

## CLASS 6 | LESSON 12 | RATIO AND PROPORTION

### EXERCISE 12.1

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

a) What is the ratio of number of girls to the number of boys?

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

Answer:

a) Ratio of number of girls to the number of boys = 20: 15

$$20: 15 = \frac{20}{15} \div \frac{5}{5} = \frac{4}{3} = 4:3$$

b) Total number of students = 20 + 15 = 35

Ratio of number of girls to the total number of students = 20:35

$$20:35 = \frac{20}{35} \div \frac{5}{5} = \frac{4}{7} = 4:7$$

2. Out of 30 students in a class, 6 like football, 12 like cricket and remaining like tennis. Find the ratio of

a) Number of students liking football to number of students liking tennis.

b) Number of students liking cricket to total number of students.

Answer:

a) The number of students liking football = 6

Total number of students in the class = 30

The number of students liking tennis = 30 – (6 + 12) = 30 – 18 = 12

The ratio of number of students liking football to number of students liking tennis = 6:12 =  $\frac{6}{12} \div \frac{6}{6} = \frac{1}{2} = 1:2$

b) Number of students liking cricket = 12

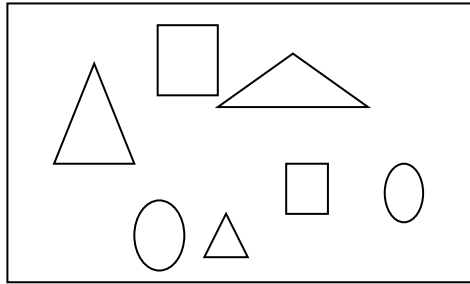
The ratio of number of students liking cricket to total number of students = 12: 30 =  $\frac{12}{30} \div \frac{6}{6} = \frac{2}{5} = 2: 5$

3. See the figure and find the ratio of

a) Number of triangles to the number of circles inside the rectangle.

b) Number of squares to all the figures inside the rectangle.

c) Number of circles to all the figures inside the rectangle.



Answer:

Number of triangles = 3

Number of circles = 2

Number of squares = 2

a) The ratio of number of triangles to the number of circles = 3:2

b) The ratio of number of squares to all the figures = 2: 7

c) The ratio of number of circles to all the figures = 2:7

4. Distances travelled by Hamid and Akhtar in an hour are 9 km and 12 km. Find the ratio of speed of Hamid to the speed of Akhtar.

Answer:

The ratio of speed of Hamid to the speed of Akhtar = 9:12 =  $\frac{9}{12} \div \frac{3}{3} = \frac{3}{4} = 3:4$

5. Fill in the following blanks:

$\frac{15}{18} = \frac{\quad}{6} = \frac{10}{30}$  [Are these equivalent ratios?]

Answer:

$$\frac{15}{18} \div \frac{3}{3} = \frac{5}{6}$$

$$\frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$$

$$\frac{5}{6} \times \frac{5}{5} = \frac{25}{30}$$

All these are equivalent ratios.

6. Find the ratio of the following:

a) 81 to 108

b) 98 to 63

c) 33 km to 121 km

d) 30 minutes to 45 minutes

Answer:

$$a) \frac{81}{108} \div \frac{27}{27} = \frac{3}{4} = 3:4$$

$$b) \frac{98}{63} \div \frac{7}{7} = \frac{14}{9} = 14:9$$

$$c) \frac{33}{121} \div \frac{11}{11} = \frac{3}{11} = 3:11$$

$$d) \frac{30}{45} \div \frac{15}{15} = \frac{2}{3}$$

7. Find the ratio of the following:

a) 30 minutes to 1.5 hours

b) 40 cm to 1.5 m

c) 55 paise to Re 1

d) 500 ml to 2 litres

Answer:

a) 1.5 hours = 90 minutes

$$30:1.5 = 30:90 = \frac{30}{90} \div \frac{30}{30} = \frac{1}{3} = 1:3$$

b) 1.5 m = 150 cm

$$40:1.5 = 40:150 = \frac{40}{150} \div \frac{10}{10} = \frac{4}{15} = 4:15$$

c) Re 1 = 100 paise

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

d) 2 litres = 2000 ml

$$500:2000 = \frac{500}{2000} \div \frac{500}{500} = \frac{1}{4} = 1:4$$

8. In a year, Seema earns Rs 1, 50,000 and saves 50,000. Find the ratio of

a) Money that Seema earns to the money she saves.

b) Money that she saves to the money she spends.

Answer:

a) The ratio of money that Seema earns to the money she saves = 1,50,000:50,000 =  $\frac{150000}{50000} \div \frac{10000}{10000} = \frac{15}{5}$   
 $= \frac{3}{1} = 3:1$

b) Total money she earned = 150000

Money she saved = 50000

Money she spend = 150000 – 50000 = 100000

The ratio of money that she saves to the money she spends = 50000:100000 =  $\frac{50000}{100000} \div \frac{10000}{10000} = \frac{5}{10} = \frac{1}{2} =$   
1:2

9. There are 102 teachers in a school of 3300 students. Find the ratio of the number of teachers to the number of students.

Answer:

Number of teachers = 102

Number of students = 3300

The ratio of the number of teachers to the number of students = 102:3300 =  $\frac{102}{3300} \div \frac{6}{6} = \frac{17}{550} = 17:550$

10. In a college, out of 4320 students, 2300 are girls. Find the ratio of

a) Number of girls to the total number of students.

b) Number of boys to the number of girls.

c) Number of boys to the total number of students.

Answer:

The number of students in a college = 4320

Number of girls = 2300

Number of boys = 4320 – 2300 = 2020

a) The ratio of number of girls to the total number of students = 2300:4320 =  $\frac{2300}{4320} \div \frac{20}{20} = \frac{115}{216} = 115:216$

b) The ratio of number of boys to the number of girls =  $2020:2300 = \frac{2020}{2300} \div \frac{20}{20} = \frac{101}{115} = 101:115$

c) The ratio of number of boys to the total number of students =  $2020:4320 = \frac{2020}{4320} \div \frac{20}{20} = \frac{101}{216} = 101:216$

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

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

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

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

Answer:

Total number of students = 1800

Number of students who opted basketball = 750

Number of students who opted cricket = 800

Number of students who opted table tennis =  $1800 - (750 + 800) = 1800 - 1550 = 250$

a) The ratio of number of students who opted basketball to table tennis =  $750:250 = \frac{750}{250} \div \frac{250}{250} = \frac{3}{1} = 3:1$

b) The ratio of number of students who opted cricket to basketball =  $800:750 = \frac{800}{750} \div \frac{50}{50} = \frac{16}{15} = 16:15$

c) The ratio of number students who opted basketball to the total number of students =  $750:1800 = \frac{750}{1800} \div \frac{150}{150} = \frac{5}{12} = 5:12$

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

Answer:

Cost of 12 pens = 180

Cost of 1 pen =  $180 \div 12 = 15$

Cost of 8 ball pens = 56

Cost of 1 ball pen =  $56 \div 8 = 7$

The ratio of the cost of a pen to the cost of a ball pen = 15:7.

13. Consider the statement: Ratio of breadth and length of a hall is 2:5. Complete the following table that shows some possible breadths and lengths of the hall.

|                                 |    |    |    |
|---------------------------------|----|----|----|
| Breadth of the hall (in metres) | 10 |    | 40 |
| Length of the hall(in metres)   | 25 | 50 |    |

Answer: Given ratio of breadth and length of a hall is 2:5.

Given length = 50m

Also breadth: length = 2:5

$$\frac{\text{Breadth}}{50} = \frac{2}{5}$$

By cross multiplication, 5 x breadth = 50 x 2

$$\text{Breadth} = \frac{50 \times 2}{5} = \frac{100}{5} = 20 \text{ m}$$

Given Breadth = 40m

$$\text{Therefore, } \frac{40}{\text{length}} = \frac{2}{5}$$

By cross multiplication, 40 x 5 = 2 x length

$$\text{Length} = \frac{40 \times 5}{2} = \frac{200}{2} = 100 \text{ m}$$

14. Divide 20 pens between Sheela and Sangeetha in the ratio of 3:2.

Answer:

Given ratio = 3:2

Total number of parts = 3 + 2 = 5

Thus Sheela will get  $\frac{3}{5}$  of 20 pens and Sangeetha will get  $\frac{2}{5}$  of 20 pens.

Thus number of pens Sheela will get =  $\frac{3}{5} \times 20 = \frac{60}{5} = 12$  pens

The number of pens Sangeetha will get =  $\frac{2}{5} \times 20 = \frac{40}{5} = 8$  pens.

15. Mother wants to divide Rs 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?

Answer:

The ratio of their ages = 15:12

Total number of parts =  $15 + 12 = 27$

$$\text{Shreya's share} = \frac{15}{27} \times 36 = \frac{540}{27} = 20 \text{ Rs}$$

$$\text{Bhoomika's share} = \frac{12}{27} \times 36 = \frac{432}{27} = 16 \text{ Rs}$$

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

- Present age of father to the present age of son.
- Age of the father to the age of son when son was 12 years old.
- Age of father after 10 years to the age of son after 10 years.
- Age of father to the age of son when father was 30 years old.

Answer:

a) Given present age of father = 42 years

Present age of son = 14 years

$$\text{The ratio of the present age of father to the present age of son} = 42:14 = \frac{42}{14} \div \frac{14}{14} = \frac{3}{1} = 3:1$$

b) When son was 12 years old, father's age = 40 years.

$$\text{Then the ratio of the age of the father to the son} = 40:12 = \frac{40}{12} \div \frac{4}{4} = \frac{10}{3} = 10:3$$

c) After 10 years, father's age = 52 years

Son's age = 24 years

$$\text{Then the ratio of age of father to the age of son} = 52:24 = \frac{52}{24} \div \frac{4}{4} = \frac{13}{6} = 13:6$$

d) When father was 30 years old, son's age = 2 years

$$\text{Then the ratio of age of father to the age of son} = 30:2 = \frac{30}{2} \div \frac{2}{2} = \frac{15}{1} = 15:1$$

