# RD Sharma Solutions for Class 6 Maths Chapter 9 Ratio, Proportion and Unitary Method 

## EXERCISE 9.1

1. Express each of the following in the language of ratios:
(i) In a class, the number of girls in the merit list of the board examination is two times that of boys.
(ii) The number of students passing mathematics test is $\mathbf{2 / 3}$ of the number that appeared.

## Solution:

(i) Ratio of the number of girls to that of boys in the merit list is $2: 1$.
(ii) Ratio of the number of students passing a mathematics test to that of total students appearing in the test is $2: 3$.
2. Express the following ratios in language of daily life:
(i) The ratio of the number of bad pencils to that of good pencils produced in a factory is $\mathbf{1 : 9}$.
(ii) In India, the ratio of the number of villages to that of cities is about 2000: 1.

Solution:
(i) The number of bad pencils produced in a factory is $1 / 9$ of the number of good pencils produced in the factory.
(ii) The number of villages is 2000 times that of cities in India.
3. Express each of the following ratios in its simplest form:
(i) 60: 72
(ii) 324: 144
(iii) 85: 391
(iv) 186: 403

Solution:
(i) $60: 72$

It can be written as 60/72
We know that the HCF of 60 and 72 is 12
By dividing the term by 12 we get
$(60 / 72) \times(12 / 12)=5 / 6$
So we get 60: $72=5: 6$
(ii) 324: 144

It can be written as 324/144
We know that the HCF of 324 and 144 is 36
By dividing the term by 36 we get
$(324 / 144) \times(36 / 36)=9 / 4$
So we get 324: $144=9: 4$
(iii) 85: 391

It can be written as $85 / 391$
We know that the HCF of 85 and 391 is 17
By dividing the term by 17 we get
$(85 / 391) \times(17 / 17)=5 / 23$
So we get $85: 391=5: 23$
(iv) 186: 403

It can be written as 186/403

We know that the HCF of 186 and 403 is 31
By dividing the term by 31 we get
$(186 / 403) \times(31 / 31)=6 / 13$
So we get 186: $403=6: 13$
4. Find the ratio of the following in the simplest form:
(i) 75 paise to Rs 3
(ii) $\mathbf{3 5}$ minutes to $\mathbf{4 5}$ minutes
(iii) 8 kg to 400 gm
(iv) 48 minutes to 1 hour
(v) 2 metres to 35 cm
(vi) 35 minutes to 45 seconds
(vii) 2 dozen to 3 scores
(viii) 3 weeks to 3 days
(ix) $\mathbf{4 8} \mathbf{~ m i n}$ to 2 hours 40 min
(x) $\mathbf{3} \mathbf{~ m ~} 5 \mathrm{~cm}$ to 35 cm

## Solution:

(i) 75 paise to Rs 3

It can be written as
75 paise to Rs $3=75$ paise: Rs 3
We know that 1 Rs $=100$ paise
So we get
75 paise to Rs $3=75$ paise: 300 paise
Dividing the two terms by HCF 75
75 paise to Rs $3=1: 4$
(ii) 35 minutes to 45 minutes

It can be written as
35 minutes to 45 minutes $=35$ minutes: 45 minutes
Dividing the two terms by HCF 5
35 minutes to 45 minutes $=7: 9$
(iii) 8 kg to 400 gm

It can be written as
8 kg to $400 \mathrm{gm}=8 \mathrm{~kg}: 400 \mathrm{gm}$
We know that $1 \mathrm{~kg}=1000 \mathrm{gm}$
So we get
8 kg to $400 \mathrm{gm}=8000 \mathrm{gm}: 400 \mathrm{gm}$
Dividing the two terms by HCF 400
8 kg to $400 \mathrm{gm}=20: 1$
(iv) 48 minutes to 1 hour

It can be written as
48 minutes to 1 hour $=48$ minutes: 1 hour
We know that 1 hour $=60$ minutes
So we get
48 minutes to 1 hour $=48$ minutes: 60 minutes
Dividing the two terms by HCF 12
48 minutes to 1 hour $=4: 5$
(v) 2 metres to 35 cm

It can be written as
2 metres to $35 \mathrm{~cm}=2$ metres: 35 cm
We know that $1 \mathrm{~m}=100 \mathrm{~cm}$
So we get
2 metres to $35 \mathrm{~cm}=200 \mathrm{~cm}: 35 \mathrm{~cm}$
Dividing the two terms by HCF 5
2 metres to $35 \mathrm{~cm}=40: 7$
(vi) 35 minutes to 45 seconds

It can be written as
35 minutes to 45 seconds $=35$ minutes: 45 seconds
We know that 1 minute $=60$ seconds
So we get
35 minutes to 45 seconds $=2100$ seconds: 45 seconds
Dividing the two terms by HCF 15
35 minutes to 45 seconds $=140: 3$
(vii) 2 dozen to 3 scores

It can be written as
2 dozen to 3 scores $=2$ dozen: 3 scores
We know that 1 dozen $=12$ score $=20$
So we get
2 dozen to 3 scores $=24: 60$
Dividing the two terms by HCF 12
2 dozen to 3 scores $=2: 5$
(viii) 3 weeks to 3 days

It can be written as
3 weeks to 3 days $=3$ weeks: 3 days
We know that 1 week $=7$ days
So we get
3 weeks to 3 days $=21$ days: 3 days
Dividing the two terms by HCF 3
3 weeks to 3 days $=7: 1$
(ix) 48 min to 2 hours 40 min

It can be written as
48 min to 2 hours $40 \mathrm{~min}=48 \mathrm{~min}$ : 2 hours 40 min
We know that 1 hour $=60$ minutes
So we get
48 min to 2 hours $40 \mathrm{~min}=48 \mathrm{~min}: 160 \mathrm{~min}$
Dividing the two terms by HCF 16
48 min to 2 hours $40 \mathrm{~min}=3: 10$
(x) 3 m 5 cm to 35 cm

It can be written as
3 m 5 cm to $35 \mathrm{~cm}=3 \mathrm{~m} 5 \mathrm{~cm}: 35 \mathrm{~cm}$
We know that $1 \mathrm{~m}=100 \mathrm{~cm}$
So we get

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3 m 5 cm to $35 \mathrm{~cm}=305 \mathrm{~cm}: 35 \mathrm{~cm}$
Dividing the two terms by HCF 5
3 m 5 cm to $35 \mathrm{~cm}=61: 7$
5. Find the ratio of
(i) 3.2 metres to 56 metres
(ii) 10 metres to 25 cm
(iii) 25 paise to Rs 60
(iv) $\mathbf{1 0}$ litres to 0.25 litre

## Solution:

(i) 3.2 metres to 56 metres

It can be written as
3.2 metres to 56 metres $=3.2$ metres: 56 metres

Dividing the two terms by HCF 1.6
3.2 metres to 56 metres $=2: 35$
(ii) 10 metres to 25 cm

It can be written as
10 metres to $25 \mathrm{~cm}=10 \mathrm{~m}: 25 \mathrm{~cm}$
We know that $1 \mathrm{~m}=100 \mathrm{~cm}$
10 metres to $25 \mathrm{~cm}=1000 \mathrm{~cm}: 25 \mathrm{~cm}$
Dividing the two terms by HCF 25
10 metres to $25 \mathrm{~cm}=40: 1$
(iii) 25 paise to Rs 60

It can be written as
25 paise to Rs $60=25$ paise: Rs 60
We know that $1 \mathrm{Rs}=100$ paise
25 paise to Rs $60=25$ paise: 6000 paise
Dividing the two terms by HCF 25
25 paise to Rs $60=1: 240$
(iv) 10 litres to 0.25 litre

It can be written as
10 litres to 0.25 litre $=10$ litres: 0.25 litre
Dividing the two terms by HCF 0.25
10 litres to 0.25 litre $=40: 1$
6. The number of boys and girls in a school are 1168 and 1095 respectively. Express the ratio of the number of boys to that of the girls in the simplest form.
Solution:
No. of boys $=1168$
No. of girls $=1095$
So the ratio of the number of boys to that of the girls = 1168: 1095
Dividing the two terms by HCF 73
Ratio of number of boys to that of the girls =16: 15
Hence, the ratio of the number of boys to that of girls in simplest form is $16: 15$.
7. Avinash works as a lecturer and earns Rs $\mathbf{1 2 0 0 0}$ per month. His wife who is a doctor earns Rs 15000 per month. Find the following ratios:
(i) Avinash's income to the income of his wife.
(ii) Avinash's income to their total income.

## Solution:

Avinash salary earned per month = Rs 12000
Avinash wife salary per month $=$ Rs 15000
(i) Avinash's income to the income of his wife $=12000 / 15000=4: 5$
(ii) Avinash's income to their total income $=12000 /(12000+15000)=4: 9$
8. Of the $\mathbf{7 2}$ persons working in an office, 28 are men and the remaining are women. Find the ratio of the number of:
(i) men to that of women,
(ii) men to the total number of persons
(iii) persons to that of women.

## Solution:

No. of persons working in an office $=72$
No. of men $=28$
So the number of women $=72-28=44$
(i) men to that of women $=28: 44$

Multiplying and dividing the equation by HCF 4
Men to that of women $=(28 / 44) \times(4 / 4)=7: 11$
(ii) men to the total number of persons $=28: 72$

Multiplying and dividing the equation by HCF 4
Men to the total number of persons $=(28 / 72) \times(4 / 4)=7: 18$
(iii) persons to that of women $=72: 44$

Multiplying and dividing the equation by HCF 4
Persons to that of women $=(72 / 44) \times(4 / 4)=18: 11$
9. The length of a steel tape for measurements of buildings is 10 m and its width is 2.4 cm . What is the ratio of its length to width?
Solution:
It is given that
Length of a steel tape $=10 \mathrm{~m}$
Width of steel tape $=2.4 \mathrm{~cm}$
So the ratio of its length to width $=10 \mathrm{~m} / 2.4 \mathrm{~cm}$
We know that $1 \mathrm{~m}=100 \mathrm{~cm}$
Ratio of its length to width $=1000 \mathrm{~cm} / 2.4 \mathrm{~cm}$
Dividing the two terms by HCF 0.8 cm
Ratio of its length to width $=1250: 3$
Hence, the ratio of its length to width is 1250: 3 .
10. An office opens at 9 am and closes at 5 pm with a lunch interval of 30 minutes. What is the ratio of lunch interval to the total period in office?
Solution:
Duration of office $=9$ am to $5 \mathrm{pm}=8$ hours
Lunch interval $=30$ minutes
So the ratio of lunch interval to the period in office $=30$ minutes $/ 8$ hours
We know that 1 hour $=60$ minutes
Ratio of lunch interval to the period in office $=30 /(8 \times 60)=30 / 480$
Dividing the two terms by HCF 30
Ratio of lunch interval to the period in office $=(30 / 480) \times(30 / 30)=1: 16$
Hence, the ratio of lunch interval to the total period in office is $1: 16$.
11. A bullock-cart travels 24 km in 3 hours and a train travels 120 km in 2 hours. Find the ratio of their speeds.
Solution:
Distance travelled by bullock-cart $=24 \mathrm{~km}$ in 3 hours
Distance travelled by train $=120 \mathrm{~km}$ in 2 hours
It can be written as
Distance travelled by bullock-cart $=24 \mathrm{~km} / 3=8 \mathrm{~km}$
Distance travelled by train $=120 \mathrm{~km} / 2=60 \mathrm{~km}$
So the ratio of their speeds $=8 / 60$
Dividing the two terms by HCF 4
Ratio of their speeds $=(8 / 60) \times(4 / 4)=2: 15$
Hence, the ratio of their speeds is $2: 15$.
12. Margarette works in a factory and earns Rs 955 per month. She saves Rs 185 per month from her earnings. Find the ratio of:
(i) her savings to her income
(ii) her income to her expenditure
(iii) her savings to her expenditure.

Solution:
Margarette monthly income = Rs 955
Margarette monthly savings = Rs 185
Margarette expenditure $=955-185=$ Rs 770
(i) her savings to her income $=185 / 955$

Dividing the two terms by HCF 5
Her savings to her income $=(185 / 955) \times(5 / 5)=37$ : 191
(ii) her income to her expenditure $=955 / 770=191: 154$
(iii) her savings to her expenditure $=185 / 770=37$ : 154

## EXERCISE 9.2

1. Which ratio is larger in the following pairs?
(i) 3: 4 or 9: 16
(ii) 15: 16 or 24: 25
(iii) 4: 7 or 5: 8
(iv) 9:20 or 8: $\mathbf{1 3}$
(v) 1:2 or 13: 27

## Solution:

(i) $3: 4$ or $9: 16$

It can be written as
3: $4=3 / 4$ and $9: 16=9 / 16$
LCM of 4 and 16 is 16
Multiplying both numerator and denominator of the term $3 / 4$ by 4 to make the denominator 16 $3 / 4=(3 / 4) \times(4 / 4)=12 / 16$ and $9 / 16$
We know that $12>9$
So we get $12 / 16>9 / 16$
We can write it as
$3 / 4>9 / 16$
Hence, 3: 4 > 9: 16.
(ii) 15: 16 or $24: 25$

It can be written as
15: $16=15 / 16$ and $24: 25=24 / 25$
LCM of 16 and 25 is 400
Multiplying both the terms by relevant numbers to make denominator as 400
$15 / 16=(15 / 16) \times(25 / 25)=375 / 400$ and $24 / 25=(24 / 25) \times(16 / 16)=384 / 400$
We know that $384>375$
So we get 384/400 > 375/400
We can write it as $24 / 25>15 / 16$
Hence, 24: 25 > 15: 16.
(iii) 4:7 or 5: 8

It can be written as
4: $7=4 / 7$ and $5: 8=5 / 8$
LCM of 7 and 8 is 56
Multiplying both the terms by relevant numbers to make denominator as 56
$4 / 7=(4 / 7) \times(8 / 8)=32 / 56$ and $5 / 8=(5 / 8) \times(7 / 7)=35 / 56$
We know that $35>32$
So we get $35 / 56>32 / 56$
We can write it as $5 / 8>4 / 7$
Hence, 5: 8 > 4: 7.
(iv) 9: 20 or 8: 13

It can be written as
9: $20=9 / 20$ and $8: 13=8 / 13$

LCM of 20 and 13 is 260
Multiplying both the terms by relevant numbers to make denominator as 260
$9 / 20=(9 / 20) \times(13 / 13)=117 / 260$ and $8 / 13=(8 / 13) \times(20 / 20)=160 / 260$
We know that $160>117$
So we get $160 / 260>117 / 260$
We can write it as $8 / 13>9 / 20$
Hence, 8: 13 > 9: 20.
(v) 1:2 or 13:27

It can be written as
1: $2=1 / 2$ and 13:27 $=13 / 27$
LCM of 2 and 27 is 54
Multiplying both the terms by relevant numbers to make denominator as 54
$1 / 2=(1 / 2) \times(27 / 27)=27 / 54$ and $13 / 27=(13 / 27) \times(2 / 2)=26 / 54$
We know that $27>26$
So we get $27 / 54>26 / 54$
We can write it as $1 / 2>13 / 27$
Hence, 1: $2>13: 27$.

## 2. Give two equivalent ratios of 6: 8 .

## Solution:

The given ratio $=6: 8$
It can be written as $=6 / 8$
Dividing the fraction by 2 we get
$6 / 8=(6 / 8) \div(2 / 2)=3 / 4$
Hence, 3: 4 is an equivalent ratio of 6:8
Multiply the fraction by 2 we get
$6 / 8=(6 / 8) \times(2 / 2)=12 / 16$
Hence, 12: 16 is an equivalent ratio of 6: 8
So, 3: 4 and 12: 16 are the equivalent ratios of 6: 8 .
3. Fill in the following blanks:
$12 / 20=\square / 5=9 / \square$
Solution:
It is given that
$12 / 20=\square / 5=9 / \square$
We know that LCM of 20 and 5 is 20
It can be written as 20/4 $=5$
Dividing the fraction by 4
$12 / 20=(12 / 20) \times(4 / 4)=3 / 5$
So the first number is 3 and the ratio is $3 / 5$.
In the same way,

Consider $2 / 3+3 / 5=9 / \square$
We know that $9 / 3=3$
Multiply the fraction by 3
$3 / 5=(3 / 5) \times(3 / 3)=9 / 15$
So the second number is 15 and the ratio is $9 / 15$.

## EXERCISE 9.3

1. Which of the following statements are true?
(i) 16: $24=20: 30$
(ii) 21: $6=35: 10$
(iii) 12: $18=28: 12$
(iv) 51: $58=85: 102$
(v) $\mathbf{4 0}$ men: 200 men = Rs 5: Rs 25
(vi) $99 \mathrm{~kg}: 45 \mathrm{~kg}=$ Rs 44: Rs 20

Solution:
(i) $16: 24=20: 30$

It can be written as
$16 / 24=20 / 30$
Dividing $16 / 24$ by $4 / 4$ and $20 / 30$ by $5 / 5$
$(16 / 24) \div(4 / 4)=(20 / 30) \div(5 / 5)$
On further calculation
$4 / 6=4 / 6$
We get
$2 / 3=2 / 3$
Hence, 16: $24=20: 30$ is true.
(ii) 21: $6=35: 10$

It can be written as
$21 / 6=35 / 10$
Dividing $21 / 6$ by $3 / 3$ and $35 / 10$ by $5 / 5$
$(21 / 6) \div(3 / 3)=(35 / 10) \div(5 / 5)$
On further calculation
$7 / 2=7 / 2$
Hence, 21: $6=35: 10$ is true.
(iii) $12: 18=28: 12$

It can be written as
$12 / 18=28 / 12$
On further calculation
$6 / 9 \neq 14 / 6$
Hence, 12: $18=28: 12$ is false.
(iv) 51 : $58=85: 102$

It can be written as
$51 / 58=85 / 102$
On further calculation
$51 / 58 \neq 5 / 6$
Hence, 51:58=85: 102 is false.
(v) 40 men: 200 men = Rs 5: Rs 25

It can be written as
$40 / 200=5 / 25$
We get $40 / 200=1 / 5$ and $5 / 25=1 / 5$
Hence, 40 men: 200 men = Rs 5: Rs 25 is true.
(vi) $99 \mathrm{~kg}: 45 \mathrm{~kg}=\mathrm{Rs} 44$ : Rs 20

It can be written as
$99 / 45=44 / 20$
Dividing the fraction by 9
$(99 / 45) \div(9 / 9)=(44 / 20) \div(9 / 9)$
On further calculation
$11 / 5=11 / 5$
Hence, $99 \mathrm{~kg}: 45 \mathrm{~kg}=$ Rs 44 : Rs 20 is true.
2. Find which of the following are in proportion:
(i) $8,16,6,12$
(ii) $6,2,4,3$
(iii) 150, 250, 200, 300

## Solution:

(i) $8,16,6,12$

We know that
8: $16=8 / 16=1 / 2$
6: $12=6 / 12=1 / 2$
So we get $8 / 16=6 / 12$
Therefore, $8,16,6,12$ are in proportion.
(ii) $6,2,4,3$

We know that
6: $2=6 / 2=3 / 1$
4: $3=4 / 3$
So we get $3 / 1 \neq 4 / 3$
Therefore, 6, 2, 4, 3 are not in proportion.
(iii) $150,250,200,300$

We know that
150: $250=150 / 250=3 / 5$
200: $300=200 / 300=4 / 6=2 / 3$
So we get $3 / 5 \neq 2 / 3$
Therefore, 150, 250, 200, 300 are not in proportion.
3. Find $x$ in the following proportions:
(i) $\mathrm{x}: 6=55: 11$
(ii) 18: $\mathrm{x}=27: 3$
(iii) 7: $\mathbf{1 4}=\mathbf{1 5}: \mathbf{x}$
(iv) 16: $18=x: 96$

## Solution:

(i) $x: 6=55: 11$

It can be written as
$\mathrm{x} / 6=55 / 11$
We get
$x / 6=5 / 1$
On further calculation
$x=5(6)=30$
(ii) 18: $\mathrm{x}=27: 3$

It can be written as
$18 / x=27 / 3$
We get
$18 / x=9 / 1$
On further calculation
$\mathrm{x}=18 / 9=2$
(iii) 7: $14=15: x$

It can be written as
$7 / 14=15 / x$
We get
$1 / 2=15 / x$
On further calculation
$x=15(2)=30$
(iv) $16: 18=x: 96$

It can be written as
$16 / 18=x / 96$
We get
8/9 = x/96
On further calculation
$x=8 / 9(96)=256 / 3$
4. Set up all proportions from the numbers $9,150,105,1750$.

Solution:
The proportions from the numbers are
9: $150=3: 50$
9: $105=3: 35$
9: 1750
150: $9=50: 3$
150: $105=10: 7$
150: $1750=3: 35$
105: $9=35: 3$
105: $150=7: 10$
105: $1750=3: 50$
1750: 9
1750: $150=35: 3$

1750: $105=50: 3$
Hence, the proportions that are formed are
9: 150 :: 105: 1750
150: 9 :: 1750: 105
1750: 150 :: 105: 9
9: 105 :: 150: 1750
5. Find the other three proportions involving terms of each of the following:
(i) $45: 30=24: 16$
(ii) 12: $18=14: 21$

## Solution:

(i) $45: 30=24: 16$ can be written as 3: 2 in simplest form

So the other three proportions involving terms are
45: $24=30: 16$ can be written as 15: 8 in simplest form
30: $45=16: 24$ can be written as $2: 3$ in simplest form
16: $30=24: 45$ can be written as $8: 15$ in simplest form
(ii) 12: $18=14: 21$ can be written as 2: 3 in simplest form

So the other three proportions involving terms are
12: $14=18: 21$ can be written as $6: 7$ in simplest form
21: $18=14: 12$ can be written as 7: 6 in simplest form
18: $12=21: 14$ can be written as $3: 2$ in simplest form
6. If 4, $x, 9$ are in continued proportion, find the value of $x$.

Solution:
We know that 4, x, 9 are in continued proportion
It can be written as
4: $\mathrm{x}:: \mathrm{x}$ : 9
We get
$4 / x=x / 9$
On further calculation
$\mathrm{x}^{2}=9(4)=36$
So we get
$\mathrm{x}=6$
7. If in a proportion, the first, second and fourth terms are 32, 112 and 217 respectively, find the third term.
Solution:
It is given that in a proportion the first, second and fourth terms are 32, 112 and 217
Consider x as the third term
We can write it as
32: 112 :: x: 217
On further calculation
$32 / 112=x / 217$
So we get
$\mathrm{x}=32 / 112(217)=62$
8. Show that the following numbers are in continued proportion:
(i) $36,90,225$
(ii) $48,60,75$
(iii) 16, 84, 441

Solution:
(i) $36,90,225$

Consider the fraction 36/90
By dividing the fraction by 18
We get
$36 / 90=2 / 5$
Consider the fraction 90/225
By dividing the fraction by 45
We get
$90 / 225=2 / 5$
Hence, 36: 90 :: 90: 225.
(ii) 48, 60, 75

Consider the fraction 48/60
By dividing the fraction by 12
We get
$48 / 60=4 / 5$
Consider the fraction 60/75
By dividing the fraction by 15
We get
$60 / 75=4 / 5$
Hence, 48: 60 :: 60: 75.
(iii) $16,84,441$

Consider the fraction 16/84
By dividing the fraction by 4
We get
$16 / 84=4 / 21$
Consider the fraction 84/441
By dividing the fraction by 21
We get
$84 / 441=4 / 21$
Hence, 16: 84 :: 84: 441.
9. The ratio of the length of a school ground to its width is 5: 2 . Find its length if the width is $\mathbf{4 0}$ metres. Solution:

It is given that
Ratio of length of a school ground to its width $=5: 2$

Width of the school ground $=40 \mathrm{~m}$
So the length of the school ground $=5 / 2(40)=100 \mathrm{~m}$
Hence, the length of the school ground is 100 m .
10. The ratio of the sale of eggs on a Sunday to that of the whole week of a grocery shop was $2: 9$. If the total sale of eggs in the same week was Rs 360 , find the sale of eggs on Sunday.
Solution:
It is given that
Ratio of the sale of eggs on a Sunday to that of the whole week of a grocery shop $=2: 9$
We know that the sale of eggs in a week is Rs 9 and on Sunday is Rs 2
If eggs of Rs 1 is sold in a week, the cost of eggs on Sunday $=$ Rs $2 / 9$
If the total sale of eggs in the same week was Rs 360 , the sale of eggs on Sunday $=2 / 9(360)=$ Rs 80
Hence, the sale of eggs on Sunday is Rs 80 .
11. The ratio of copper and zinc in an alloy is $9: 7$. If the weight of zinc in the alloy is 9.8 kg , find the weight of copper in the alloy.

## Solution:

It is given that
Ratio of copper and zinc in an alloy $=9: 7$
We know that
If the weight of zinc is 7 kg then the weight of copper is 9 kg
If the weight of zinc is 1 kg then the weight of copper $=9 / 7 \mathrm{~kg}$
So if the weight of zinc is 9.8 kg then the weight of copper $=9 / 7(9.8)=12.6 \mathrm{~kg}$
Hence, the weight of copper in the alloy is 12.6 kg .
12. The ratio of the income to the expenditure of a family is 7: 6 . Find the savings if the income is Rs 1400 . Solution:

It is given that
Ratio of the income to the expenditure of a family $=7: 6$
We know that saving = total income - expenditure
So we get
Ratio of saving to the income $=[7-6]: 7=1: 7$
It is given that income $=$ Rs 1400
So the saving of the family $=1 / 7(1400)=$ Rs 200
Hence, the saving of the family is Rs 200.
13. The ratio of story books in a library to other books is $1: 7$. The total number of story books is 800 . Find the total number of books in the library.
Solution:
It is given that
Ratio of story books in a library to other books $=1: 7$
Consider the ratio as x

So the number of story books $=\mathrm{x}$
Number of other books $=7 \mathrm{x}$
We know that
Total number of story books $=800$
Number of other books $=7 \times 800=5600$
Total number of books $=5600+800=6400$
Hence, the total number of books in the library is 6400 .

## EXERCISE 9.4

1. The price of $\mathbf{3}$ metres of cloth is Rs 79.50 . Find the price of 15 metres of such cloth.

## Solution:

It is given that
Price of 3 m of cloth = Rs 79.50
We get
Price of 1 m of cloth $=79.50 / 3=$ Rs 26.5
So the price of 15 m of cloth $=26.5(15)=$ Rs 397.50
Hence, the price of 15 m of such cloth is Rs 397.50.
2. The cost of $\mathbf{1 7}$ chairs is Rs 9605 . Find the number of chairs that can be purchased in Rs $\mathbf{5 6 5 0 0}$. Solution:

No. of chairs purchased for Rs $9605=17$
We get
No. of chairs purchased for Rs $1=17 / 9605$
So the number of chairs purchased for Rs $56500=17 / 9605(56500)=100$
Hence, 100 chairs can be purchased in Rs 56500 .
3. Three ferryloads are needed to carry 150 people across a river. How many people will be carried on 4 ferryloads?
Solution:
We know that
No. of people required to carry 3 ferryloads $=150$
We get
No. of people required to carry 1 ferryload $=150 / 3=50$
So the number of people required to carry 4 ferryloads $=4(50)=200$
Hence, 200 people are required to carry 4 ferryloads.
4. If 9 kg of rice costs Rs 120.60 , what will 50 kg of such a quality of rice cost?

Solution:
It is given that
Cost of 9 kg rice $=$ Rs 120.60
We know that
Cost of 1 kg rice $=120.60 / 9=$ Rs 13.4
So the cost of 50 kg rice $=13.4(50)=$ Rs 670
Hence, 50 kg of such a quality of rice costs Rs 670 .
5. A train runs 200 kilometres in $\mathbf{5}$ hours. How many kilometres does it run in $\mathbf{7}$ hours? Solution:

Distance travelled by train in 5 hours $=200 \mathrm{~km}$

We know that
Distance travelled by train in 1 hour $=200 / 5=40 \mathrm{~km}$
So the distance travelled by train in 7 hours $=40(7)=280 \mathrm{~km}$
Hence, the train runs 280 km in 7 hours.
6. 10 boys can dig a pitch in 12 hours. How long will 8 boys take to do it?

Solution:
It is given that
10 boys can dig a pitch in 12 hours
We know that the time taken by one boy $=10(12)=120$ hours
So the time taken by 8 boys to dig the pitch $=120 / 8=15$ hours
Hence, 8 boys will take 15 hours to dig the pitch.
7. A man can work 8 hours daily and finishes a work in 12 days. If he works $\mathbf{6}$ hours daily, in how many days will the same work be finished?

## Solution:

It is given that
A man can work 8 hours daily and finishes a work in 12 days
If he works for one hour, then the time taken to finish the work $=8 \times 12=96$ days
If he works 6 hours daily, the days required to finish the work $=96 / 6=16$ days
Hence, the man requires 16 days to finish the same work.
8. Fifteen post cards cost Rs 2.25 . What will be the cost of 36 post cards? How many postcards can be bought in Rs 45 ?

## Solution:

It is given that
Cost of fifteen post cards $=$ Rs 2.25
We know that
Cost of one post card = Rs 2.25/15
So the cost of 36 post cards $=2.25 / 15(36)=$ Rs 5.40
We get
No. of postcards that can be purchased in Rs $1=15 / 2.25$
Number of postcards that can be bought in Rs $45=15 / 2.25(45)=300$
Hence, the cost of 36 post cards is Rs 5.40 and 300 post cards can be bought in Rs 45 .
9. A rail journey of 75 km costs Rs 215 . How much will a journey of 120 km cost?

Solution:
It is given that
Cost of rail journey of $75 \mathrm{~km}=$ Rs 215
We know that
Cost of rail journey of $1 \mathrm{~km}=$ Rs 215/75

So the cost of rail journey of $120 \mathrm{~km}=215 / 75(120)=$ Rs 344
Hence, the cost of rail journey of 120 km is Rs 344 .
10. If the sales tax on a purchase worth Rs 60 is Rs 4.20 . What will be the sales tax on the purchase worth Rs 150 ?
Solution:
It is given that
Sales tax on a purchase worth Rs $60=$ Rs 4.20
We know that
Sales tax on a purchase worth Rs $1=$ Rs $4.20 / 60$
So the sales tax on the purchase worth Rs $150=4.20 / 60(150)=$ Rs 10.50
Hence, the sales tax on the purchase worth Rs 150 is Rs 10.50 .
11. The cost of $\mathbf{1 7}$ chairs is Rs 19210 . Find the number of such chairs that can be purchased in Rs $\mathbf{1 1 3 0 0 0}$ ? Solution:

It is given that
No. of chairs purchased in Rs $19210=17$
We know that
No. of chairs purchased in Rs $1=17 / 19210$
So the number of chairs that can be purchased in Rs $113000=17 / 19210(113000)=100$
Hence, 100 chairs can be purchased in Rs 113000 .
12. A car travels 165 km in 3 hours
(i) How long will it take to travel 440 km?
(ii) How far will it travel in 7 hours?

Solution:
Distance travelled by car $=165 \mathrm{~km}$ in 3 hours
So the speed of car $=$ Distance $/$ time $=165 / 3=55 \mathrm{~km}$ per hour
(i) Time taken to travel $440 \mathrm{~km}=440 / 55=8$ hours
(ii) Distance covered in 7 hours $=55(7)=385 \mathrm{~km}$
13. $\mathbf{2}$ dozens of oranges cost Rs $\mathbf{6 0}$. Find the cost of $\mathbf{1 2 0}$ similar oranges?

Solution:
It is given that
Cost of 2 dozens of oranges $=$ Rs 60
We know that
Cost of 1 orange $=$ Rs 60/24
So the cost of 120 similar oranges $=60 / 24(120)=$ Rs 300
Hence, the cost of 120 similar oranges is Rs 300 .
14. A family of 4 members consumes 6 kg of sugar in a month. What will be the monthly consumption of sugar, if the number of family members becomes 6 ?

## Solution:

It is given that
Amount of sugar used by a 4 members family $=6 \mathrm{~kg}$
We know that
Amount of sugar used by 1 member $=6 / 4 \mathrm{~kg}$
So the sugar consumed by 6 members of a family $=6 / 4(6)=9 \mathrm{~kg}$
Hence, 9 kg is the monthly consumption of sugar, if the number of family members becomes 6 .
15. The weight of 45 folding chairs is 18 kg . How many such chairs can be loaded on a truck having a capacity of carrying 4000 kg load?
Solution:
It is given that
No. of folding chairs weighing $18 \mathrm{~kg}=45$
We know that
No. of folding chairs weighing $1 \mathrm{~kg}=45 / 18$
So the number of folding chairs weighing $4000 \mathrm{~kg}=45 / 18(4000)=10000$
Hence, 10000 chairs can be loaded on a truck having a capacity of carrying 4000 kg load.

## OBJECTIVE TYPE QUESTIONS

Mark the correct alternative in each of the following:

1. A ratio equivalent of $2: 3$ is
(a) $4: 3$
(b) $2: 6$
(c) $6: 9$
(d) $10: 9$

Solution:
The option (c) is correct answer.
We know that 6 : 9 when divided by 3 we get $2: 3$.
2. The angles of a triangle are in the ratio $1: 2: 3$. The measure of the largest angle is
(a) $30^{\circ}$
(b) $60^{\circ}$
(c) $90^{\circ}$
(d) $120^{\circ}$

Solution:
The option (c) is correct answer.
We know that the sum of all the angles $=180^{\circ}$
So the largest angle $=3 /(1+2+3) \times 180$
We get
Largest angle $=3 / 6 \times 180=90^{\circ}$
3. The sides of a triangle are in the ratio $2: 3: 5$. If its perimeter is 100 cm , the length of its smallest side is
(a) 2 cm
(b) 20 cm
(c) 3 cm
(d) 5 cm

Solution:
The option (b) is correct answer.
We know that the length of smallest side $=100 \times 2 /(2+3+5)=200 / 10=20 \mathrm{~cm}$
4. Two numbers are in the ratio $7: 9$. If the sum of the numbers is 112 , then the larger number is
(a) 63
(b) 42
(c) 49
(d) 72

Solution:
The option (a) is correct answer.
Consider x as the largest number
So we get
$7 \mathrm{x}+9 \mathrm{x}=112$
$16 \mathrm{x}=112$
$\mathrm{x}=112 / 16=7$

Here
$7 \mathrm{x}=7 \times 7=49$
$9 \mathrm{x}=9 \times 7=63$
Hence, the largest number is 63 .
5. Two ratio $384: 480$ in its simplest form is
(a) $3: 5$
(b) $5: 4$
(c) $4: 5$
(d) $2: 5$

Solution:
The option (c) is correct answer.
384: 480 can be written as
$384 / 480=4 / 5$ when divided by 96
6. If $A, B, C$, divide Rs 1200 in the ratio $2: 3: 5$, then $B$ 's share is
(a) Rs 240
(b) Rs 600
(c) Rs 380
(d) Rs 360

Solution:
The option (d) is correct answer.
So B's share $=1200 \times 3 /(2+3+5)$
On further calculation
B's share $=1200 \times 3 / 10=$ Rs 360
7. If a bus travels 126 km in 3 hours and a train travels 315 km in $\mathbf{5}$ hours, then the ratio of their speeds is
(a) $2: 5$
(b) $2: 3$
(c) $5: 2$
(d) $25: 6$

Solution:
The option (b) is correct answer.
We know that speed $=$ distance/time
So the speed of bus $=126 / 3=42 \mathrm{~km} / \mathrm{h}$
Speed of train $=315 / 5=63 \mathrm{~km} / \mathrm{h}$
So the ratio of their speeds $=42: 63=2: 3$
8. The ratio of male and female employees in a multinational company is $5: 3$. If there are $\mathbf{1 1 5}$ male employees in the company, then the number of female employees is
(a) 96
(b) 52
(c) 69
(d) 66

Solution:
The option (c) is correct answer.

Consider x as the number of female employees
So we get
$5 / 3=115 / \mathrm{x}$
By cross multiplication
$5 \mathrm{x}=115 \times 3=345$
By division
$\mathrm{x}=345 / 5=69$
9. Length and width of a field are in the ratio $5: 3$. If the width of the field is 42 m , then its length is
(a) 50 m
(b) 70 m
(c) 80 m
(d) 100 m

## Solution:

The option (b) is correct answer.
It is given that length and width of a field $=5: 3$
Consider x m as the length
Width of the filed $=42 \mathrm{~m}$
So the length can be written as

## $5 / 3=x / 42$

By cross multiplication
$3 \mathrm{x}=42 \times 5=210$
By division
$x=210 / 3=70$
10. If $57: x=51: 85$, then the value of $x$ is
(a) 95
(b) 76
(c) 114
(d) None of these

## Solution:

The option (a) is correct answer.
It can be written as
$57 / x=51 / 85$
By cross multiplication
$57 \times 85 / 51=x$
So we get
$\mathrm{x}=95$
11. The ratio of boys and girls in a school is $12: 5$. If there are 840 girls in the school, then the number of boys is
(a) 1190
(b) 2380
(c) 2856
(d) 2142

Solution:
The options are not correct.

Consider x as the number of boys
Ratio of boys and girls $=12: 5$
It can be written as
$12 / 5=x / 840$
By cross multiplication
$\mathrm{x}=12 / 5 \times 840=2016$
12. If $4, a, a, 36$ are in proportion, then $a=$ (a) 24
(b) 12
(c) 3
(d) 24

Solution:
The option (b) is correct answer.
It is given that $4, a, a, 36$ are in proportion
We can write it as $4: \mathrm{a}:: \mathrm{a}: 36$
So we get
$4 / a=a / 36$
By cross multiplication
$4 \times 36=\mathrm{a} \times \mathrm{a}$
We get
$\mathrm{a}^{2}=144$
So $\mathrm{a}=12$
13. If $5: 4:: 30: x$, then the value of $x$ is
(a) 24
(b) 12
(c) $3 / 2$
(d) 6

## Solution:

The option (a) is correct answer.
It can be written as
$5 / 4=30 / \mathrm{x}$
By cross multiplication
$\mathrm{x}=30 \times 4 / 5=24$
14. If $\mathrm{a}, \mathrm{b}, \mathrm{c}, \mathrm{d}$ are in proportion, then
(a) $\mathbf{a b}=\mathrm{cd}$
(b) $\mathbf{a c}=\mathrm{bd}$
(c) $\mathrm{ad}=\mathrm{bc}$
(d) None of these

## Solution:

The option (c) is correct answer.
It is given that $\mathrm{a}, \mathrm{b}, \mathrm{c}, \mathrm{d}$ are in proportion
We can write it as $\mathrm{a}: \mathrm{b}:: \mathrm{c}: \mathrm{d}$
So we get
$\mathrm{a} / \mathrm{b}=\mathrm{c} / \mathrm{d}$

By cross multiplication
$\mathrm{ad}=\mathrm{bc}$
15. If $a, b, c$, are in proportion, then
(a) $\mathbf{a}^{2}=b c$
(b) $\mathrm{b}^{2}=\mathrm{ac}$
(c) $\mathrm{c}^{2}=\mathrm{ab}$
(d) None of these

## Solution:

The option (b) is correct answer.
It is given that a, b, c are in proportion
We can write it as
$\mathrm{a}: \mathrm{b}:: \mathrm{b}: \mathrm{c}$
So we get
$\mathrm{a} / \mathrm{b}=\mathrm{b} / \mathrm{c}$
By cross multiplication
$b^{2}=\mathrm{ac}$
16. If the cost of $\mathbf{5}$ bars of a soap is Rs. $\mathbf{3 0}$, then the cost of one dozen bars is
(a) Rs 60
(b) Rs 120
(c) Rs 72
(d) Rs 140

Solution:
The option (c) is correct answer.
Consider Rs x as the cost of one dozen bars
It can be written as
$30 / 5=\mathrm{x} / 12$
So we get
$\mathrm{x}=30 / 5 \times 12=$ Rs 72
17. 12 men can finish a piece of work in 25 days. The number of days in which the same piece of work can be done by 20 men, is
(a) 10 days
(b) 12 days
(c) 15 days
(d) 14 days

## Solution:

The option (c) is correct answer.
Consider x days required by 20 men to do the same work
$20 / 12=25 / \mathrm{x}$
So we get
$x=12 \times 25 / 20=15$ days
18. If the cost of $\mathbf{2 5}$ packets of $\mathbf{1 2}$ pencils each is Rs $\mathbf{7 5 0}$, then the cost of $\mathbf{3 0}$ packets of $\mathbf{8}$ pencils each is
(a) Rs 600
(b) Rs 720
(c) Rs 640
(d) None of these

## Solution:

The option (a) is correct answer.
We know that
Cost of 300 pencils $=$ Rs 750
So consider Rs x as the cost of 240 pencils
It can be written as
750: 300 :: x: 240
So we get
Cost of 240 pencils $=750 / 300 \times 240=$ Rs 600
19. If $a, b, c$ are in proportion, then
(a) a : b: : b:c
(b) $\mathbf{a}: b: \mathbf{c}: \mathbf{a}$
(c) $a: b:: c: b$
(d) a : c: : b:c

## Solution:

The option (a) is correct answer.
We know that $\mathrm{a}, \mathrm{b}, \mathrm{c}$ are in proportion
So we get $\mathrm{a}: \mathrm{b}:: \mathrm{b}: \mathrm{c}$
It can be written as ac $=b^{2}$
20. The first, second and fourth terms of a proportion are 16,24 and 54 respectively. The third term is
(a) 32
(b) 48
(c) 28
(d) 36

Solution:
The option (d) is correct answer.
Consider x as the third term
We can write it as
16: 24 = x: 54
So we get
$16 / 24=x / 54$
By cross multiplication
$x=16 / 24 \times 54$
We get
$\mathrm{x}=36$

