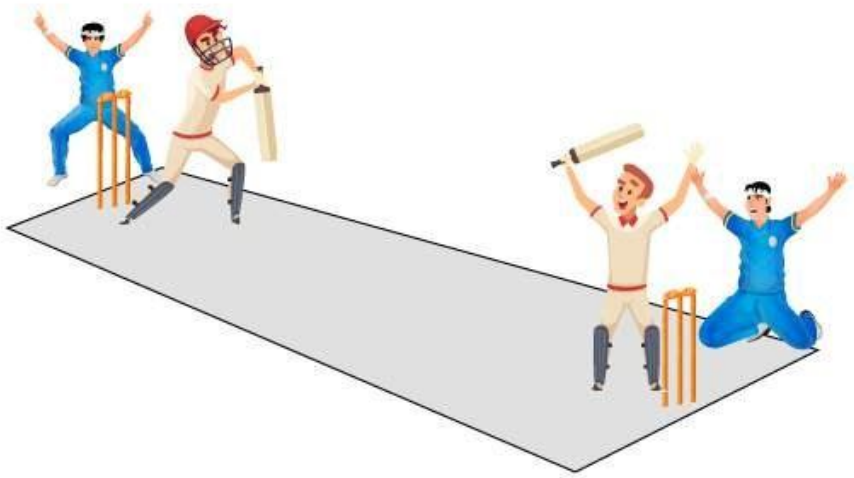
EXERCISE 12.1 PAGE NO: 251

1. There are 20 girls and 15 boys in a class.
(a) What is the ratio of number of girls to the number boys?
(b) What is the ratio of number of girls to the total number of students in the class?
Solutions:

Given
Number of girls = 20 girls
Number of boys = 15 boys
Total number of students = 20 + 15
= 35
(a) Ratio of number of girls to number of boys = 20 / 15 = 4 / 3
(b) Ratio of number of girls to total number of students = 20 / 35 = 4 / 7

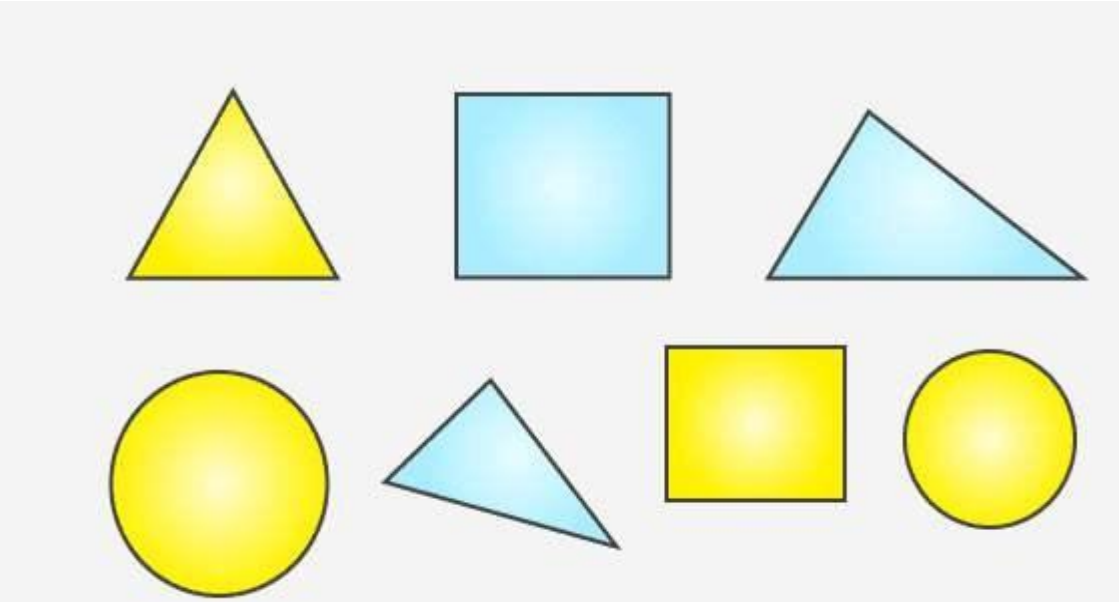
2. Out of 30 students in a class, 6 like football, 12 like cricket and remaining like tennis. Find the ratio of



(a) Number of students liking football to number of students liking tennis.
(b) Number of students liking cricket to total number of students.
Solutions:

Given
Number of students who like football = 6
Number of students who like cricket = 12
Number of students who like tennis = 30 – 6 – 12
= 12
(a) Ratio of number of students liking football to the number of students liking tennis
= 6 / 12 = 1 / 2
(b) Ratio of number of students liking cricket to total number of
= 12 / 30
= 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.

Solutions:

Given in the figure
Number of triangles = 3
Number of circles = 2
Number of squares = 2
Total number of figures = 7
(a) Ratio of number of triangles to the number of circles inside the rectangle
= 3 / 2
(b) Ratio of number of squares to all the figures inside the rectangle
= 2 / 7
(c) Ratio of number of circles to all the figures inside the rectangle
= 2 / 7

4. Distance 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.

Solutions:

We know that the speed of a certain object is the distance travelled by that object in an hour
Distance travelled by Hamid in one hour = 9 km
Distance travelled by Akhtar in one hour = 12 km
Speed of Hamid = 9 km/hr
Speed of Akhtar = 12 km/hr
Ratio of speed of Hamid to the speed of Akhtar = 9 / 12 = 3 / 4

5. Fill in the following blanks:
15 / 18 = ☐ / 6 = 10 / ☐ = ☐ / 30 [Are these equivalent ratios?]

Solutions:
15 / 18 = (5 × 3) / (6 × 3)
= 5 / 6
5 / 6 = (5 × 2) / (6 × 2)
= 10 / 12
5 / 6 = (5 × 5) / (6 × 5)
= 25 / 30
Hence, 5, 12 and 25 are the numbers which come in the blanks respectively. Yes, all 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

Solutions:
(a) 81 / 108 = (3 × 3 × 3 × 3) / (2 × 2 × 3 × 3 × 3)
= 3 / 4
(b) 98 / 63 = (14 × 7) / (9 × 7)
= 14 / 9
(c) 33 / 121 = (3 × 11) / (11 × 11)
= 3 / 11
(d) 30 / 45 = (2 × 3 × 5) / (3 × 3 × 5)
= 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 ☐ 1
(d) 500 ml to 2 litres
Solutions:
(a) 30 minutes to 1.5 hours
30 min = 30 / 60
= 0.5 hours
Required ratio = (0.5 × 1) / (0.5 × 3)
= 1 / 3
(b) 40 cm to 1.5 m
1.5 m = 150 cm
Required ratio = 40 / 150
= 4 / 15

(c) 55 paise to □ 1

□ 1 = 100 paise

Required ratio = 55 / 100 = (11 × 5) / (20 × 5)

= 11 / 20

(d) 500 ml to 2 litres

1 litre = 1000 ml

2 litre = 2000 ml

Required ratio = 500 / 2000 = 5 / 20 = 5 / (5 × 4)

= 1 / 4

8. In a year, Seema earns □ 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.

Solutions:

Money earned by Seema = □ 150000

Money saved by her = □ 50000

Money spent by her = □ 150000 - □ 50000 = □ 100000

(a) Ratio of money earned to money saved = 150000 / 50000 = 15 / 5

= 3 / 1

(b) Ratio of money saved to money spent = 50000 / 100000 = 5 / 10

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.

Solutions:

Given

Number of teachers in a school = 102

Number of students in a school = 3300

Ratio of number of teachers to the number of students = 102 / 3300

= (2 × 3 × 17) / (2 × 3 × 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.

Solutions:

Given

Total number of students = 4320

Number of girls = 2300

Number of boys = 4320 – 2300

= 2020

(a) Ratio of number of girls to the total number of students = 2300 / 4320
= (2 × 2 × 5 × 115) / (2 × 2 × 5 × 216)
= 115 / 216
(b) Ratio of number of boys to the number of girls = 2020 / 2300
= (2 × 2 × 5 × 101) / (2 × 2 × 5 × 115)
= 101 / 115
(c) Ratio of number of boys to the total number of students = 2020 / 4320
= (2 × 2 × 5 × 101) / (2 × 2 × 5 × 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.
Solutions:
(a) Ratio of number of students who opted basketball to the number of students who opted table tennis = 750 / 250 = 3 / 1
(b) Ratio of number of students who opted cricket to the number of students opting basketball
= 800 / 750 = 16 / 15
(c) Ratio of number of students who opted basketball to the total number of students
= 750 / 1800 = 25 / 60 = 5 / 12

12. Cost of a dozen pens is □ 180 and cost of 8 ball pens is □ 56. Find the ratio of the cost of a pen to the cost of a ball pen.
Solutions:
Cost of a dozen pens = □ 180
Cost of 1 pen = 180 / 12
= □ 15
Cost of 8 ball pens = □ 56
Cost of 1 ball pen = 56 / 8
= □ 7
Hence, required ratio is 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.
Solutions:
(i) Length = 50 m
Breadth / 50 = 2 / 5
By cross multiplication
5 × breadth = 50 × 2
Breadth = (50 × 2) / 5
= 100 / 5

= 20 m

(ii) Breadth = 40 m

40 / Length = 2 / 5

By cross multiplication

2 × Length = 40 × 5

Length = (40 × 5) / 2

Length = 200 / 2

Length = 100 m

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

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

Solutions:

Terms of 3: 2 = 3 and 2

Sum of these terms = 3 + 2

= 5

Now Sheela will get 3 / 5 of total pens and Sangeeta will get 2 / 5 total pens

Number of pens having with Sheela = 3 / 5 × 20

= 3 × 4

= 12

Number of pens having with Sangeeta = 2 / 5 × 20

= 2 × 4

= 8

15. 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.

Solutions:

Ratio of ages = 15 / 12
= 5 / 4
Hence, mother wants to divide □ 36 in the ratio of 5: 4
Terms of 5: 4 are 5 and 4
Sum of these terms = 5 + 4
= 9
Here Shreya will get 5 / 9 of total money and Sangeeta will get 4 / 9 of total money
The amount Shreya get = 5 / 9 × 36
= 20
The amount Sangeeta get = 4 / 9 × 36
= 16

Therefore Shreya will get □ 20 and Sangeeta will get □ 16

16. Present age of father is 42 years and that of his son is 14 years. Find the ratio of
(a) Present age of father to the present age of son
(b) Age of the father to the age of son, when son was 12 years old.
(c) Age of father after 10 years to the age of son after 10 years.
(d) Age of father to the age of son when father was 30 years old. Solutions:

(a) Present age of father = 42 years
Present age of son = 14 years
Required ratio 42 / 14
= 3 / 1

(b) The son was 12 years old 2 years ago. So the age father 2 years ago will be
= 42 – 2 = 40 years
Required ratio = 40 / 12 = (4 × 10) / (4 × 3) = 10 / 3

(c) After ten years age of father = 42 + 10 = 52 years
After 10 years age of son = 14 + 10 = 22 years
Required ratio = 52 / 24 = (4 × 13) / (4 × 6)
= 13 / 6

(d) 12 years ago, age of father was 30
At that time age of son = 14 – 12
= 2 years
Required ratio = 30 / 2 = (2 × 15) / 2
= 15 / 1

EXERCISE 12.2 PAGE NO: 255

1. Determine if the following are in proportion.

(a) 15, 45, 40, 120
(b) 33, 121, 9, 96
(c) 24, 28, 36, 48
(d) 32, 48, 70, 210
(e) 4, 6, 8, 12
(f) 33, 44, 75, 100

Solutions:

(a) 15, 45, 40, 120
15 / 45 = 1 / 3
40 / 120 = 1 / 3
Hence, 15: 45 = 40:120
∴ These are in a proportion

(b) 33, 121, 9, 96
33 / 121 = 3 / 11
9 / 96 = 3 / 32
Hence 33:121 ≠ 9: 96
∴ These are not in a proportion

(c) 24, 28, 36, 48
24 / 28 = 6 / 7
36 / 48 = 3 / 4
Hence, 24: 28 ≠ 36:48
∴ These are not in a proportion

(d) 32, 48, 70, 210
32 / 48 = 2 / 3
70 / 210 = 1 / 3
Hence, 32: 48 ≠ 70: 210
∴ These are not in a proportion

(e) 4, 6, 8, 12
4 / 6 = 2 / 3
8 / 12 = 2 / 3
Hence 4: 6 = 8: 12
∴ These are in a proportion

(f) 33, 44, 75, 100
33/ 44 = 3/ 4
75 / 100 = 3 / 4
Hence, 33:44 = 75: 100
∴ These are in a proportion

2. Write True (T) or False (F) against each of the following statements :

(a) 16 : 24 :: 20 : 30
(b) 21: 6 :: 35 : 10
(c) 12 : 18 :: 28 : 12
(d) 8 : 9 :: 24 : 27
(e) 5.2 : 3.9 :: 3 : 4
(f) 0.9 : 0.36 :: 10 : 4

Solutions:

(a) 16: 24 :: 20: 30
16 / 24 = 2 / 3
20 / 30 = 2 / 3
Hence, 16: 24 = 20: 30
Therefore True

(b) 21: 6:: 35: 10
21 / 6 = 7 / 2
35 / 10 = 7 / 2
Hence, 21: 6 = 35: 10
Therefore True

(c) 12: 18 :: 28: 12
12 / 18 = 2 / 3
28 / 12 = 7 / 3
Hence, 12: 18 ≠ 28:12
Therefore False

(d) 8: 9:: 24: 27
We know that = 24 / 27 = (3 × 8) / (3 × 9)
= 8 / 9
Hence, 8: 9 = 24: 27
Therefore True

(e) 5.2: 3.9:: 3: 4
As 5.2 / 3.0 = 4 / 3
Hence, 5.2: 3.9 ≠ 3: 4
Therefore False

(f) 0.9: 0.36:: 10: 4
0.9 / 0.36 = 90 / 36
= 10 / 4
Hence, 0.9: 0.36 = 10: 4
Therefore True

3. Are the following statements true?
(a) 40 persons : 200 persons = □ 15 : □ 75
(b) 7.5 litres : 15 litres = 5 kg : 10 kg
(c) 99 kg : 45 kg = □ 44 : □ 20

(d) 32 m : 64 m = 6 sec : 12 sec
(e) 45 km : 60 km = 12 hours : 15 hours
Solutions:

(a) 40 persons : 200 persons = □ 15 : □ 75
40 / 200 = 1 / 5
15 / 75 = 1 / 5
Hence, True

(b) 7.5 litres : 15 litres = 5 kg : 10 kg
7.5 / 15 = 1 / 2
5 / 10 = 1 / 2
Hence, True

(c) 99 kg : 45 kg = □ 44 : □ 20
99 / 45 = 11 / 5
44 / 20 = 11 / 5
Hence, True

(d) 32 m : 64 m = 6 sec : 12 sec
32 / 64 = 1 / 2
6 / 12 = 1 / 2
Hence, True

(e) 45 km : 60 km = 12 hours : 15 hours
45 / 60 = 3 / 4
12 / 15 = 4 / 5
Hence, False

4. Determine if the following ratios form a proportion. Also, write the middle terms and extreme terms where the ratios form a proportion.
(a) 25 cm : 1 m and □ 40 : □ 160
(b) 39 litres : 65 litres and 6 bottles : 10 bottles
(c) 2 kg : 80 kg and 25 g : 625 g (d) 200 mL : 2.5 litre and □ 4 : □ 50 Solutions:

(a) 25 cm : 1 m and □ 40 : □ 160
25 cm = 25 / 100 m
= 0.25 m
0.25 / 1 = 1 / 4
40 / 160 = 1 / 4
Yes, these are in a proportion
Middle terms are 1 m, □ 40 and Extreme terms are 25 cm, □ 160

(b) 39 litres : 65 litres and 6 bottles : 10 bottles
39 / 65 = 3 /5
6 / 10 = 3 / 5
Yes, these are in a proportion
Middle terms are 65 litres, 6 bottles and Extreme terms are 39 litres, 10 bottles

(c) 2 kg : 80 kg and 25 g : 625 g

2 / 80 = 1 / 40

25 / 625 = 1 / 25

No, these are not in a proportion

(d) 200 mL : 2.5 litre and □ 4 : □ 50

1 litre = 1000 ml

2.5 litre = 2500 ml

200 / 2500 = 2 / 5

4 / 50 = 2 / 25

Yes, these are in a proportion

Middle terms arte 2.5 litres, □ 4 and Extreme terms are 200 ml, □ 50

EXERCISE 12.3 PAGE NO: 259

1. If the cost of 7 m of cloth is □ 1470, find the cost of 5 m of cloth.

Solutions:

Given

Cost of 7 m cloth = □ 1470

Cost of 1 m cloth = 1470 / 7

= □ 210

So, cost of 5 cloth = 210 × 5 = 1050

∴ Cost of 5 m cloth is □ 1050

2. Ekta earns □ 3000 in 10 days. How much will she earn in 30 days?

Solutions:

Money earned by Ekta in 10 days = □ 3000

Money earned in one day by her = 3000 / 10

= □ 300

So, money earned by her in 30 days = 300 × 30

= □ 9000

3. 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.

Solutions:

Measure of rain in 3 days = 276 mm

Measure of rain in one day = 276 / 3

= 92 mm

So, measure of rain in one week i.e 7 days = 92 × 7

= 644 mm

= 644 / 10

= 64.4 cm

4. Cost of 5 kg of wheat is □ 91.50.

(a) What will be the cost of 8 kg of wheat?

(b) What quantity of wheat can be purchased in □ 183?

Solutions:

(a) Cost of 5 kg wheat = □ 91.50.

Cost of 1 kg wheat = 91.50 / 5

= □ 18.3

So, cost of 8 kg wheat = 18.3 × 8

= □ 146.40

(b) Wheat purchased in □ 91.50 = 5 kg

Wheat purchased in □ 1 = 5 / 91.50 kg

So, wheat purchased in □ 183 = (5 / 91.50) × 183

= 10 kg

5. The temperature dropped 15 degree celsius in the last 30 days. If the rate of temperature drop remains the same, how many degrees will the temperature drop in the next ten days?

Solutions:

Temperature drop in 30 days = 15^0 C

Temperature drop in 1 day = 15 / 30

= $(1 / 2)^0$ C

So, temperature drop in next 10 days = (1 / 2) × 10

= 5^0 C

∴ The temperature drop in the next 10 days will be 5^0 C

6. Shaina pays □ 15000 as rent for 3 months. How much does she has to pay for a whole year, if the rent per month remains same?

Solutions:

Rent paid by Shaina in 3 months = □ 15000

Rent for 1 month = 15000 / 3

= □ 5000

So, rent for 12 months i.e 1 year = 5000 × 12

= □ 60,000

∴ Rent paid by Shaina in 1 year is □ 60,000

7. Cost of 4 dozen bananas is □ 180. How many bananas can be purchased for □ 90?

Solutions:

Number of bananas bought in □ 180 = 4 dozens

= 4 × 12

= 48 bananas

Number of bananas bought in □ 1 = 48 / 180

So, number of bananas bought in □ 90 = (48 / 180) × 90

= 24 bananas

∴ 24 bananas can be purchased in □ 90

8. The weight of 72 books is 9 kg. What is the weight of 40 such books?

Solutions:

Weight of 72 books = 9 kg

Weight of 1 book = 9 / 72

= 1 / 8 kg

So, weight of 40 books = (1 / 8) × 40

= 5 kg

∴ Weight of 40 books is 5 kg

9. 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?

Solutions:

Diesel required for 594 km = 108 litres
Diesel required for 1 km = 108 / 594
= 2 / 11 litre
So, diesel required for 1650 km = (2 / 11) × 1650
= 300 litres

∴ Diesel required by the truck to cover a distance of 1650 km is 300 litres

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

Solutions:

Pens purchased by Raju in □ 150 = 10 pens
Cost of 1 pen = 150 / 10
= □ 15
Pens purchased by Manish in □ 84 = 7 pens
Cost of 1 pen = 84 / 7
= □ 12

∴Pens purchased by Manish are cheaper than Raju

11. Anish made 42 runs in 6 overs and Anup made 63 runs in 7 overs. Who made more runs per over?

Solutions:

Runs made by Anish in 6 overs = 42
Runs made by Anish in 1 over = 42 / 6
= 7
Runs made by Anup in 7 overs = 63
Runs made by Anup in 1 over = 63 / 7
= 9

∴ Anup scored more runs than Anish.