 000. The ratio of the cost of motorbike to the cost of car is  
 a. 1 : 6                      b. 1 : 5                      c. 1 : 4                      d. 1 : 3
7. The speed of Shubham is 6 km per hour. The speed of yash is 2 km per hour. The ratio of the speed of Shubham to the speed of Yash is  
 a. 2 : 3                      b. 3 : 1                      c. 1 : 3                      d. 3 : 2
8. The length and breadth of a rectangular park are 50 m and 40 m respectively. Find the ratio of the length to the breadth of the park.  
 a. 4 : 5                      b. 4 : 1                      c. 5 : 1                      d. 5 : 4

9. The ratio 40 cm to 1 m is  
 a. 2 : 5                      b. 3 : 5                      c. 4 : 5                      d. 5 : 2
10. In a family, there are 8 males and 4 females. The ratio of the number of females to the number of males is  
 a. 1 : 2                      b. 1 : 4                      c. 1 : 8                      d. 2 : 1
11. Which of the following ratios is equivalent to 2: 3?  
 a. 4 : 8                      b. 4 : 9                      c. 6 : 9                      d. 6 : 12
12. Which of the following ratios is not equivalent to 10: 5?  
 a. 1 : 2                      b. 2 : 1                      c. 20 : 10                      d. 30 : 15
13. Find the ratio of number of circles and number of squares inside the following rectangle:



- a. 3 : 1                      b. 2 : 1                      c. 2 : 3                      d. 3 : 2
14. There are 20 teachers in a school for 500 students. The ratio of the number of teachers to the number of students is  
 a. 1 : 20                      b. 1 : 50                      c. 1 : 25                      d. 25 : 1
15. The ratio of 25 minutes to 1 hour is  
 a. 7 : 5                      b. 5 : 12                      c. 12 : 5                      d. 5 : 7
16. Out of 30 students in a class, 20 like cricket and 10 like Hockey. The ratio of the number of students liking Hockey to the total number of students is  
 a. 3 : 1                      b. 1 : 3                      c. 2 : 3                      d. 1 : 2
17. The cost of 1 dozen bananas is ₹ 30. The cost of 6 oranges is ₹ 18. The ratio of the cost of a banana to the cost of an orange is  
 a. 3 : 2                      b. 2 : 3                      c. 6 : 5                      d. 5 : 6
18. The present age of Hari Krishan is 60 years. The present age of Manish is 30 years. The ratio of the age of Manish to the age of Hari Krishan 10 years ago was  
 a. 2 : 5                      b. 5 : 2                      c. 2 : 3                      d. 3 : 2
19. 100 students appeared in annual examination. 60 students passed. The ratio of the number of students who failed to the total number of student is  
 a. 5 : 2                      b. 2 : 5                      c. 2 : 3                      d. 3 : 2
20. ₹ 100 are divided between Sangeeta and Manish in the ratio 4 : 1. Find the amount sangeeta gets.  
 a. ₹ 80                      b. ₹ 20                      c. ₹ 60                      d. ₹ 50

21. Which of the following are in proportion?

- a. 2, 30, 20, 30    b. 3, 4, 15, 18    c. 1, 3, 11, 22    d. 2, 5, 40, 80

22. Which of the following is true?

- a.  $15 : 40 :: 10 : 30$     b.  $16 : 48 :: 25 : 75$   
c.  $40 : 60 :: 30 : 40$     d.  $20 : 100 :: 30 : 120$

23. Which of the following is false?

- a.  $25 \text{ g} : 30 \text{ g} :: 40 \text{ kg} : 48 \text{ kg}$     b.  $81 : 91 :: 24 \text{ h} : 27 \text{ h}$   
c.  $32 \text{ m} : 40 \text{ m} :: 6 \text{ minutes} : 12 \text{ minutes}$     d.  $25 \text{ km} : 60 \text{ km} :: ₹ 10 : ₹ 24$

24. Which of the following statement is not true?

- a.  $4 : 7 = 5 : 9$     b.  $₹ 5 : ₹ 25 = 12 \text{ g} : 60 \text{ g}$   
c.  $30 : 80 = 6 : 16$     d.  $12 : 36 = 14 : 42$

25. A car requires 5 litres of petrol to cover 80 km. How many litres of petrol are required to cover 32 km?

- a. 1    b. 2    c. 3    d. 4

26. The cost of 10 note books is ₹ 100. The cost of 1 note book is

- a. ₹ 10    b. ₹ 100    c. ₹ 20    d. ₹ 5

27. The cost of 1 dozen pens is ₹ 24. Find the cost of 30 pens.

- a. ₹ 40    b. ₹ 45    c. ₹ 30    d. ₹ 60

28. The cost of 3 envelopes is ₹ 15. The cost of 10 envelopes is

- a. ₹ 20    b. ₹ 30    c. ₹ 45    d. ₹ 50

29. The cost of 5 kg of tomatoes is ₹ 100. The cost of 2 kg of tomatoes is

- a. ₹ 20    b. ₹ 40    c. ₹ 30    d. ₹ 50

30. The weight of 50 books is 10 kg. The weight of 25 books is

- a. 5 kg    b. 8 kg    c. 6 kg    d. 4 kg

31. The cost of 20m of cloth is ₹ 400. The cost of 15 m of cloth is

- a. ₹ 100    b. ₹ 200    c. ₹ 300    d. ₹ 360

32. The salary of a month of an employee is ₹ 4000. The annual salary of the employee is

- a. ₹ 48000    b. ₹ 24000    c. ₹ 12000    d. ₹ 8000

33. An aeroplane covers a distance of 5000 km in 5 hours. How much distance will it cover 2 hours?

- a. 1000km    b. 2000 km    c. 3000 km    d. 4000 km

34. The fare for 5 tickets from Kosi Kalan to Mathura is ₹ 150. The fare for 3 tickets is

- a. ₹ 90    b. ₹ 60    c. ₹ 75    d. ₹ 45

35. 150 kg of oil can be filled in 10 containers. To fill 750 kg of oil, how many containers will be required?

- a. 10                      b. 20                      c. 40                      d. 50

36. The cost of 8 almirahs is ₹ 8000. The cost of 1 almirah is

- a. ₹ 1000                b. ₹ 2000                c. ₹ 4000                d. ₹ 6000

1. a	2. a	3. a	4. a	5. b	6. a	7. b	8. d	9. a
10. a	11. c	12. a	13. d	14. c	15. b	16. b	17. d	18. a
19. b	20. a	21. a	22. a	23. c	24. a	25. b	26. a	27. d
28. d	29. b	30. a	31. c	32. a	33. b	34. a	35. d	36. a

#### IV. Multiple choice questions

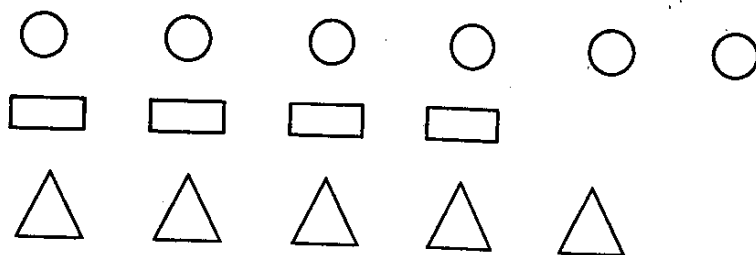
- The ratio of 8 books to 20 books is
  - 2 : 5
  - 5 : 2
  - 4 : 5
  - 5 : 4
- The ratio 92 : 115 in its simplest form is
  - 23 : 25
  - 18 : 23
  - 3 : 5
  - 4 : 5
- The ratio of the number of sides of a square to the number of edges of a cube is
  - 1 : 2
  - 3 : 2
  - 4 : 1
  - 1 : 3
- Which of the following ratio is the greatest?
  - 3 : 4
  - 5 : 7
  - 9 : 11
  - 1 : 8
- The greatest ratio among the ratios 2 : 3, 5 : 8, 75 : 121 and 40 : 25 is
  - 2 : 3
  - 5 : 8
  - 75 : 121
  - 40 : 25
- If a, b, c, d are in proportion, then
  - ac = bd
  - ad = bc
  - ab = cd
  - none of these
- A picture is 60 cm wide and 1.8 m long. The ratio of its width to its perimeter in lowest form is
  - 1 : 2
  - 1 : 3
  - 1 : 4
  - 1 : 8
- The length and breadth of a steel tape are 10 m and 2.4 cm, respectively. The ratio of the length to the breadth is
  - 5 : 1.2
  - 25 : 6
  - 625 : 6
  - 1250 : 3
- Neelam's annual income is ₹ 2,88,000. Her annual savings amount to ₹ 36,000. The ratio of her savings to her expenditure is
  - 1 : 8
  - 1 : 7
  - 1 : 6
  - 1 : 5

10. 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
11. If  $57 : x = 51 : 85$ , then the value of  $x$  is
- a. 95                      b. 76                      c. 114                      d. none of these
12. If 4,  $a$ ,  $a$ , 36 are in proportion, then  $a =$
- a. 24                      b. 12                      c. 3                      d. 24
13. 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
- a.  $\frac{b}{b+g}$                       b.  $\frac{g}{b+g}$                       c.  $\frac{b}{g}$                       d.  $\frac{b+g}{b}$

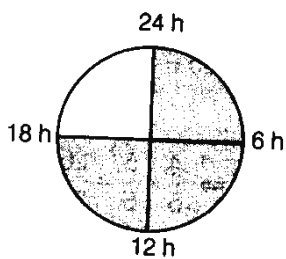
1. a	2. d	3. d	4. c	5. d	6. b	7. d
8. d	9. b	10. c	11. a	12. b	13. a	

### I. Fill in the blanks

Directions (Q. Nos. 1- 3) See the figure and fill in the blanks.



- The ratio of the number of rectangles to the circles is \_\_\_\_\_.
- The ratio of the number of triangles to the rectangles is \_\_\_\_\_.
- The ratio of the number of circles to that of triangles is \_\_\_\_\_.
- The cost of 4 pens is ₹ 40. The cost of 11 pens is \_\_\_\_\_.
- The weight of 15 boxes is 60 kg. The weight of 12 boxes is \_\_\_\_\_.
- Maya can walk 6 km in 2 h. In 3h, she can walk \_\_\_\_\_.
- Sleeping time of a python in a 24 h clock is represented by the unshaped portion in figure



The ratio of sleeping time to the awaking time is \_\_\_\_\_.

8. A ratio expressed in lowest form has no common factor other than \_\_\_\_\_ in its terms.
9. To find the ratio of two quantities, they must be expressed in \_\_\_\_\_ unit.
10. Ratio of 5 paise to 25 paise is the same as the ratio of 20 paise to \_\_\_\_\_.

1. 2 : 3	2. 5 : 4	3. 6 : 5	4. ₹ 10	5. 48kg	6. 9 km	7. 1 : 3	8. 1	9. Same	10. 100
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## II. Fill in the blanks

1. A ratio is form of comparison by \_\_\_\_\_.
2. 20 m : 70m = Rs. 8 : ₹ \_\_\_\_\_.
3. There is a number in the box  such that,  24, 9, 12 are in proportion.  
The number in the box is \_\_\_\_\_.
4. If two ratios are equal, then they are in \_\_\_\_\_.
5. Saturn and Jupiter take 9 hours 56 minutes and 10 hours 40 minutes, respectively for one spin on their axes. The ratio of the same time taken by Saturn and Jupiter in lowest form is \_\_\_\_\_.
6. 10 g of caustic soda dissolved in 100 ml 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 \_\_\_\_\_.
7.  $\frac{3}{5} = \frac{\quad}{20}$
8.  $\frac{\quad}{18} = \frac{2}{9}$  \_\_\_\_\_.
9.  $\frac{8}{\quad} = \frac{3.2}{4}$  \_\_\_\_\_.
10.  $\frac{\quad}{45} = \frac{16}{40} = \frac{24}{\quad}$
11.  $\frac{16}{36} = \frac{\quad}{63} = \frac{36}{117} = \frac{\quad}{\quad}$  \_\_\_\_\_.
12. \_\_\_\_\_ is used to represent a ratio.
13. \_\_\_\_\_ is used to represent proportion.
14. There are \_\_\_\_\_ terms in a ratio.
15. There are \_\_\_\_\_ terms in a proportion.



16. A ratio has \_\_\_\_\_ units  
 17. Product of \_\_\_\_\_ = product of \_\_\_\_\_.  
 18. The first and fourth terms of a proportion are called \_\_\_\_\_.

1. Division	2. 28	3. 18	4. Proportion	5. 149:160	6. 100g m	7. 12	8. 4	9. 10
10. 18,60	11. 28,81,52	12. :	13. ::	14. 2	15. 4	16. No	17. Mens, extremes	18. Extremes

### I. Match the followings

a) $x$ increased by 12	i) $7y + 5x$
b) $x$ decreased by 12	ii) $y^3 - x^3$
c) 5 times $x$ added to 7 times $y$	iii) $x - 12$
d) $x$ cube less than $y$ cube	iv) $2x + y$
e) Twice $x$ increased by $y$	v) $x + 12$

a) v	a. iii	b. i	c. ii	d. iv
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### I. True or False

- $4 : 7 = 20 : 35$
- $15 \text{ m} : 40 \text{ m} = 40 \text{ cm} : 80 \text{ cm}$
- The ratio of 20 kg to 200 kg is 1 : 10
- If  $10 : 30 :: 40 : x$ , then the value of  $x$  is 120.
- The ratio 8 : 40 is in its lowest form.
- The ratio of 10 kg to 100 kg is 1 : 10
- The ratio of 150 cm to 1 m is 1 : 1.5.
- $25 : 20 = 50 : 40$
- The ratio of 1 h to one day is 1 : 1
- The ratio 4 : 16 is in its lowest form.

1. True	2. False	3. True	4. True	5. False
6. True	7. False	8. True	9. False	10. False

## II. True or False

1.  $0.2 : 5 = 2 : 0.5$
2.  $3 : 33 = 33 : 333$
3.  $15 \text{ m} : 40 \text{ m} = 35 \text{ m} : 65 \text{ m}$
4.  $27 \text{ cm}^2 : 57 \text{ cm}^2 = 18 \text{ cm} : 38 \text{ cm}$ .
5.  $5 \text{ kg} : 7.5 \text{ kg} = \text{Rs. } 7.50 : \text{Rs. } 5$
6.  $20 \text{ g} : 100 \text{ g} = 1 \text{ metre} : 500 \text{ cm}$
7.  $12 \text{ hours} : 30 \text{ hours} = 8 \text{ km} : 20 \text{ km}$
8. The ratio of 1 hour to one day is  $1 : 1$
9. The ratio  $5 : 4$  is different from the ratio  $4 : 5$
10. A ratio will always be more than 1.
11. A ratio will always be more than 1.
12. If  $b : a = c : d$ , then  $a, b, c, d$  are in proportion.
13. The two terms of a ratio can be in two different units.
14. 30, 40, 45, 60 are in proportion
15.  $6 : 8$  and  $9 : 12$  are equivalent ratios of  $3 : 4$
16. A dozen : a score =  $5 : 3$
17.  $60 \text{ p} : ₹ 3 = 1 : 5$

1. False	2. False	3. False	4. True	5. False	6. True	7. True	8. False	9. True
10. False	11. True	12. False	13. False	14. True	15. True	16. False	17. True	

### I. Very Short Answer Type Questions

1. Write the following ratios in the simplest form.

a) 600 g to 1 kg

$$\begin{aligned} \text{Ratio of } 600 \text{ g to } 1 \text{ kg} &= \frac{600}{1000} [\because 1 \text{ kg} = 1000 \text{ g}] \\ &= \frac{3}{5} = 3 : 5 \end{aligned}$$

b) 2 cm to 4 m

$$2 \text{ cm to } 4 \text{ m} = \frac{2}{400} = 1 : 200 [\because 1 \text{ m} = 100 \text{ cm}]$$

2. Given two equivalent ratios of  $3 : 8$ .

$$3 : 8 = \frac{3}{8} = \frac{3 \times 2}{8 \times 2} = \frac{6}{16}, \quad 3 : 8 = \frac{3}{8} = \frac{3 \times 3}{8 \times 3} = \frac{9}{24}$$

Hence, two equivalent ratios of  $3 : 8$  are  $6 : 16$  and  $9 : 24$ .

### 3. Find

- i) **The ratio of 70 cm to 1 m**

We know that, 1 m = 100 cm

$$\therefore \text{Required ratio} = 70 : 100 = \frac{70}{100} = 7 : 10$$

- ii) **The ratio of 50 paise to ₹ 2**

We know that, ₹ 1 = 100 paise

$$\therefore \text{Required ratio} = \frac{50}{200} = \frac{1}{4} = 1 : 4$$

4. **Fill in the box**  $\frac{4}{5} \times \frac{5}{5} = \frac{20}{5}$

We have,

$$\frac{4}{5} \times \frac{5}{5} = \frac{20}{5} \Rightarrow \frac{4}{5} \times \frac{5}{5} = \frac{20}{25}$$

5. **Are the ratio 10 g : 40 and 25 kg: 100 kg in proportion?**

We have, 10 g : 40 g =  $\frac{10}{40} = 1 : 4$

And 25 kg : 100 kg =  $\frac{25}{100} = 1 : 4$

So, they are in proportion.

6. **Are 10, 15, 20 and 30 in proportion?**

Ratio of 10 to 15 =  $\frac{10}{15} = 2 : 3$

Ratio of 20 to 30 =  $\frac{20}{30} = 2 : 3$

Since, 10 : 15 = 20 : 30

Hence, 10, 15, 20 and 30 are in proportion.

7. **If 15 : 10 :: x : 20, then find the value of x.**

**Given, 15: 10:: x: 20**

$$\Rightarrow \frac{15}{10} : \frac{x}{20}$$

$$\Rightarrow 10x = 15 \times 20 \Rightarrow x = \frac{15 \times 20}{10} = 30$$

8. **If 10 bananas cost is ₹ 20. What will 7 bananas cost?**

Cost of 10 bananas = ₹ 20

Cost of 1 banana = ₹  $\frac{20}{10} = ₹ 2$

$\therefore$  Cost of 7 bananas =  $7 \times 2 = ₹ 14$

9. **Determine whether the given ratios are equal.**

30: 45 and 60: 100

$$30 : 45 = \frac{30}{45} = \frac{2}{3} = 2 : 3$$

$$60 : 100 = \frac{60}{100} = \frac{3}{5} = 3 : 5$$

So, the ratios 30: 45 and 60: 100 are not equal.

10. 3 dozen pens cost is ₹ 72. How much 2 dozen pens cost?

Cost of 3 dozen pens ₹ 72

Cost of 1 dozen pens =  $\frac{72}{3} = ₹ 24$

∴ Cost of 2 dozen pens =  $2 \times 24 = ₹ 48$

11. 30 % of Zuben's house are is equal to 40 % of Seema's house area.

Express as a ratio, Zuben's house area to Seema's house area.

Given, 30% of Zuben's house area = 40% of Seema's house area

∴ Required ratio of Zuben's house to Seema's house =  $\frac{4}{3} = 4: 3$

## II. Very Short Answer Type Questions

1. The market price of a table is ₹ 625 and its sale price is ₹ 500. What is the ratio of the sale price to the market price?

Given marked price of a table = ₹ 625

And sale price of a table = ₹ 500

∴ Ratio of the sale price to the marked price

= Sale price of the table: Marked price of the table

= 500: 625 = 4: 5 [dividing by 125 in both ratios]

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

2. 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.

Given, number of milk teeth = 20

And the number of permanent teeth = 32

∴ Ratio of the number of milk teeth to the number of permanent teeth

= Number of milk teeth: number of permanent teeth

= 20: 32 = 5 : 8 [dividing by 4 in both ratios]

Hence, the required ratio is 5: 8

3. 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.

Given, length of rectangular sheet = 1.2 m = 120 cm [ ∴ 1 m = 100 cm]

And width of rectangular sheet = 21 cm

∴ Ratio of width to its length = 21: 120 = 7: 40 [dividing by 3 in both ratios]

Hence, the required ratio is 7: 40.

4. Give two ratios equivalent to 18: 8.  
9: 4, 36: 16
5. Express 21: 9 in the simplest form.  
7: 3
6. Which ratio is largest 7: 28 or 5: 25.  
7: 28
7. First, second, third terms of a proportion are 7, 14 and 25 respectively, find 4<sup>th</sup> term.  
50

### III. Very Short Answer Type Questions

1. 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 \_\_\_\_\_.

Time taken by Saturn = 9 hours 56 minutes

$$= 596 \text{ minutes (1 hour = 60 minutes)}$$

Time taken by Jupiter = 10 hours 40 minutes

$$= 640 \text{ minutes (1 hour = 60 minutes)}$$

$\therefore$  Ratio of the time taken by Saturn and Jupiter in lowest form is  $596 : 640 = 149 : 160$

2. The quarterly school fee in Kendriya vidyalaya for class VI is ₹ 540. What will be the fee for seven months?

Quarterly school fee for class VI = ₹ 540

Monthly school fee for class VI = ₹  $540 \div 3 = ₹ 180$

Fee for seven months = ₹  $180 \times 7 = ₹ 1260$ .

3. Find two ratios equivalent to 16: 56.

Ratio equivalent to 16: 56 are  $\frac{16 \times 2}{56 \times 2}$  32: 112,  $\frac{16 \times 3}{56 \times 3} = 48: 168$ .

# Next Generation School

## I. Short Answer Type Questions

1. Which pair of ratios are equal and why?

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

$$\frac{2}{3} = 2:3 \text{ and } \frac{4}{6} = 2:3$$

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

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

$$\frac{8}{4} = 2:1 \text{ and } \frac{2}{1} = 2:1$$

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

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

$$\frac{4}{5} = 4:5 \text{ and } \frac{12}{20} = 3:5 \text{ are not equal.}$$

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

Quantity of burfi = 18 kg

Given, khoya : Sugar = 7 : 2

Total = 7 + 2 = 9

Quantity of khoya =  $\frac{18 \times 7}{9} = 14$  kg

So, Reshma used 14 kg khoya.

3. 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.

Length of line segment = 56 cm

Ratio of two parts = 2: 5

Sum of parts = 2 + 5 = 7

$\therefore$  Length of first part =  $\frac{56 \times 2}{7} = 16$  cm

and length of second part =  $\frac{56 \times 5}{7} = 40$  cm

4. Ram and Mohan ran in a race. Ram covered 210m while during the same time Mohan covered only 180 m. What is the ratio of the distance covered by Mohan to that by Ram?

Distance covered by Ram = 210 m

Distance covered by Mohan = 180 m

$$\therefore \text{Required ratio} = \frac{180}{210} = \frac{6}{7} = 6:7$$

5. School starts at 7: 00 am and gets over at 12: 30 pm. If the break time is from 9:50 am to 10: 10 am. What is the ratio of the break time to the total time the students spend at school?

School starts at 7 : 00 am and gets over at 12 : 30 pm. Total time the student spend at school

$$= 5 \text{ h } 30 \text{ min} = (5 \times 60 + 30) \text{ m} = 330 \text{ min}$$

Break time = 9: 50 am to 10: 10 = 20 min

$$\therefore \text{Required ratio} = \frac{20}{330} = 2: 33$$

6. There are two rectangles A and B. A has a length of 12 cm and breadth of 6 cm. B has a length of 11 cm and breadth of 9 cm. Find the ratio of their perimeter.

For rectangle A,

Length = 12 cm and breadth = 6 cm

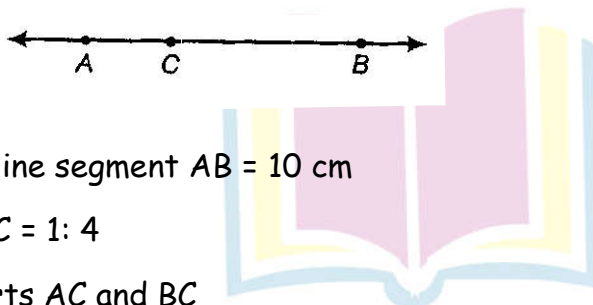
$$\begin{aligned} \text{Perimeter of rectangle A} &= 2 \times (\text{Length} + \text{Breadth}) \\ &= 2 (12+6) = 36 \text{ cm} \end{aligned}$$

For rectangle B, length = 11 cm and breadth = 9 cm

$$\text{Perimeter of rectangle B} = 2 (11+9) = 40 \text{ cm}$$

$$\therefore \text{Required Ratio} = \frac{36}{40} = \frac{9}{10} = 9: 10$$

7. Line segment AB = 10 cm is divided at C in the ratio 1:4, what are the lengths of  $\overline{AC}$  and  $\overline{BC}$ ?



Length of line segment AB = 10 cm

and AC : BC = 1: 4

Sum of parts AC and BC

$$= AC + BC = 1 + 4 = 5$$

$$\text{Length of } \overline{AC} = \frac{10 \times 1}{5} = 2 \text{ cm}$$

$$\text{Length of } \overline{BC} = \frac{10 \times 4}{5} = 8 \text{ cm}$$

8. 17 bags of cement costs ₹ 1675.50. How many bags of cement can be bought of ₹ 1182?

In ₹ 1675.50, number of bag purchased = 17

$$\text{In ₹ 1, number of bag purchased} = \frac{17}{1675.50}$$

$$\begin{aligned} \text{In ₹ 1182, number of bag purchased} &= \frac{1182 \times 17}{1675.50} \\ &= 12 \text{ (approx)} \end{aligned}$$

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)  $\frac{b}{b+g}$

$\frac{g}{b+g}$

b)  $\frac{b}{g}$

c)  $\frac{b+g}{b}$

Given, number of boys in the class = b

And number of girls in the class = g

∴ Total number of students = Numbers of boys in

Class + Number of girls in the class = b + g

Ratio of boys to the total number of students

= Number of boys in the class: Total number of students

$$= b : b + g = \frac{b}{b+g}$$

Hence, option (a) is correct

10. The sides of a triangle are in the ratio 2: 3: 5. If the total perimeter of the triangle is 70 cm, then find the length of the longest side.

Ratio of sides of triangle = 2: 3: 5

Total Perimeter = 70

Total of the ratio of sides = 2 + 3 + 5 = 10

∴ Length of the longest side =  $70 \times \frac{5}{10} = 35$  cm



## II. Short Answer Type Questions

1. At the parking stand of Ramleela ground, karthik 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.

Given, counted cycles at ground = 115

Counted scooters at ground = 75

Counted bikes at ground = 45

Total vehicles at ground = (Number of bikes)  
= (115 + 75 + 45)  
= 235

Ratio of number of cycles to the total number of vehicles

= Number of cycles: total number of vehicles

= 115: 235 = 23: 47

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

For getting larger ratio, compare both ratios 10 : 21 and 21 : 93.

a)  $10 : 21 = \frac{10}{21} = 0.47$  [by division]

b)  $21 : 93 = \frac{21}{93} = 0.225$  [by deviation]

Here,  $0.476 > 0.225$

So, the value of 10 : 21 is larger than ratio of 21: 93.

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

Given, ratio of number of large classroom to small classrooms = 3 : 4 and number of small rooms = 20 According to the ratio property, ratio of large number of large classrooms to small classrooms.

Let the number of large rooms =  $x$

Then, number of large classrooms,  $3 : 4 = x : 20$

$$\Rightarrow \frac{3}{4} = \frac{x}{20}$$

$$\Rightarrow 4x = 3 \times 20$$

[by interchanging property]

$$\Rightarrow 4x = 3 \times 20$$

$$\Rightarrow x = \frac{3 \times 20}{4} \Rightarrow x = 15$$

Hence, the number of large rooms is 15.

4. An office opens at 9 pm 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?

Total time period in the office = Time of office close

- Time of office opens

$$= 5 : 30 - 9 : 00 = 8 : 30 \text{ h} = 8\frac{1}{2} \text{ h} = \frac{17}{2} \text{ h}$$

∴ Time of lunch break to the total period in the office

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

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

Hence, the ratio of lunch break to the total period is 1 : 17

5. Find  $x$ , if  $36, x, x, 16$  are in proportion.

Since  $36, x, x, 16$  are in proportion

Therefore product of extreme terms =  $36 \times 16$

And product of middle terms =  $x \times x = x^2$

then  $x^2 = 36 \times 16$

or  $x = \sqrt{36 \times 16}$

or  $x = \sqrt{2 \times 2 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2}$

or  $x = 2 \times 3 \times 2 \times 2$

$$x = 24$$

6. Are 20, 18, 5, 6 in proportion?

Since,  $20 : 18 = \frac{20}{18} = \frac{10}{9}$

And  $5 : 6 = \frac{5}{6}$

Therefore,  $20 : 18 \neq 5 : 6$

Hence, 20, 18, 5, 6 are not in proportion.

7. Compare the ratio 5 : 12 and 3 : 8

Since,  $5 : 12 = \frac{5}{12}$  and  $3 : 8 = \frac{3}{8}$

Then  $\frac{5}{12}$  and  $\frac{3}{8}$

or  $\frac{5 \times 2}{12 \times 2}$  and  $\frac{3 \times 3}{8 \times 3}$

[∴ LCM of 12 and 8 = 24]

$$\frac{10}{24} \text{ and } \frac{9}{24}$$

Thus,  $\frac{10}{24} > \frac{9}{24}$  [∴  $10 > 9$ ]

Therefore,  $\frac{5}{12} > \frac{3}{8}$

**8. Find the ratio of 36 minutes to 2 hours.**

$$\begin{aligned}
 \text{Since, } 36 \text{ minutes: } 2 \text{ hours} &= 36 \text{ min: } 2 \times 60 \text{ min} \\
 &= [\because 1 \text{ hour} = 60 \text{ min}] \\
 &= 36 \text{ min: } 120 \text{ min} \\
 &= \frac{36 \text{ min}}{120 \text{ min}} \\
 &= \frac{36}{120} \\
 &= 3 : 10
 \end{aligned}$$

**10. Express a dozen to a score**

Since, a dozen to a score = 1 dozen: 1 score

[ $\because$  1 dozen = 12 and 1 score = 20]

$$\begin{aligned}
 &= 12 : 20 \\
 &= \frac{12}{20} = \frac{3}{5} = 3 : 5
 \end{aligned}$$

**11. Divide ₹ 2500 between Ravi and Ashok in ratio 2 : 3**

Sum of the terms of the ratio = (2 + 3) = 5

Total amount = ₹ 2500

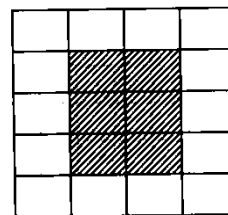
$$\text{Ravi's share} = ₹ \left( \frac{2}{5} \times 2500 \right) = ₹ 1000$$

$$\text{Ashok's share} = ₹ \left( \frac{3}{5} \times 2500 \right) = ₹ 1500$$

**12. In a floral design made from tiles each of dimensions 40cm by 60cm (see Fig), find the ratios of:**

The perimeter of shaded portion to the perimeter of the whole design

$$\begin{aligned}
 \text{Ratio} &= \frac{\text{Perimeter of shaded portion}}{\text{Perimeter of whole design}} \\
 &= \frac{480 \text{ cm}}{880 \text{ cm}} = \frac{6}{11} = 6 : 11
 \end{aligned}$$



**a) The area of the shaded portion to the area of the unshaded portion.**

$$\begin{aligned}
 \text{Ratio} &= \frac{\text{Area of shaded portion}}{\text{Area of unshaded portion}} \\
 &= \frac{2400 \times 6 \text{ cm}}{2400 \times 14 \text{ cm}} = \frac{3}{7} = 3 : 7
 \end{aligned}$$

13. 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 ₹ 17, then what amount will she be required to pay for her medical bill for 15 days?

No. of iron tablets taken in a day = 2

No. of iron tablets taken in 15 days =  $2 \times 15 = 30$

Cost of 10 tablets = ₹ 17

Cost of 1 tablet = ₹  $17 / 10 = ₹ 1.7$

Cost of 30 tablets = ₹  $1.7 / 10 = ₹ 51$

14. A recipe for raspberry jelly calls for 5 cups of raspberry juice and  $2 \frac{1}{2}$  cups of sugar. Find the amount of sugar needed for 6 cups of the juice?

For 5 cups of raspberry juice in recipe

=  $2 \frac{1}{2}$  cups of sugar

=  $\frac{5}{2}$  cups of sugar

Therefore, for 1 cup of raspberry juice =  $\frac{5}{2} \times \frac{1}{5}$

=  $\frac{1}{2}$  cup of sugar

Therefore for 6 cups of juice =  $\frac{1}{2} \times 6$

= 3 cups of sugar

15. 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?

Total no. of plants planted = 1890

$$\therefore \text{no. of rows} = \frac{\text{Total no of plants}}{\text{No. of plants in each row}}$$

$$= \frac{1890}{63} = 30$$

No. of plants destroyed in each row = 18

Total no. of plants destroyed – No. of rows X No.

Of plants destroyed in each row

$$= 30 \times 18 = 540$$

### III. Short Answer Type Questions

1. In a proportion, the 1<sup>st</sup>, 2<sup>nd</sup> and 4<sup>th</sup> terms are 34, 136 and 120 respectively.

Find the 3<sup>rd</sup> term.

Let 3<sup>rd</sup> term be  $x$

We have,  $34 : 136 :: x : 120$

Clearly, product of means = product of extremes

$$\therefore 34 \times 120 = 136 \times x$$

$$x = \frac{34 \times 120}{136} = 30 \quad \text{So, 3<sup>rd</sup> term is 30.}$$

2. If it has rained 276 mm in the last 3 days, how many cm of rain will fall in one full week (7 days)? Assume that the rain continues to fall at the same rate.

$$\text{Rain in last 3 days} = 276 \text{ mm} = \frac{276}{10} \text{ cm} = 27.6 \text{ cm}$$

$$\text{Therefore, rain in 1 day} = \frac{27.6 \text{ cm}}{3} = 9.2 \text{ cm}$$

$$\text{Therefore, rain in 1 week} = 9.2 \text{ cm} \times 7 = 64.4 \text{ cm.}$$

3. A truck requires 108 litres of diesel for covering a distance of 594 km. How much diesel will be required by the truck to cover a distance of 1650 km?

$$\text{Litres of diesel used to cover 594 km} = 108 \text{ litres}$$

$$\begin{aligned} \text{Litres of diesel used to cover 1 km} &= \frac{108}{594} \times 1650 \\ &= 300 \text{ litres} \end{aligned}$$

4. There are 20 girls and 15 boys in a class.

- i) What is the ratio of number of girls to the number of boys?

$$\text{Number of boys} = 15$$

$$\text{Number of girls} = 20$$

$$\text{Ratio of number of girls to number of boys is } 20:15$$

$$\text{Ratio can be written as } \frac{20}{15} = \frac{20 \div 5}{15 \div 5} = \frac{4}{3} = 4:3$$

$$\text{Required ratio is } 4:3$$

- ii) What is the ratio of number of girls to the total number of students in the class?

$$\text{Total students} = \text{Number of girls} + \text{Number of boys}$$

$$= 20 + 15$$

$$= 35$$

$$\text{Now, ratio of girls to total number of students is } 20:35$$

$$\text{Ratio can be written as } \frac{20}{35} = \frac{20 \div 5}{35 \div 5} = \frac{4}{7} = 4:7$$

$$\text{Required ratio is } 4:7$$

5. Divide 20 pens between Sheela and Sangeeta in the ratio of 3:2

Two parts are 3 and 2.

$$\text{Therefore, sum of parts} = 3 + 2 = 5$$

We can say that sheela gets 3 parts and sangeeta gets 2 parts out of every 5 parts.

$$\text{Therefore, sheela's share} = \frac{3}{5} \times 20 = 3 \times 4 = 12$$

$$\text{And, sangeeta's share} = \frac{2}{5} \times 20 = 2 \times 4 = 8$$

6. Cost of a dozen pen is ₹ 180 and cost of 8 ball pens is ₹ 56. Find the ratio of the cost of pen to the cost of a ball pen.

Total cost of pens = ₹ 180

Number of pens = 12

$$\begin{aligned}\text{Cost of a pen} &= \frac{\text{Total cost of pens}}{\text{Number of pens}} \\ &= \frac{180}{12} = 15\end{aligned}$$

Now, total cost of ball pens = ₹ 56

Number of ball pens = 8

$$\text{Cost of a ball pen} = \frac{\text{Total cost of ball pens}}{\text{Number of ball pens}} = \frac{56}{8} = 7$$

So, ratio of cost of a pen to cost of ball pen is 15 : 7

7. Mother wants to divide ₹ 36 between her daughters shreya and Bhoomika in the ratio of their ages. If age of shreya is 15 years and age of Bhoomika is 12 years, find how much shreya and Bhoomika will get.

Money to be divided = ₹ 36

Shreya's age = 15 years

Bhoomika's age = 12 years

So, sum of their ages = (15 + 12) = 27 years

$$\therefore \text{Shreya's share} = \left(\frac{15 \times 36}{27}\right) = ₹ 20$$

$$\text{Bhoomika's share} = \left(\frac{12 \times 36}{27}\right) = ₹ 16.$$

8. A scooter travels 120 km in 3 hours and a train travels 120 km in 2 hours. Find the ratio of their speeds.

$$\left[ \text{Hint: Speed} = \frac{\text{Distance travelled}}{\text{Time taken}} \right]$$

Distance travelled by scooter = 120 km

Time taken = 3 hours

As given, speed  $\frac{\text{Distance travelled}}{\text{Time taken}}$

$$\therefore \text{Speed} = \frac{120}{3} = 40 \text{ km/hr.}$$

Now, distance travelled by train = 120 km

Time taken = 2 hours

$$\text{So, speed} = \frac{120}{2} = 60 \text{ km/hr.}$$

$$\therefore \text{Ratio of their speeds} = 40 : 60 = \frac{40}{60} = \frac{2}{3} = 2 : 3$$

Ratio of their speeds is 2 : 3

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

Opening time of office = 9 am

Closing time of office = 5: 30 pm

Total period of office = Closing time - Opening time

$$= 5.30 \text{ pm} - 9 \text{ am} = 8 \text{ hours } 30 \text{ mins} = 510 \text{ mins}$$

Lunch break = 30 minutes

$$\therefore \text{Ratio of lunch break to total period} = \frac{30}{510} = \frac{1}{17} = 1 : 17$$

10. Cost of 4 dozen bananas is ₹ 60. How much bananas can be purchased for ₹ 12.50?

Cost of 4 dozen bananas = ₹ 60

$$\text{Cost of 1 dozen bananas} = ₹ \frac{60}{4} = ₹ 15$$

We know, 1 dozen = 12

$$\therefore \text{Cost of 1 banana} = \frac{15}{12} = ₹ 1.25$$

Therefore, in ₹ 12.50 the number of bananas that can be purchased

$$= \frac{12.50}{1.25} = 10$$

Thus, 10 bananas can be purchased.

11. Raju purchases 10 pens for ₹ 150 and Manish buys 7 pens for ₹ 84. Can you say who got the pens cheaper?

Cost of 10 pens purchased by Raju = ₹ 150

$$\text{Cost of 1 pen purchased by Raju} = \frac{150}{10} = ₹ 15$$

Now, cost of 7 pens purchased = ₹ 84

$$\text{Cost of 1 pen purchased by Manish} = \frac{84}{7} = ₹ 12$$

Thus, Manish got the pens cheaper than Raju.

12. 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?

Length of school ground = 150 m

Breadth of school ground = 90 m

$$\text{So, Ratio of school ground} = \frac{150}{90} = \frac{5}{3} = 5 : 3$$

Now, length of mela ground = 210 m

Breadth of mela ground = 126 m

$$\text{Ratio of mela ground} = \frac{210}{126} = \frac{5}{3} = 5 : 3$$

Therefore, Ratio of school ground = Ratio of mela ground, i.e. 5 : 3 :: 5 : 3  
So, measurements are in proportion.

## I. Long Answer Type Questions

1. 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
- The number of English newspapers to the number of Hindi newspapers.
  - The number of Hindi newspapers to the total number of newspapers.

Total number of newspapers = 312

Number of English newspapers = 216

Hindi newspapers = Total number of newspapers - Number of English newspapers  
 $= 312 - 216 = 96$

- Ratio of the number of English newspapers to the number of Hindi newspapers  
 $= 216 : 96 = \frac{216}{96} = \frac{9}{4} = 9:4$
- Ratio of the number of Hindi newspapers to the total number of newspapers =  
 $\frac{96}{312} = \frac{4}{13} = 4:13$

2. In a club having 100 members, 20 play carom, 24 play table tennis, 16 play badminton and the remaining do not play any game (no member plays more than one game). Find the ratio of the number of members who play
- Carom to the numbers of those, who play table tennis.
  - Badminton to the number of those, who play carom.
  - Table tennis to the number of those, who play badminton.
  - Badminton to the number of those, who do not play any game.

Total number of members = 100

Number of members, who play carom = 20

Number of members, who play table tennis = 24

Number of members, who play badminton = 16

Number of members, who do not play any game

$$= 100 - (20 + 24 + 16) = 100 - 60 = 40$$



- a. Ratio of members of badminton to the members of table tennis =  $20 : 24 = \frac{20}{24} = 5 : 6$
- b. Ratio of members of badminton to the members of carom =  $16 : 20 = \frac{16}{20} = \frac{4}{5} = 4 : 5$
- c. Ratio of table tennis to the member of those, who play badminton =  $24 : 16 = \frac{24}{16} = \frac{3}{2} = 3 : 2$
- d. Ratio of badminton to the number of those, who do not play any game =  $16 : 14 = \frac{16}{14} = \frac{2}{5} = 2 : 5$

3. Length and breadth of the floor of a room are 5 m and 3 m, respectively. Forty tiles, each with area  $\frac{1}{16} \text{ m}^2$  are used to cover the floor partially. Find the ratio of the tiled and the non-tiled portion of the floor.

Given

Length of floor of a room = 5 m

Breadth of floor of a room = 3 m

Area of floor =  $5 \times 3 = 15 \text{ m}^2$

Tiled portion of the floor =  $\frac{5}{2} \text{ m}^2$

Now, non-tiled portion of the floor =  $\left[15 - \frac{5}{2}\right] \text{ m}^2$   
 $= \left(\frac{30-5}{2}\right) = \frac{25}{2} \text{ m}^2$

The ratio of tiled and non-tiled portion of the floor

$$= \frac{5}{2} : \frac{25}{2} = \frac{\frac{5}{2}}{\frac{25}{2}} = \frac{5}{25} = \frac{1}{5} = 1 : 5$$

Hence, the required ratio is 1 : 5.

4. Determine, if the following ratios form a proportion or not?

a. 2 : 3 and 4 : 5

b. 25 g : 200 g and 6 kg : 48 kg

c. 440 m : 2 km and 55 cm : 3 m

d. 200 ml : 2.5 L and ₹ 4 : ₹ 50

a.  $2 : 3 = \frac{2}{3}$  and  $4 : 5 = \frac{4}{5}$

$2 : 3$  and  $4 : 5$  are not equal, therefore ratios are not in proportion.

b.  $25 \text{ g} : 200 \text{ g} = \frac{25}{200} = \frac{1}{8} = 1 : 8$

$6 \text{ kg} : 48 \text{ kg} = \frac{6}{48} = \frac{1}{8} = 1 : 8$

Hence, they form a proportion.

c.  $440 \text{ m} : 2 \text{ km} = \frac{440}{2000}$  [ $\therefore 1 \text{ km} = 1000 \text{ m}$ ]  
 $= \frac{11}{50} = 11 : 50$

$55 \text{ cm} : 3 \text{ m} = \frac{55}{300} = \frac{11}{60} = 11 : 60$

So, they are not in proportion.

d.  $200 \text{ mL} : 2.5 \text{ L} = \frac{200}{2500}$  [ $\therefore 1 \text{ L} = 1000 \text{ mL}$ ]  
 $= \frac{2}{25} = 2 : 25$

$₹ 4 : ₹ 50 = \frac{4}{50} = \frac{2}{25} = 2 : 25$

So, they are in proportion.

5. Reena earns ₹ 90000 and save ₹ 30000. Find the ratio of the money she earns to the money she saves. Mention the value you depict from this.

Reena's earning = ₹ 90000

Reena's saving = ₹ 30000

Ratio of earning to the saving =  $\frac{90000}{30000} = 3:1$

The value depict here is economic planning for future.

6. 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

Given, ratio of books with green cover to brown cover = 2:3

And number of books with green cover = 18

$$\Rightarrow \frac{18}{\text{Brown cover books}} = \frac{2}{3}$$

$$\Rightarrow 2 \times \text{Brown cover books} = 18 \times 3$$

$$\text{Brown cover books} = \frac{18 \times 3}{2} = 27$$

So, the number of books with brown cover is 27.

Hence, option (c) is correct.

7. In a year, Ravi earns ₹ 360000 and paid ₹ 24000 as income tax. Find the ratio of his

a. Income to paid income tax.

b. Paid income tax to income after paying income tax.

Given, Ravi earns in a year = ₹ 360000

And Ravi paid income tax in a year = ₹ 240000

(a) Ratio of income to the income tax paid

$$\text{Paid} = 360000 : 240000$$

$$= 360 : 24 \text{ [dividing by 1000 in both ratio]}$$

$$= 15 : 1 \text{ [dividing by 24 in both ratio]}$$

Hence, the ratio of income to income tax is = 15 : 1

(b) After paying income tax remaining income

$$= \text{Total income} - \text{income tax}$$

$$= 360000 - 240000 = ₹ 336000$$

Ratio of income tax to income after paying income tax

$$= 24000 : 336000$$

$$= 24 : 336 \text{ [dividing by 1000 in both ratio]}$$

$$= 1 : 14 \text{ [dividing by 24 in both ratio]}$$

Hence, the ratio of income tax to after paying income tax is 1 : 14.

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

a. Ramesh's earnings to their total earnings.

b. Rama's earnings to their total earnings.

Given, Ramesh earns per month = ₹ 28000

and Rama earns per month = ₹ 36000

$$\begin{aligned} \text{Total earnings} &= \text{Ramesh's earning per month} + \text{Rama's earning per month} \\ &= ₹(28000 + 36000) = ₹64000 \end{aligned}$$

(a) Ratio of Ramesh's earning to their total earnings

$$\begin{aligned} &= \text{Ramesh's earning} : \text{Total earning} \\ &= 28000 : 64000 \\ &= 28 : 64 \text{ [dividing by 1000 in both ratio ]} \\ &= 7 : 16 \text{ [ dividing by 4 in both ratio ]} \end{aligned}$$

Hence, the ratio of Ramesh's earning to total earnings is 7 : 16

(b) Rama's earnings to their total earnings

$$\begin{aligned} &= \text{Rama's earnings} : \text{Total earnings} \\ &= 36000 : 64000 \\ &= 36 : 64 \text{ [dividing by 1000 in both ratios ]} \\ &= 9 : 16 \text{ [dividing by 4 in both ratios]} \end{aligned}$$

Hence, the ratio of Rama's earnings to their total earnings is 9 : 16.

9. A recipe calls for 1 cup of milk forever  $2\frac{1}{2}$  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 people?

Given , milk needed for making cake = 1 cup

$$\begin{aligned} \text{And flour needed for making cake} &= 2\frac{1}{2} \text{ cup} \\ &= \frac{5}{2} \text{ cup} \end{aligned}$$

Then , total amount needed = milk + flour

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

So,  $\frac{7}{2}$  cups of milk and flour 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 a multiple of cups ]

By ratio and proportion law ,  $\frac{\frac{7}{2}}{6} = \frac{x}{8}$

$$\Rightarrow \frac{7}{2} \times 8 = 6 \times x \quad \Rightarrow x = \frac{28}{6}$$

$$\Rightarrow x = \frac{14}{3} \quad \text{[ dividing by 2 ]}$$

Hence, the cups needed for 8 persons is  $\frac{14}{3}$ .

10. A scooter travels 120 km in 3 h and a car travels 120 km in 2 h. find the ratio of their speeds. [Hint  $Speed = \frac{Distance\ travelled}{Time\ taken}$ ]

Given, distance travelled by a persons = 120 km

Time taken by a scooter = 3 h

$$Speed\ of\ scooter = \frac{Distance\ travelled}{time\ taken} = \frac{120\ km}{3\ h} = 40\ km/h$$

Distance traveled by train = 120 km

and time taken by a train = 2 h

$$\therefore Speed\ of\ the\ car = \frac{Distance\ travelled}{Time\ taken} = \frac{120\ km}{2\ h} = 60\ km/h$$

$\therefore$  Ratio of their speeds

$$= Speed\ of\ the\ scooter : Speed\ of\ the\ car = 40 : 60 = 2 : 3 \quad [dividing\ by\ 20\ in\ both\ ratios]$$

Hence, the ratio of their speeds is 2: 3.

11. 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 the uniform speed?

Given, distance travel by train = 130 km

And time taken by train = 2 h

$$Speed\ of\ train = \frac{130\ km}{2\ h} = 65\ km/h$$

And distance between Delhi to Bhopal = 780 km

Let time taken by train = x h

Then, speed of train

$$= \frac{Distance\ between\ Bhopal\ to\ Delhi}{Time\ taken\ by\ train}$$

$$\Rightarrow 65 = \frac{780}{x}$$

$$\Rightarrow x = \frac{780}{65} = 12\ h$$

Hence, the required time is 12 h for distance 780 km.

12. 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.

Given, the ratio of zinc and copper in alloy = 7: 9

And total weight of alloy = 8 kg

Let the weight of zinc and copper in alloy be 7 x and 9x respectively, where, x is a multiple of weight.

Then, total weight = 7x + 9x = 16x

$$\therefore 16x = 8\ kg \Rightarrow x = \frac{8}{16} = \frac{1}{2}$$

$$\therefore \text{Weight of copper in alloy} = 9x = 9 \times \frac{1}{2} = \frac{9}{2}\ kg = 4\frac{1}{2}\ kg$$

Hence, the weight of copper is  $4\frac{1}{2}$  kg.

13. A sum of money was distributed among Anmol, Amit and Anil in the ratio 3:5:2. If Amit received ₹ 720, then
- How much money did Anmol receive?
  - How much was the sum of money distributed?

Given, the ratio of sum of money distributed among Anmol, Amit and Anil = 3: 5 : 2

Total of the ratio = 3 + 5 + 2 = 10

Money received by Amit = 720

$$\therefore \text{Total money distributed} = 720 \times \frac{10}{5} = ₹ 1440.$$

$$\text{Money received by Anmol} = 1440 \times \frac{3}{10} = ₹ 432.$$

## II. Long Answer Type Questions

1. Of the 288 persons working in a company, 112 are men and the remaining are women. Find the ratio of the number of
- Men to that of women.
  - Men to the total number of persons.
  - Women to the total number of persons.

Given, total number of persons working in a company = 288

and number of men working in a company = 112

$\therefore$  Remaining persons, which are women in a company

= total persons working in a company - Men working in a company

$$= 288 - 112 = 176$$

(a) Ratio of the number of men that of women

$$= 112 : 176$$

$$= 7 : 11 \text{ [both ratios divided by 16]}$$

Hence, the ratio of the number of men of that to women is 7: 11.

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

$$= 112 : 288 = 7 : 18 \text{ [both ratios divided by 16]}$$

Hence, the ratio of the number of men to the total number of persons is 7 : 18.

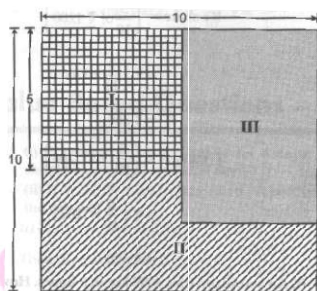
(c) Ratio of the number of women to the total number of persons

$$= 176 : 288 = 11 : 18 \text{ [both ratios divided by 16]}$$

Hence, the ratio of the number of women to the total number of persons is 11 :

18.

2. In the given fig. 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 portion I and II taken together and shaded portion III?

By splitting the above figure, we get,

a) Now,

$$AD = 5$$

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

$$AB = 5$$

Area of shaded portion I = Area of ABCD

$$\therefore \text{Area of } ABCD = AD \times AB = 5 \times 5 = 25$$

So, Area of shaded portion I = 25

Area of shaded portion II = Area of DCIJ - Area GFHI

$$\text{Now, } DJ = AJ - AD = 10 - 5 = 5$$

$$DC = AB \quad (\text{as it's a square})$$

$$DC = 5$$

$$\text{of } DCIJ = DJ \times DC = 5 \times 5 = 25$$

$$\text{Now, } AJ = EH \quad (\text{side of a square})$$

$$EH = 10$$

$$\text{So, } FH = EH - EF = 10 - 7$$

$$FH = 3$$

$$\text{and } GF = BE$$

$$GF = 5$$

$$\text{Area } GFHI = GF \times FH$$

$$= 5 \times 3 = 15$$

$$\therefore \text{Area of shaded portion II} = 25 + 15 = 40$$

So, required ratio of shaded portion I to II is 25 : 40

$$= \frac{25}{40} = \frac{5 \times 5}{8 \times 5}$$

$$= \frac{5}{8} = 5 : 8$$

b) Area of shaded portion III = Area of BEFG

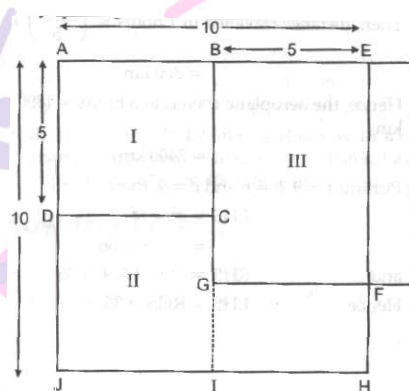
$$= BE \times EF$$

$$= 5 \times 7$$

$$= 35$$

So, required ratio of shaded portion II to III is 40 : 35

$$= \frac{40}{35} = \frac{8 \times 5}{7 \times 5} = \frac{8}{7}$$



$$= 8 : 7$$

c) Area of shaded portion I and II = 25 + 40  
= 65

So, required ratio = 65 : 35

$$= \frac{65}{35} = \frac{13 \times 5}{7 \times 5} = \frac{13}{7}$$

$$= 13 : 7$$

3. Find the ratio of the price of coffee to that of tea, when coffee costs Rs 24 per 100 gm and the tea costs Rs 80 per Kg

In order to compare the price of coffee with that of tea, we must first find the cost of the same quantity of each of them. Let us find the cost or 1 kg of each of the two items.

We have, Cost of 100 gm of coffee = Rs 24

$$\Rightarrow \text{cost of 1 gm of coffee} = \text{Rs } \left( \frac{24}{100} \right)$$

$$\Rightarrow \text{cost of 1000 gm of coffee} = \text{Rs } \frac{24}{100} \times 1000$$

$$= \text{Rs } 240$$

$$\therefore \text{cost of 1 kg of coffee} = \text{Rs } 240 [\because 1 \text{ kg} = 1000 \text{ gm}]$$

It is given that the cost of 1 kg of tea is Rs 80.

$$\therefore \text{Ratio of the price of coffee to the price of tea}$$

$$= \text{Cost of 1 kg of coffee} : \text{Cost of 1 kg of tea}$$

$$= \text{Rs } 240 : \text{Rs } 80$$

$$= 240 : 80$$

$$= 3 : 1$$

[Dividing the first and second terms by their H.C.F. = 80]

4. 25 bags of wheat each weighing 40 kg cost Rs 2750. Find the cost of 35 bags of wheat, if each bag weight 50 kg.

We have, Quantity of wheat in one bag = 40 kg.

$$\therefore \text{Quantity of wheat in 25 bags} = (40 \times 25) \text{ kg} \\ = 1000 \text{ kg.}$$

If Quantity of wheat in one bag = 50 kg.

$$\therefore \text{Quantity of wheat in 35 bags} = (50 \times 35) \text{ kg} \\ = 1750 \text{ kg.}$$

Now, cost of 1000 kg of wheat = Rs 2750

$$\text{Cost of 1 kg of wheat} = \left( \frac{2750}{1000} \right)$$

Hence, the cost of 1750 kg of wheat

$$\begin{aligned}
 &= \left( \frac{2750}{1000} \times 1750 \right) \\
 &= \frac{9625}{2} \\
 &= 4812.50
 \end{aligned}$$

Thus, 35 bags of 50 kg each will cost Rs 4812.50.

5. In a school library, the ratio of Mathematics books to Science books is the same as the ratio of Science books to Hindi books. If there are 450 books in Science and 300 books in Hindi, find the number of books in Mathematics.

Let the number of books in Mathematics be  $x$ . It is given that

Number of Mathematics books: Number of Science books

= Number of Science books: Number of Hindi books

$$\Rightarrow x : 450 = 450 : 300$$

$$\Rightarrow 300 \times x = 450 \times 450$$

$$\begin{aligned}
 \Rightarrow x &= \frac{450 \times 450}{300} \\
 \Rightarrow x &= 675
 \end{aligned}$$

Hence, the number of Mathematics books in the library is 675.

6. Divide Rs 1200 among A, B, C in the ratio 2:3:5.

Sum of the terms of the ratio = 2 + 3 + 5 = 10

$$\begin{aligned}
 \therefore \quad A's \text{ share} &= \left( \frac{2}{10} \text{ of Rs } 1200 \right) \\
 &= \text{Rs} \left( \frac{2}{10} \times 1200 \right) = \text{Rs } 240
 \end{aligned}$$

$$\begin{aligned}
 B's \text{ share} &= \left( \frac{3}{10} \text{ of Rs } 1200 \right) \\
 &= \text{Rs} \left( \frac{3}{10} \times 1200 \right)
 \end{aligned}$$

$$= \text{Rs } 360$$

$$\begin{aligned}
 C's \text{ share} &= \left( \frac{5}{10} \text{ of Rs } 1200 \right) \\
 &= \left( \frac{5}{10} \times 1200 \right) \\
 &= \text{Rs } 600.
 \end{aligned}$$

7. (i) An aeroplane flies 4000 km in 5 hours. How far does it travel in 3 hours?

(ii) If  $a = 9$ ,  $b = 6$  and  $c = 4$ , then verify that  $a \times c = b \times b$  or  $b^2 = ac$ .

(i) Since, distance travelled in 5 hours = 4000 km

$$\begin{aligned}
 \text{Then, distance travelled in 1 hours} &= \left( \frac{4000}{5} \right) \text{ km} \\
 &= 800 \text{ km}
 \end{aligned}$$

Hence, the aeroplane travels in 3 hours = (800 × 3)

$$= 2400 \text{ km}$$

(ii) Putting  $a = 9$ ,  $b = 6$  and  $c = 4$ , then



$$\begin{aligned} \text{LHS} &= b^2 = 6^2 \\ &= 6 \times 6 = 36 \end{aligned}$$

and  $\text{RHS} = ac = 9 \times 4 = 36$

Hence  $\text{LHS} = \text{RHS} = 36.$

### III. Long Answer Type Questions

1. See the figure and find the ratio of

(i) Number of triangles to the number of circles inside the rectangle.

(ii) Number of squares to all the figure inside the rectangle.

(iii) Number of circles to all figures inside the rectangle.

(i) Number of triangles = 3

Number of circles = 2

Therefore, ratio of number of triangles to circle

(ii) Number of squares = 2

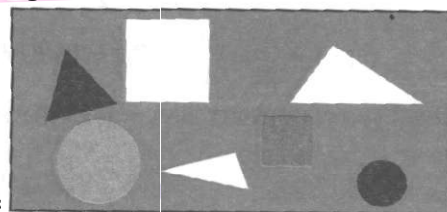
Number of all the figures = 7

Therefore, ratio of no, of squares to all figures is 2:7.

(iii). Number of circles = 2

Number of all figures = 7

$\therefore$  Ratio of circles to all the figures is 2:7.



2. Find the ratio of the following:

(i) 81 to 108

(ii) 98 to 63

(iii) 33 km to 121 km

(iv) 30 minutes to 45 minutes

(v) ₹ 39 to ₹ 138.

(i) 81 to 108

$$\therefore 81 : 108 = \frac{81}{108} = \frac{3 \times 27}{4 \times 27} = \frac{3}{4} = 3 : 4.$$

(ii) 98 to 63

$$\therefore 98 : 63 = \frac{98}{63} = \frac{14 \times 7}{9 \times 7} = \frac{14}{9} = 14 : 9.$$

(iii) 33 km to 121 km

$$\therefore 33 : 121 = \frac{33}{121} = \frac{3 \times 11}{11 \times 11} = \frac{3}{11} = 3 : 11$$

(iv) 30 minutes to 45 minutes

$$\therefore 30 : 45 = \frac{30}{45} = \frac{2 \times 15}{3 \times 15} = \frac{2}{3} = 2 : 3$$

(v) ₹ 39 to ₹ 138

$$\therefore 39 : 138 = \frac{39}{138} = \frac{13 \times 3}{46 \times 3} = \frac{13}{46} = 13 : 46.$$

**3. Find the ratio of the following**

(i) 30 minutes to 1.5 hours

(ii) 40 cm to 1.5 m

(iii) 55 paise to ₹ 1

(iv) 500 ml to 2 litres

(i) The two quantities are not in same unit. Therefore, we have to convert them into same unit.

$$1.5 \text{ hours} = 1.5 \times 60 \text{ min} = 90 \text{ min}$$

Therefore, the required ratio is 30 : 90

$$= \frac{30}{90} = \frac{30 \times 1}{30 \times 3} = \frac{1}{3} = 1 : 3.$$

(ii) The two quantities are not in same unit. Therefore, we have to convert them into same units.

$$1.5 \text{ m} = 1.5 \times 100 \text{ cm} = 150 \text{ cm}$$

Therefore, the required ratio is 40:150

$$= \frac{40}{150} = \frac{4 \times 10}{15 \times 10} = \frac{4}{15} = 4 : 15.$$

(iii) The two quantities are not in same unit. Therefore, we have to convert them into same unit.

$$\text{₹}1 = 1 \times 100 \text{ paise} = 100 \text{ paise}$$

∴ Required ratio is 55 : 100

$$= \frac{55}{100} = \frac{11 \times 5}{20 \times 5} = \frac{11}{20} = 11 : 20.$$

(iv) The two quantities are not in same unit. Therefore, we have to convert them into same unit.

$$2 \text{ litres} = 2 \times 1000 \text{ mL} = 2000 \text{ mL}$$

∴ Required ratio is 500 : 2000

$$= \frac{500}{2000} = \frac{1 \times 500}{4 \times 500} = \frac{1}{4} = 1 : 4.$$

**4. Out of 1800 students in a school, 750 opted basketball, 800 opted cricket and remaining opted table tennis. If a students can opt only one game, find the ratio of**

(i) Number of students who opted basketball to the number of students who opted table tennis.

(ii) Number of students who opted cricket to the number of students opting basketball.

(iii) Number of students who opted basketball to the total number of students.

$$\text{Total number of students} = 1,800$$

$$\text{Number of students opted for basketball} = 750$$

$$\text{Number of students opted for cricket} = 800$$

Total number of students in basketball and cricket =  $750 + 800 = 1,550$

Students opted for table tennis

= Total students – Total students in basketball and cricket.

=  $1,800 - 1,550 = 250$

(i) Students opted for basketball = 750

Students opted for table tennis = 250

Required ratio is 750 : 250

$$= \frac{750}{250} = \frac{250 \times 3}{250 \times 1} = \frac{3}{1} = 3:1$$

(ii) Students opted for cricket = 800

Students opted for basketball = 750

Required ratio is 800 : 750

$$= \frac{800}{750} = \frac{16 \times 50}{15 \times 50} = \frac{16}{15} = 16:15$$

(iii) Students opted for basketball = 750

Total number of students = 1800

Required ratio is 750 : 1800

$$= \frac{750}{1800} = \frac{75}{180} = \frac{15 \times 5}{15 \times 12} = \frac{5}{12} = 5:12$$

5. Present age of father is 42 years and that of his son is 14 years. Find the ratio of

(i) Present age of father to the present age of son.

(ii) Age of the father to the age of son, when son was 12 years old.

(iii) Age of father after 10 years to the age of son after 10 years.

(iv) Age of father to the age of son when father was 30 years old.

(i) Present age of father = 42

Present age of son = 14

∴ Required ratio is 42 : 14

$$= \frac{42}{14} = \frac{14 \times 3}{14 \times 1} = \frac{3}{1} = 3:1$$

(ii) Age of father when age of son was 12 years old =  $42 - 2$

= 40 years

Age of son = 12 years

Required ratio is 40 : 12

$$= \frac{40}{12} = \frac{10 \times 4}{3 \times 4} = \frac{10}{3} = 10:3$$

(iii) Age of father after 10 years =  $42 + 10 = 52$  years

Age of son after 10 years =  $14 + 10 = 24$  years

Required ratio is 52 : 24

$$= \frac{52}{24} = \frac{13 \times 4}{6 \times 4} = \frac{13}{6} = 13:6$$

(iv) Age of father = 30 years

Age of son when father was 30 years old = 14 - 12 = 2 years

Required ratio is 30 : 2

$$= \frac{30}{2} = \frac{15 \times 2}{1 \times 2} = \frac{15}{1} = 15 : 1$$

6. Determine if the following ratios form a proportion. Also, write the middle terms and extreme terms where the ratios form a proportion.

(i) 25 cm : 1 m and ₹ 40 : ₹ 160

(ii) 39 litres : 65 liters and 6 bottles

(iii) 2 kg : 80 kgm and 25 g : 625 g

(iv) 200 mL ; 2.5 litre and ₹ 4 : ₹ 50.

(i) Here, the two quantities are not in same unit, therefore, we convert them in same unit,

$$1 \text{ m} = 100 \text{ cm}$$

$$\therefore 25 \text{ cm} : 100 \text{ cm} = \frac{25}{100} = \frac{25 \times 1}{25 \times 4} = 1 : 4$$

$$\text{And, } ₹ 40 : ₹ 160 = \frac{40}{160} = \frac{1}{4} = 1 : 4$$

So, 25 cm : 1 m = ₹ 40 : ₹ 160

Therefore, the ratios are in proportion, i.e.,

$$25 : 1 :: 40 : 60$$

The middle terms are 1 m and ₹ 40 and extreme terms are 25 cm and ₹ 160.

(ii) 39 liters : 65 liters =  $\frac{39}{65} = \frac{13 \times 3}{13 \times 5} = \frac{3}{5} = 3 : 5$

$$\text{and, } 6 \text{ bottles} = \frac{6}{30} = \frac{3 \times 2}{5 \times 2} = \frac{3}{5} = 3 : 5$$

So, 39 liters : 65 liters = 6 bottles : 10 bottles

Therefore, the ratio are in proportion, i.e.,

$$39 : 65 :: 6 : 10$$

The middle terms are 65 liters and 6 bottles and extreme terms are 39 liters and 10 bottles.

(iii) 2 kg : 80 kg =  $\frac{2}{80} = \frac{2 \times 1}{2 \times 40} = \frac{1}{40} = 1 : 40$

$$\text{And, } 25 \text{ g} : 625 \text{ g} = \frac{25}{625} = \frac{25 \times 1}{25 \times 25} = \frac{1}{25} = 1 : 25$$

Therefore, ratio are not in proportion, i.e., 2 : 80  $\neq$  25 : 625.

(iv) Here, the two quantities are not in same unit, therefore, we convert then in same unit.

$$2.5 \text{ liters} = 2.5 \times 1000 \text{ mL} = 2500 \text{ mL}$$

$$\text{Now, } 200 \text{ mL} : 2500 \text{ mL} = \frac{200}{2500} = \frac{2}{25} = 2 : 25$$

$$\text{and, } ₹ 4 : ₹ 50 = \frac{4}{50} = \frac{2 \times 2}{2 \times 25} = 2 : 25$$

so, 200 mL : 2.5 L = ₹ 4 : ₹ 50

Therefore, the ratio are in proportion, i.e.,  $200 : 25 :: 4 : 50$

The middle terms are 2.5 L and ₹4 and extreme terms are 200 mL and ₹ 50.

**7. Determine if the following are in proportion.**

(i) 15, 45, 40, 120

(ii) 33, 121, 9, 96

(iii) 24, 28, 36, 48

(iv) 32, 48, 70, 210

(v) 33, 44, 75, 100

Ratio of 15 and 45 =  $\frac{15}{45} = \frac{15 \times 1}{15 \times 3} = \frac{1}{3} = 1:3$

Ratio of 40 and 120 =  $\frac{40}{120} = \frac{40 \times 1}{40 \times 3} = \frac{1}{3} = 1:3$

Since,  $15:45 = 40:120$

Therefore, 15, 45, 40, 120 are in proportion.

(i) Ratio of 33 and 121 =  $\frac{33}{121} = \frac{11 \times 3}{11 \times 11} = \frac{3}{11} = 3:11$

Ratio of 9 and 96 =  $\frac{9}{96} = \frac{3 \times 3}{32 \times 3} = \frac{3}{32} = 3:32$

Since  $33:121 \neq 9:96$

Therefore, 33, 121, 9, 96 are not proportion.

(ii) Ratio of 24 and 28 =  $\frac{24}{28} = \frac{6 \times 4}{7 \times 4} = \frac{6}{7} = 6:7$

Ratio of 36 and 48 =  $\frac{36}{48} = \frac{12 \times 3}{12 \times 4} = \frac{3}{4} = 3:4$

Since  $24:28 \neq 36:48$

Therefore, 24, 28, 36, 48 are not in proportion.

(iii) Ratio of 32 and 48 =  $\frac{32}{48} = \frac{16 \times 2}{16 \times 3} = \frac{2}{3} = 2:3$

Ratio of 70 and 210 =  $\frac{70}{210} = \frac{70 \times 1}{70 \times 3} = \frac{1}{3} = 1:3$

Since  $32:48 \neq 70:210$

Therefore, 32, 48, 70, 210 are not in proportion.

(iv) Ratio of 33 and 44 =  $\frac{33}{44} = \frac{11 \times 3}{11 \times 4} = \frac{3}{4} = 3:4$

Ratio 75 and 100 =  $\frac{75}{100} = \frac{25 \times 3}{25 \times 4} = \frac{3}{4} = 3:4$

Since  $33:44 = 75:100$

Therefore, 33, 44, 75, 100 are in proportion.

**8. Find the value of x in each of the following proportions:**

(i) 55: 11: :x: 6

(ii) 27: x : : 63: 84

(iii) 51: 85 : : 57: x

(iv) x: 92: 87: 116

(i) Clearly, Product of means = Product of extremes

$$\therefore x \times 11 = 55 \times 6$$

$$x = \frac{55 \times 6}{11}$$

$$x = 5 \times 6 = 30$$

(ii) We know,

Product of means = Product of extremes

$$\therefore x = 63 = 27 \times 84$$

$$x = \frac{27 \times 84}{63}$$

Hence,  $x = 36$

(iii) We know,

Product of means = Product of extremes

$$85 \times 57 = x \times 51$$

$$x = \frac{85 \times 57}{51} = 95$$

(iv) We know,

Product of means = Product of extremes

$$92 \times 87 = x \times 116$$

$$x = \frac{92 \times 87}{116} = 69$$

9. BachhuManjhi earns ₹ 24000 in 8 months. At this rate,

(i) How much does he earn in one year?

(ii) In how many months does he earn ₹ 42000?

(i) BachhuManjhi 8 months earns = ₹ 24000

$$\text{BachhuManjhi 1 month earns} = \frac{\text{₹}24000}{8} = \text{₹}3000$$

$$\therefore \text{Bachhu Manjhi 1 year earns} = \text{₹}3000 \times 12 = \text{₹}36000 \text{ (1 year = 12 months)}$$

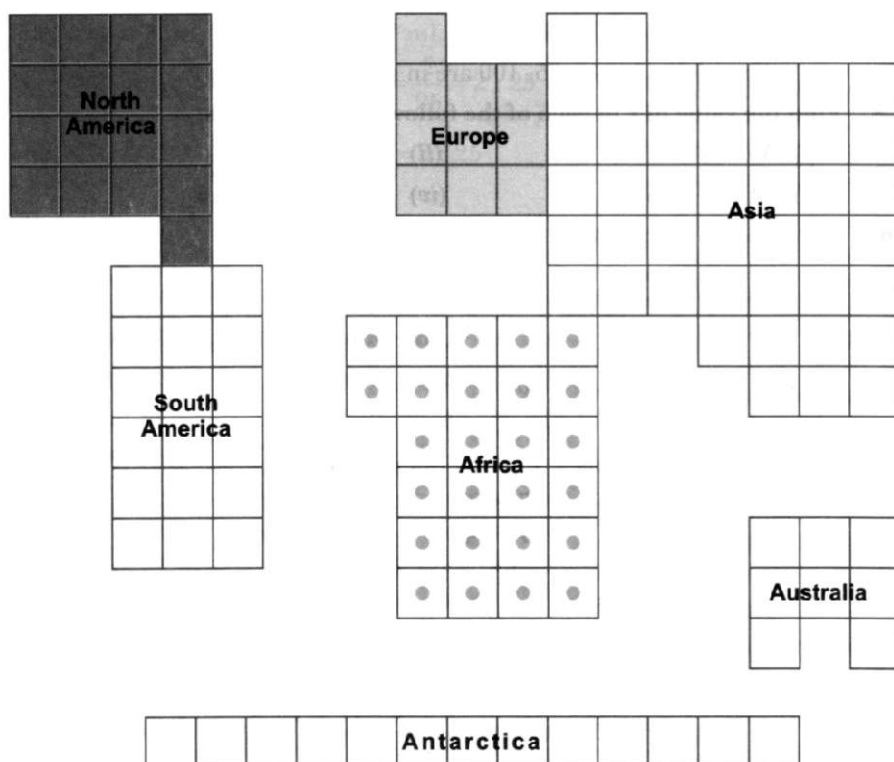
(ii) BachhuManjhi 1 month earns = ₹ 3000

$$\text{Months took to earn ₹ 42000} = \frac{\text{₹}42000}{3000} = 14 \text{ months}$$

$$\therefore \text{BachhuManjhi in 14 months to earns} = \text{₹}42000.$$

10. In figure the comparative areas of the continents are given:

What is the ratio of the areas of?



- (i) Africa to Europe
- (ii) Australia to Asia
- (iii) Antarctica to combined area of North America and South America.

(i) Area of Africa = No. of squares in Africa region = 26  
 Area of Europe = No. of squares in Europe region = 10  
 $\therefore$  Required ratio is 26: 10

$$= \frac{26}{10} = \frac{13 \times 2}{5 \times 2} = \frac{13}{5} = 13:5$$

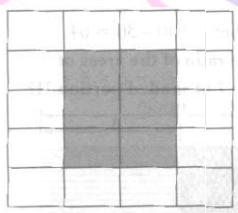
(ii) Area of Australia = No. of squares in Australia region = 8  
 Area of Asia = No. of squares in Asia region = 44  
 $\therefore$  Required ratio is 8: 44

$$= \frac{8}{44} = \frac{2 \times 4}{11 \times 4} = \frac{2}{11} = 2:11$$

Ratio is 2: 11.

(iii) Area of Antarctica = No. of squares in Antarctica region = 13  
 Area of North America = No. of squares in North America region = 17  
 Area of South America = No. of squares in South America region = 18  
 Combined Area of North and South America = 17 + 18 = 35  
 $\therefore$  Required ratio is 13: 35.

11. In a floral design made from tiles each of dimensions 40 cm by 60 cm (See Figure) find the ratio of:



- (i) The perimeter of shaded portion to the perimeter of the whole design.
- (ii) The area of the shaded portion to the area of the unshaded portion.

(i) Ratio =  $\frac{\text{Perimeter of shaded portion}}{\text{Perimeter of whole design}}$   
 $= \frac{480 \text{ cm}}{880 \text{ cm}} = \frac{6}{11} = 6:11$

(ii) Ratio =  $\frac{\text{Area of shaded portion}}{\text{Area of unshaded portion}}$   
 $= \frac{2400 \times 6 \text{ cm}^2}{2400 \times 14 \text{ cm}^2} = \frac{3}{7} = 3:7.$

12. 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 ₹ 17, then what amount will she be required to pay for her medical bill for 15 days?

Number of iron tablets taken in a day = 2

Number of iron tablets taken in 15 days = 2 × 15 = 30

Cost of 10 tablets = ₹17

Cost of tablets = ₹17 ÷ 10 = ₹1.7

Cost of 30 tablets = ₹ 1.7 × 30 = ₹ 51

## I. High Order Thinking Skills (HOTS)

1. 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?

Length of school ground = 150 m

Breadth of school ground = 90 m

$$\begin{aligned}\text{So, ratio of school ground} &= \frac{150}{90} \\ &= \frac{5}{3} = 5 : 3\end{aligned}$$

Now, Length of mela ground = 210 m

Breadth of mela ground = 126 m

$$\text{So, Ratio of mela ground} = \frac{210}{126} = \frac{5}{3} = 5 : 3$$

Therefore, Ratio of school ground = Ratio of mela ground,  
i.e., 5:3 : 5:3. So, measurements are in proportion.

2. 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.

Given, the ratio of zinc and copper in alloy = 7:9 and total weight of alloy = 8 kg

Let the weight of zinc and copper in alloy =  $7x : 9x$  [where,  $x$  is a multiple of weight]

Then, total weight of both ratios =  $7x + 9x = 16x$

If total weight of alloy is equal to the total weight of both ratios, then

$$16x = 8 \text{ kg}, x = \frac{8}{16}, x = \frac{1}{2}$$

$$\therefore \text{Weight of copper in alloy} = 9x = 9 \times \frac{1}{2}$$

$$= \frac{9}{2} \text{ kg} = 4\frac{1}{2} \text{ kg}$$

Hence, the weight of copper is  $4\frac{1}{2}$  kg.

## II. High Order Thinking Skills (HOTS)

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

Let one number be  $x$

So, the other number is  $100 - x$

and  $\frac{x}{100-x} = \frac{9}{16}$

$$16x = 9(100 - x)$$

$$16x = 900 - 9x$$

$$16x + 9x = 900$$

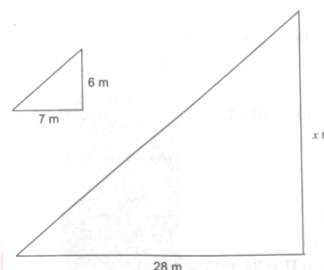
$$25x = 900 \Rightarrow x = \frac{900}{25} = 36$$



2. The shadow of a 6 m long stick is 7 m long. At the same time of the day, if the shadow of a flagstaff?

Let the length of the flagstaff be  $x$  m

$$\begin{aligned} \therefore x : 6 &= 28 : 7 \\ \frac{x}{6} &= \frac{28}{7} \\ x &= \frac{28 \times 6}{7} = 24 \text{ m.} \end{aligned}$$



### Value Based questions

1. (i) A worker is paid Rs 162.50 for 5 days. What should be paid to him for 28 days  
(ii) If 25, 35, 35,  $x$  are in continued proportion, find the value of  $x$ .

(i) The payment for 5 days = Rs 162.50

Then, the payment for 1 day = Rs  $\left[\frac{162.50}{5}\right]$

$$\begin{aligned} \text{Thus, the payment for 28 days} &= \text{Rs } \frac{162.50}{5} \times 28 \\ &= \text{Rs } (32.50 \times 28) \\ &= \text{Rs } 910.10 \end{aligned}$$

(ii)  $25 \times x = 35 \times 35$

or  $x = \frac{35 \times 35}{25}$

or  $x = 7 \times 7 = 49$

or  $x = 49$

2. (i) The weight of 45 folding chairs is 18 kg. How many chairs can be loaded on a truck having a capacity of carrying 4000 kg load?  
(ii) If the ratio of length and breadth of a rectangle is 6:5 and its perimeter is 88 cm, then find its length and breadth.

(i) Since, the number of chairs in 18 kg weight = 45

Then, the number of chairs in 1 kg weight =  $\frac{45}{18}$

$$\begin{aligned} \text{Therefore, the number of chairs in 4000 kg weight} \\ &= \frac{45}{18} \times 4000 = 10,000. \end{aligned}$$

(ii) Let  $l = 6x$  and  $b = 5x$ , then

$$\text{Perimeter} = 2(l + b)$$

$$\Rightarrow 88 \text{ cm} = 2(5x + 6x)$$

or  $2 \times 11x = 88 \text{ cm}$

or  $x = \frac{88}{2 \times 11} = \frac{8}{2} = 4$

Hence  $b = 5x = 5 \times 4 = 20 \text{ cm}$  and  $l = 6x$

$$\Rightarrow l = 6 \times 4 = 24 \text{ cm}$$

Hence, length = 24 cm

And breadth = 20 cm.