EXERCISE 11 (B)
1. The monthly salary of a person is Rs 12,000 and his monthly expenditure is Rs 8,500. Find the ratio of his:
(i) salary to expenditure
(ii) expenditure to savings
(iii) savings to salary
Solution:
Given
The monthly salary of a person = Rs 12, 000
Monthly expenditure = Rs 8, 500
(i) Salary to expenditure will be as given below
12, 000: 8, 500 = 12, 000 / 8, 500
On simplification, we get
= 120 / 85
= 24 / 17
= 24: 17
∴ The ratio between salary and expenditure is 24: 17
(ii) Savings = salary – expenditure
Savings = 12, 000 – 8, 500
= 3, 500
The ratio between expenditure and savings will be as given below
8500: 3500 = 8500 / 3500
On simplification, we get
= 85 / 35
= 17 / 7
= 17: 7
∴ The ratio between expenditure and savings will be 17: 7
(iii) Savings = salary – expenditure
Savings = 12, 000 – 8, 500
= 3, 500
The ratio between savings and salary will be as given below
3, 500: 12, 000 = 3500 / 12000
On simplification, we get
= 35 / 120
= 7 / 24
= 7: 24
∴ The ratio between savings and salary will be 7: 24

2. The strength of a class is 65, including 30 girls. Find the ratio of the number of:
(i) girls to boys
(ii) boys to the whole class
(iii) the whole class to girls
Solution:
Given
Total strength of class = 65
Total strength of girls = 30
Hence, total number of boys in a class will be
Boys = 65 – 30
= 35
(i) The ratio of girls to boys will be as given below:
30: 35 = 30 / 35
On calculating further, we get
= 6 / 7
= 6: 7
∴ The ratio between girls and boys will be 6: 7
(ii) Ratio of boys to the whole class will be as given below
35: 65 = 35 / 65
By calculating further, we get
= 7 / 13
= 7: 13
∴ The ratio between boys and whole class will be 7: 13
(iii) Ratio of whole class to the girls will be as given below
65: 30 = 65 / 30
On further calculation, we get
= 13 / 6
= 13: 6
∴ The ratio between whole class and girls will be 13: 6

3. The weekly expenses of a boy have increased from Rs 1, 500 to Rs 2, 250. Find the ratio of:
(i) increase in expenses to original expenses
(ii) original expenses to increased expenses
(iii) increased expenses to increase in expenses
Solution:
Given
Increased expenses of a boy = Rs 2, 250
Original expenses of a boy = Rs 1, 500
Hence, increase in expense will be:

Increase in expenses = 2250 – 1500

= 750

Hence, the ratio of increase in expenses to the original expenses will be:

750: 1500 = 750 / 1500

On calculation, we get

= 1 / 2

= 1: 2

∴ The ratio of increase in expenses to the original expenses will be 1: 2

(ii) The ratio of original expenses to increased expenses will be as given below

1500: 2250 = 1500 / 2250

On further calculation, we get

= 2 / 3

= 2: 3

∴ The ratio of original expenses to increased expenses will be 2: 3

(iii) The ratio of increased expenses to increase in expenses will be as given below

2250: 750 = 2250 / 750

On further calculation, we get

= 3 / 1

= 3: 1

∴ The ratio of increased expenses to increase in expenses will be 3: 1

4. Reduce each of the following ratios to their lowest terms:

(i) 1 hour 20 min: 2 hours

(ii) 4 weeks: 49 days

(iii) 3 years 4 months: 5 years 5 months

(iv) 2 m 40 cm: 1 m 44 cm

(v) 5 kg 500 gm: 2 kg 750 gm

Solution:

(i) 1 hour 20 min: 2 hours

We know that,

1 hour = 60 minutes

Hence, we can convert hour into minutes as:

1 hour = 1 × 60 minutes = 60 minutes

2 hours = 2 × 60 minutes = 120 minutes

So, the above expression can be written as follows:

(60 + 20) minutes / 120 minutes = 80 / 120

On further calculation, we get

= 2 / 3

= 2: 3

∴ The ratio of 1 hour 20 minutes: 2 hours will be 2: 3

(ii) 4 weeks: 49 days
We know that,
1 week = 7 days
Hence, we can convert weeks into days as given below
4 weeks = 4 × 7 days
= 28 days
So, the above expression can be written as follows:
28 days / 49 days = 4 / 7
We get
= 4: 7
∴ The ratio of 4 weeks: 49 days will be 4: 7
(iii) 3 years 4 months: 5 years 5 months
We know that,
1 year = 12 months
Hence, we can convert years into months as follows:
3 years = 3 × 12 months
= 36 months
5 years = 5 × 12 months
= 60 months
So, the above expression can be written as follows:
(36 + 4) months / (60 + 5) months = 40 / 65
On further calculation, we get
= 8 / 13
= 8: 13
∴ The ratio of 3 years 4 months: 5 years 5 months will be 8: 13
(iv) 2 m 40 cm: 1 m 44 cm
We know that,
1 metre = 100 cm
So, we can convert meter into centimetre as follows:
2 metre = 2 × 100 centimetres
= 200 centimetres
1 metre = 1 × 100 centimetre
= 100 centimetres
So, the above expression can be written as follows:
(200 + 40) centimetres / (100 + 44) centimetres = 240 / 144
On calculating further, we get
= 20 / 12
= 5 / 3
= 5: 3
∴ The ratio of 2 m 40 cm: 1 m 44 cm will be 5: 3

(v) 5 kg 500 gm: 2 kg 750 gm
We know that,
1 kilogram = 1000 gram
So, we can convert kilogram into gram as follows:
5 kilogram = 5 × 1000 gram
= 5000 gram
2 kilogram = 2 × 1000 gram
= 2000 gram
So, the above expression can be written as follows:
(5000 + 500) gram / (2000 + 750) gram = 5500 / 2750
On further calculation, we get
= 2 / 1
= 2: 1
∴ The ratio of 5 kg 500 gm: 2 kg 750 gm will be 2: 1

5. Two numbers are in the ratio 9: 2. If the smaller number is 320, find the larger number.
Solution:
Given
Two numbers are in the ratio = 9: 2
Smaller number = 320
Now, let us assume that the larger number is 9x and the smaller number is 2x
Therefore, the larger number = (9x × 320) / 2x
= 1440
Hence, the larger number = 1440

6. A bus travels 180 km in 3 hours and a train travels 450 km in 5 hours. Find the ratio of speed of train to speed of bus.
Solution:
Given
Total distance travelled by a bus = 180 km
Time taken by bus = 3 hours
Total distance travelled by train = 450 km
Time taken by train = 5 hours
We know that,
Speed = distance / time
Hence,
Speed of a bus = 180 km / 3 hr
= 60 km / hr
Speed of a train = 450 km / 5 hr

= 90 km / hr
Thus, ratio of speed of train to speed of bus will be
90: 60 = 90 / 60
We get
= 3: 2

7. In winters, a school opens at 10 a.m. and closes at 3.30 p.m. If the lunch interval is of 30 minutes, find the ratio of lunch interval to total time of the class periods.
Solution:
Given
School opens at = 10 a.m.
School closes at = 3.30 p.m.
Lunch interval timing of school = 30 minutes
Hence, total school timing will be 5 hours 30 minutes
Total time of class periods will be as follows:
Total time interval of class = Total school timings – lunch interval timing
= 5 hour 30 minutes - 30 minutes
= 5 hours
We know that,
1 hour = 60 minutes
So, we can convert hours into minutes as shown below
5 hour = 5 × 60 minutes
= 300 minutes
Thus, ratio of lunch interval to total class time will be
30 min: 300 min = 30 / 300
On calculation, we get
= 1 / 10
= 1: 10
∴ The ratio of lunch interval to total time of class periods will be 1: 10

8. Rohit goes to school by car at 60 km per hour and Manoj goes to school by scooty at 40 km per hour. If they both live in the same locality, find the ratio between the time taken by Rohit and Manoj to reach school.
Solution:
Given
Rohit car speed = 60 km/hr
Manoj car speed = 40 km/hr
Since, it is given that, they stay in the same locality
Hence, let the distance be x
We know

Time = Distance / Speed
Hence, time taken by Rohit to reach school will be:
Time taken by Rohit = x / 60
Time taken by Manoj = x / 40
Hence, ratio of time taken by Rohit and Manoj to reach school will be as follows:
x / 60: x / 40 = 1 / 3: 1 / 2
= 2 / 3
= 2: 3
Hence, the ratio between the time taken by Rohit and Manoj to reach school is 2: 3.

9. In a club having 360 members, 40 play carom, 96 play table tennis, 144 play badminton and remaining members play volley-ball. If no member plays two or more games, find the ratio of members who play:
(i) carom to the number of those who play badminton
(ii) badminton to the number of those who play table-tennis
(iii) table-tennis to the number of those who play volley-ball
(iv) volley-ball to the number of those who play other games
Solution:
Given
Total number of members in a club = 360 members
Total number of members who play carom = 40 members
Total number of members who play table tennis = 96 members
Total number of members who play badminton = 144 members
Hence, total number of members who play volley ball will be as follows:
360 – (40 + 96 + 144) = 360 – 280
= 80
(i) Hence, the ratio between the members who play carom to the number of those who play badminton will be:
40: 144 = 40 / 144
We get
= 5 / 18
= 5: 18
(ii) Hence, the ratio between the members who play badminton to the number of those who play table tennis will be:
144: 96 = 144 / 96
We get
= 6 / 4
= 3 / 2
= 3: 2
(iii) Hence, the ratio between the members who play table tennis to the number of those

who play volley ball will be:

96: 80 = 96 / 80

We get

= 6 / 5

= 6: 5

(iv) Number of members who play other games than volley ball will be:

360 – 80 = 280

Hence, the ratio between the members who play volley ball to those members who play other games will be:

80: 280 = 80 / 280

On simplification, we get

= 4 / 14

= 2 / 7

= 2: 7

10. The length of a pencil is 18 cm and its radius is 4 cm. Find the ratio of its length to its diameter.

Solution:

Given

The length of a pencil = 18 cm

Radius of a pencil = 4 cm

We know that,

Diameter = 2 × radius

So,

Diameter of a pencil = 2 × 4

= 8 cm

Hence, ratio of pencil length to its diameter will be:

18: 8 = 18 / 8

We get

= 9 / 4

= 9: 4

11. Ratio of distance of the school from A's home to the distance of the school from B's home is 2: 1

(i) Who lives nearer to the school?

(ii) Complete the following table:

Solution:

(i) B lives nearer to school than A because

Since, it is given that, A's home distance from school: B's home distance from school = 2: 1

(A's home distance from school) / (B's home distance from school) = 2 / 1
Hence, A's home distance from school = 2 × B's home distance from school
(ii) Let A's home is 2x km from school and B's home is x km
Hence,
A's home distance from school: B's home distance from school = 2: 1
(A's home distance from school) / (B's home distance from school) = 2 / 1
A's home distance from school = 2 × B's home distance from school
(a) So if A lives at a distance of 4 km then B will live at a distance of = 1 / 2 × 4
= 2 km
(b) So if B lives at a distance of 9 km then A will live at a distance of = 2 × 9
= 18 km
(c) So if A lives at a distance of 8 km then B will live at a distance of = 1 / 2 × 8
= 4 km
(d) So if B lives at a distance of 8 km the n A will live at a distance of = 2 × 8
= 16 km
(e) So if A lives at a distance of 6 km then B will live at a distance of = 1 / 2 × 6
= 3 km

12. The student-teacher ratio in a school is 45: 2. If there are 4050 students in the school, how many teachers must be there?
Solution:
Given
Total number of students in school = 4050
Student –teacher ratio in a school = 45: 2
Let us assume that the total number of teachers in school be x
Hence,
Required ratio = Total number of students / Total number of teachers
We get
45: 2 = 4050: x
45 / 2 = 4050 / x
x = (4050 × 2) / 45
x = 8100 / 45
x = 180 teachers