EXERCISE 6A

Express each of the given ratios in its simplest form:

(i) 22: 66
(ii) 1.5: 2.5
(iii) 6 1/4: 12 1/2
(iv) 40 kg: 1 quintal
(v) 10 paise: ₹ 1
(vi) 200 m: 5 km
(vii) 3 hours: 1 day
(viii) 6 months: 1 1/3 years
(ix) 1 1/3: 2 1/4: 2 1/2
Solution:

(i) 22: 66
It can be written as
= 22/66
We know that the HCF of 22 and 66 is 22
Dividing both numerator and denominator by 22
= (22 ÷ 22)/ (66 ÷ 22)
So we get
= 1/3
= 1: 3

(ii) 1.5: 2.5
It can be written as
= 1.5/ 2.5
Multiplying both numerator and denominator by 10
= 15/25
We know that the HCF of 15 and 25 is 5
Dividing both numerator and denominator by 5
= (15 ÷ 5)/ (25 ÷ 5)
So we get
= 3/5
= 3: 5

(iii) 6 1/4: 12 1/2
It can be written as
= 25/4: 25/2
= 25/4 × 2/25
By further calculation
= 2/4
So we get
= 1/2
= 1: 2

(iv) 40 kg: 1 quintal
We know that
1 quintal = 100 kg
= 40 kg: 100 kg

It can be written as
= 40/100
We know that the HCF of 40 and 100 is 20
Dividing both numerator and denominator by 20
= (40 ÷ 20)/ (100 ÷ 20)
So we get
= 2/5
= 2: 5

(v) 10 paise: ₹ 1
We know that
1 Rupee = 100 Paise
We get
= 10 paise: 100 paise
It can be written as
= 10/100
So we get
= 1/10
= 1: 10

(vi) 200 m: 5 km
We know that
1 km = 1000 m
We get
= 200 m: 5000 m
It can be written as
= 200/ 5000
Here the HCF of 200 and 5000 is 200
Dividing both numerator and denominator by 200
= (200 ÷ 200)/ (5000 ÷ 200)
So we get
= 1/25
= 1: 25

(vii) 3 hours: 1 day
We know that
1 day = 24 hours
We get
= 3 hours: 24 hours
It can be written as
= 3/24
So we get
= 1/ 8
= 1: 8

(viii) 6 months: 1 1/3 years
We know that
1 year = 12 months
= 6 months: 4/3 × 12 months
It can be written as
= 6 months: 16 months

= 6/ 16
Here the HCF of 6 and 16 is 2
Dividing both numerator and denominator by 2
= (6 ÷ 2)/ (16 ÷ 2)
So we get
= 3/ 8
= 3: 8

(ix) 1 1/3: 2 1/4: 2 1/2
It can be written as
= 4/3: 9/4: 5/2
We know that the LCM of 3, 4 and 2 is 12
= (16: 27: 30)/ 12
So we get
= 16: 27: 30

2. Divide 64 cm long string into two parts in the ratio 5: 3.
Solution:

We know that
The sum of ratios = 5 + 3 = 8
So the first part = 5/8 of 64 cm = 40 cm
Similarly the second part = 3/8 of 64 cm = 24 cm

3. ₹ 720 is divided between x and y in the ratio 4: 5. How many rupees will each get?
Solution:

It is given that
Total amount = ₹ 720
Ratio between x and y = 4: 5
We know that
The sum of ratios = 4 + 5 = 9
So x's share = 4/9 of ₹ 720 = ₹ 320
Similarly y's share = 5/9 of ₹ 720 = ₹ 400

4. The angles of a triangle are in the ratio 3: 2: 7. Find each angle.
Solution:

It is given that
Ratios in angles of a triangle = 3: 2: 7
We know that
The sum of ratios = 3 + 2 + 7 = 12
In a triangle, the sum of all the angles = 180°
So the first angle of the triangle = 3/12 × 180° = 45°
Second angle of the triangle = 2/12 × 180° = 30°
Similarly the third angle of the triangle = 7/12 × 180° = 105°

5. A rectangular field is 100 m by 80 m. Find the ratio of:
(i) length to its breadth
(ii) breadth to its perimeter.
Solution:

It is given that
Length of the rectangular field = 100 m
Breadth of the rectangular field = 80 m
So the perimeter = 2 (length + breadth)
= 2 (100 + 80) m
By further calculation
= 2 × 180
= 360 m

(i) Ratio of length to its breadth
= 100: 80
Here the HCF of 100 and 80 is 20
Dividing both numerator and denominator by 20
= (100 ÷ 20)/ (80 ÷ 20)
So we get
= 5/4
= 5: 4

(ii) Ratio of breadth to its perimeter
= 80: 360
Here the HCF of 80 and 360 is 40
Dividing both numerator and denominator by 40
= (80 ÷ 40)/ (360 ÷ 40)
So we get
= 2/9
= 2: 9

6. The sum of three numbers, whose ratios are 3 1/3: 4 1/5: 6 1/8 is 4917. Find the numbers.
Solution:

It is given that
Sum of three numbers = 4917
Ratio between the three numbers = 3 1/3: 4 1/5: 6 1/8
It can be written as
= 10/3: 21/5: 49/8
We know that the LCM of 3, 5 and 8 is 120
= (400: 504: 735)/ 120
So we get
= 400: 504: 735

Here the sum of ratio = 400 + 504 + 735 = 1639
So the first number = 400/1639 of 4917 = 1200
Second number = 504/1639 of 4917 = 1512
Similarly the third number = 735/1639 of 4917 = 2205

7. The ratio between two quantities is 3: 4. If the first is ₹ 810, find the second.
Solution:

It is given that
The ratio between two quantities = 3: 4
So the sum of ratio = 3 + 4 = 7
Here the second quantity = (810 × 4)/ 3
We get
= 270 × 4
= ₹ 1080

8. Two numbers are in the ratio 5: 7. Their difference is 10. Find the numbers.
Solution:

It is given that
The ratio between two numbers = 5: 7
The difference between two numbers = 7 – 5 = 2
Here if 2 is the difference, the first number is 5
Similarly if 10 if the difference, the first number = 5/2 × 10 = 25
Second number = 7/2 × 10 = 35

9. Two numbers are in the ratio 10: 11. Their sum is 168. Find the numbers.
Solution:

It is given that
The ratio between two numbers = 10: 11
Sum of ratio between two numbers = 10 + 11 = 21
Sum of two numbers = 168
So the first number = 168/21 × 10 = 80
Similarly the second number = 168/21 × 11 = 88

10. A line is divided into two parts in the ratio 2.5: 1.3. If the smaller one is 35.1 cm, find the length of the line.
Solution:

It is given that
Ratio between two parts of a line = 2.5: 1.3
Multiplying by 10
= 25: 13
Here the sum of ratios = 25 + 13 = 38
Length of smaller one = 35.1 cm
So the length of the line = 38/13 × 35.1
We get
= 38 × 2.7 cm
= 102.6 cm

11. In a class, the ratio of boys to the girls is 7:8. What part of the whole class are girls?
Solution:

It is given that

Ratio of boys to the girls = 7: 8
Here the sum of ratios = 7 + 8 = 15
So the part of the whole class are girls = 8/15

Hence, 8/15 part of the whole class are girls.

12. The population of a town is 180,000, out of which males are 1/3 of the whole population. Find the number of females. Also, find the ratio of the number of females to the whole population.
Solution:

It is given that
Total population = 180000
So the population of males = 1/3 of 180000 = 60, 000
Similarly the population of females = 180000 – 60000 = 120000
Here the ratio of females to whole population = 120000: 180000 = 2: 3

13. Ten gram of an alloy of metals A and B contains 7.5 gm of metal A and the rest is metal B. Find the ratio between:
(i) the weights of metals A and B in the alloy.
(ii) the weight of metal B and the weight of the alloy.
Solution:

We know that
Total weight of A and B metals = 10 gm A weight - 7.5 gm B weight
So we get
= 10 – 7.5
= 2.5 gm

(i) Ratio between the weight of A and B in the alloy = 7.5: 2.5
It can be written as
= 75/10: 25/10
So we get
= 3: 1

(ii) Ratio between the weight of metal B and the weight of the alloy = 2.5: 10
It can be written as
= 25/10: 10
So we get
= 25: 100
= 1: 4

14. The ages of two boys A and B are 6 years and 8 months and 7 years and 4 months respectively. Divide ₹ 3,150 in the ratio of their ages.
Solution:

It is given that
Age of A = 6 years 8 months
It can be written as
= 6 × 12 + 8
= 72 + 8

= 80 months
Age of B = 7 years 4 months
It can be written as
= 7 × 12 + 4
= 84 + 4
= 88 months
So the ratio between them = 80: 88 = 10: 11
Amount = ₹ 3150
We know that
Sum of ratio between them = 10 + 11 = 21
Here A share = (3150 × 10)/ 21 = ₹ 1500
Similarly B share = (3150 × 11)/ 21 = ₹ 1650

15. Three persons start a business and spend ₹ 25,000, ₹ 15,000 and ₹ 40,000 respectively. Find the share of each out of a profit of ₹ 14,400 in a year.
Solution:

It is given that
Investment of A = ₹ 25000
Investment of B = ₹ 15000
Investment of C = ₹ 40000
Here the ratio between their investment = 25000: 15000: 40000 = 5: 3: 8
So the sum of ratios = 5 + 3 + 8 = 16
Total profit = ₹ 14400
Share of A = 14400/16 × 5 = ₹ 4500
Share of B = 14400/16 × 3 = ₹ 2700
Share of C = 14400/16 × 8 = ₹ 7200

16. A plot of land, 600 sq m in area, is divided between two persons such that the first person gets three-fifths of what the second gets. Find the share of each.
Solution:

It is given that
Area of plot of land = 600 sq m
Consider second share = x
So first share = 3/5 x
Here the ratio between them = 3/5x: x
We get
= 3/5: 1
= 3: 5
Sum of the ratio between them = 3 + 5 = 8
So the share of first person = 600/8 × 3 = 225 sq m
Similarly the share of second person = 600/8 × 5 = 375 sq m

17. Two poles of different heights are standing vertically on a horizontal field. At a particular time, the ratio between the lengths of their shadows is 2: 3. If the height of the smaller pole is 7.5 m, find the height of the other pole.
Solution:

It is given that

Ratio between the shadows of two poles = 2: 3
We know that the height of smaller pole = 7.5 m
So the height of taller pole = (7.5 × 3)/ 2
On further calculation
= 22.5/ 2
= 11.25 m

18. Two numbers are in the ratio 4: 7. If their L.C.M. is 168, find the numbers.
Solution:

It is given that
Ratio between two numbers = 4: 7
LCM of two numbers = 168
Consider first number = 4x
Second number = 7x
Now the LCM of 4x and 7x = 4 × 7 × x = 28x
By equating both the values
28x = 168
So we get
x = 168/28 = 6
So the required numbers
4x = 4 × 6 = 24
7x = 7 × 6 = 42

19. ₹ 300 is divided between A and B in such a way that A gets half of B. Find:
(i) the ratio between the shares of A and B.
(ii) the share of A and the share of B.
Solution:

Amount divided between A and B = ₹ 300

(i) We know that A gets half of B
So the ratio between the shares of A and B = ½ = 1: 2

(ii) We know that
Sum of the ratios = 1 + 2 = 3
Share of A = (300 × 1)/ 3 = ₹ 100
Share of B = (300 × 2)/ 3 = ₹ 200

20. The ratio between two numbers is 5: 9. Find the numbers, if their H.C.F. is 16.
Solution:

Consider first number = 5x
Second number = 9x
We know that
HCF of 5x and 9x = LCM of 5x and 9x = x
So HCF = 16
Here x = 16
We get the required numbers
5x = 5 × 16 = 80

9x = 9 × 16 = 144

21. A bag contains ₹ 1,600 in the form of ₹ 10 and ₹ 20 notes. If the ratio between the numbers of ₹ 10 and ₹ 20 notes is 2: 3; find the total number of notes in all.
Solution:

Amount in the bag = ₹ 1,600
The bag has notes in the denomination of ₹ 10 and ₹ 20
So the ratio between the number of ₹ 10 and ₹ 20 notes = 2: 3
Consider the number of ₹ 10 notes = x
Number of ₹ 20 notes = y
Using the condition
10x + 20y = 1600 …. (1)
x = 2/3 y ….. (2)
By substituting the value of x in equation (1)
10 × 2/3 y + 20y = 1600
On further calculation
20/3y + 30y = 1600
By taking LCM
(20 + 60)/ 3 y = 1600
We get
80/3 y = 1600
We can write it as
y = (1600 × 3)/ 80
y = 60
Substituting the value of y in equation (2)
x = 2/3 × 60 = 40
So the total number of notes in all = x + y
= 60 + 40
= 100 notes

22. The ratio between the prices of a scooter and a refrigerator is 4: 1. If the scooter costs ₹ 45,000 more than the refrigerator, find the price of the refrigerator.
Solution:

It is given that
Ratio between the prices of a scooter and a refrigerator = 4: 1
Cost of scooter = ₹ 45,000
Consider the cost of scooter = 4x
Cost of refrigerator = 1x
Using the condition
Cost of scooter > Cost of refrigerator
4x – 1x = 45000
On further calculation
3x = 45000
So we get
x = 45000/3 = ₹ 15000
So the price of refrigerator = ₹ 15000