NCERT solution for Ratio and Proportion

Exercise 12.1
Question 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)
Number of girls: number of boys = 20: 15 =20/15= 4/3 = 4:3
b) Number of girls = 20
Number of boys = 15
Total number of students in the class = 35
Number of girls: total number of students in the class = 20: 35 =20/35 = 4: 7

Question 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

Given
Total number of students in the class = 30
Number of students who like football = 6
Number of students who like cricket = 12
So
Number of students who like tennis = Total number of students in the class – (Sum of students who like football and cricket)

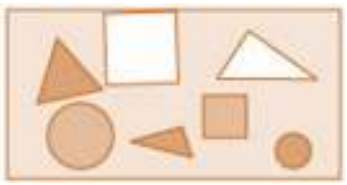
=30 – (6 + 12) = 12

a) Number of students who like football: number of students who like tennis = 6: 12 =6/12= 1: 2

b) Number of students who like cricket: total number of students = 12: 30 =12/30= 2: 5

Question 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

We can count number of different figures in the given question

Number of triangles = 3
Number of circles = 2
Number of squares = 2
Total number of figures inside the rectangle =3+2+2= 7

a) Number of triangles to the number of circles inside the rectangle = 3: 2
(b) Number of squares to all the figures inside the rectangle = 2: 7
(c) Number of circles to all the figures inside the rectangle = 2: 7

Question 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

Distance travelled by Hamid in 1 hour = 9 km
We know that
Speed is given as
Speed= Distance travelled/ Time taken = Speed of Hamid = distance/time = 9 km/hr

Similarly, Distance travelled by Akhtar in 1 hour = 12 km
Speed of Hamid = distance/time = 12 km/hr

Ratio of speed of Hamid: Akhtar = 9: 12 =9/12= 3: 4

Question 5

Fill in the following blanks:

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

Answer

15/18 = 5/6 = 10/12 = 25/30
These ratios are equivalent

Question 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)	81/108 = 9/12= ¾
b)	98/63= 14/9
c)	33/121= 3/11
d)	30/45= 6/9= 2/3

Question 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 Re1

(d) 500 mL to 2 litres

Answer

We can only find ratio here by converting them in same units

It is always easy to convert into smaller of unit

a) 30 minutes to 1.5 hours

1.5 hours = 90 min

So ratio = 30/90= 1/3

b) 40 cm to 1.5 m

1.5 m = 150cm

So ratio= 40/150 = 4/15

c) 55 paise to Re1

Re 1 = 100 paise

So ratio = 55/100 = 11/20

d) 500 mL to 2 litres

2 litres= 2000ml

So ratio = 500/2000 = 1/4

Question 8

In a year, Seema earns Rs 1, 50, 000 and saves Rs 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

Amount earned by Seema = Rs 1,50,000
Amount saved by Seema= Rs. 50,000
Amount spent = Amount earned by Seema - Amount saved by Seema
= 1,50,000 – 50,000 = 1,00,000

a) Money Seema earns: money she saves =1,50,000: 50,000 = 150/50 = 3 :1

b) Money saved: money spent = 50,000: 1,00,000 = 1:2

Question 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 in the school = 102
Number of students in the school = 3300

Number of teachers: number of students = 102: 3300 = 51/1650= 17/550 = 17:550

Question 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

Total number of students in the school = 4320
Number of girls = 2300
Number of boys = Total number of students in the school - Number of girls
=4320 – 2300 = 2020
a) number of girls: total number of students
= 2300: 4320 = 2300/4320 = 230/432 = 115/216
b) number of boys: number of girls
= 2020: 2300 = 202/230 = 101/115 = 101: 115
c) number of boys: total number of students
= 2020: 4320 = 202/432=101/216 = 101: 216

Question 11

Out of 1800 students in a school, 750 opted basketballs, 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 in a school = 1800
Students who opted for basketball = 750
Students who opted for cricket = 800
Students who opted for table tennis = Total number of students in a school - (Sum of students who opted Basketball and cricket)

=1800 – (750 + 800) = 1800 – 1550 = 250

a) Students who opted basketball: Students who opted for table tennis
= 750: 250 = 75/25= 3/1 = 3:1
b) students who opted cricket: basketball
= 800: 750 = 80/75= 16:15
c) students who opted basketball: total number of students
= 750: 1800 = 75/180 = 5:12

Question 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

1dozen = 12 pieces
Cost of 12 pens (a dozen) is = Rs. 180
So Cost of 1 pen = 180 ÷ 12 = Rs 15

Cost of 8 ball pens = Rs. 56
Cost of 1 ball pen = 56 ÷ 8 = Rs. 7

Cost of a pen: Cost of a ball pen = 15: 7

Question 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 meters)	10	?	40
Length of the hall (in meters)	25	50	?

Answer

Breadth of a hall: length of the hall = 2: 5

To fill the missing numbers, we find the equivalent ratios.

Since 5 × 10 = 50, we find 2 × 10 = 20.
That is,
2/5 = 20/50

So 20: 50 is the second ratio.
Similarly
40: 100 is the third ratio.

Question 14

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

Answer

The two parts are 3 and 2. Sum of the parts is 5.
So, Sheela gets 3 parts and Sangeetha gets 2 parts out of every 5 parts.
So we can say that
Sheela gets 3/5 of the total pens and Sangeeta gets 2/5 of the total pens.

Number of pens Sheela gets = (3/5) × 20 = 12
Number of pens Sangeeta gets = (2/5) × 20 =8
Therefore, Sheela gets 12 pens and Sangeeta gets 8 pens.

Question 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

Ratio of their ages = 15: 12 =15/12= 5: 4
Mother divides Rs. 36 in the ratio of their ages 5: 4
Sum of 5 +4= 9

So, Shreya gets 5/9 of the total amount to be divided and Bhoomika gets 4/9 of the total amount to be divided.

Amount Shreya gets = (5/9)× 36= 20
Amount Bhoomika gets = (4/9)× 36= 16
Therefore, Shreya gets Rs. 20 and Bhoomika gets Rs. 16

Question 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.

Answer

Given
Present age of father = 42 years
Present age of his son = 14 years

a) Age of father: age of son = 42: 14 = 42/14= 3/1 = 3:1

b) When the son was 12 = (14 – 2) years old
Then father would have been 40 = (42 – 2) years old.
Age of father: Age of son = 40: 12 = 10:3
c) Age of father after 10 years = Present age + 10 = 42 + 10 = 52 years
Age of son after 10 years = 14 + 10 = 24 years
Age of father: Age of son = 52: 24 = 13:6
d) When was the father 30 years old?
Since, 42 – 30 = 12, we know that 12 years back, the father was 30 years old.
So
Age of son 12 years back was = present age – 12 =14-2= 2 years
Ratio of father: Age of son = 30: 2 = 15: 1

a)	3:1
b)	10:3

c)	13:6
d)	15: 1