

Chapter 8 - Ratio and Proportion

Exercise 8.1

1. Express the following ratios in simplest form:

(i) $20 : 40 \Rightarrow 20/40 = 1/2 \Rightarrow$ Answer: $1 : 2$

(ii) $40 : 20 \Rightarrow 40/20 = 2/1 \Rightarrow$ Answer: $2 : 1$

(iii) $81 : 108 \Rightarrow 81/108 = 3/4 \Rightarrow$ Answer: $3 : 4$

(iv) $98 : 63 \Rightarrow 98/63 = 14/9 \Rightarrow$ Answer: $14 : 9$

2. Fill in the missing numbers in the following equivalent ratios:

(i) $14/21 = \dots/3 = 6/\dots \Rightarrow 14/21 = 2/3 = 6/9$

Answer: Missing numbers are 2 and 9

(ii) $15/18 = \dots/6 = 10/\dots = \dots/30 \Rightarrow 15/18 = 5/6 = 10/12 = 25/30$

Answer: Missing numbers are 5, 12, and 25

3. Find the ratio of each of the following in simplest form:

(i) 2.1 m to 1.2 m $\Rightarrow 2.1/1.2 = 21/12 = 7/4 \Rightarrow$ Answer: $7 : 4$

(ii) 91 cm to 1.04 m (104 cm) $\Rightarrow 91/104 = 7/8 \Rightarrow$ Answer: $7 : 8$

(iii) 3.5 kg (3500 g) to 250 g $\Rightarrow 3500/250 = 14/1 \Rightarrow$ Answer: $14 : 1$

(iv) 60 paise to 4 rupees (400 paise) $\Rightarrow 60/400 = 3/20 \Rightarrow$ Answer: $3 : 20$

(v) 1 minute (60 sec) to 15 seconds $\Rightarrow 60/15 = 4/1 \Rightarrow$ Answer: $4 : 1$

(vi) 15 mm to 2 cm (20 mm) $\Rightarrow 15/20 = 3/4 \Rightarrow$ Answer: $3 : 4$

4. The length and the breadth of a rectangular park are 125 m and 60 m respectively.

What is the ratio of the length to the breadth of the park?

Length = 125 m, Breadth = 60 m

Ratio = $125/60 = 25/12$

Answer: $25 : 12$

5. The population of village is 4800. If the number of females is 2160, find the ratio of males to that of females.

Total population = 4800, Females = 2160

Number of males = $4800 - 2160 = 2640$

Ratio = $2640 / 2160 = 11 / 9$

Answer: 11 : 9

6. In a class, there are 30 boys and 25 girls. Find the ratio of the number of:

(i) boys to that of girls = $30/25 = 6/5 \Rightarrow$ Answer: 6 : 5

(ii) girls to that of total number of students (55) = $25/55 = 5/11 \Rightarrow$ Answer: 5 : 11

(iii) boys to that of total number of students (55) = $30/55 = 6/11 \Rightarrow$ Answer: 6 : 11

7. In a year, Reena earns ₹1,50,000 and saves ₹50,000. Find the ratio of:

Earnings = ₹1,50,000, Savings = ₹50,000, Spending = ₹1,00,000

(i) money she earns to the money she saves = $1,50,000 / 50,000 = 3/1 \Rightarrow$ Answer: 3 : 1

(ii) money that she saves to the money she spends = $50,000 / 1,00,000 = 1/2 \Rightarrow$ Answer: 1 : 2

8. The monthly expenses on transport of a student have increased from ₹350 to ₹500. Find the ratio of:

Original = ₹350, Increased = ₹500, Increase amount = ₹150

(i) increase in expenses to original expenses = $150/350 = 3/7 \Rightarrow$ Answer: 3 : 7

(ii) original expenses to increased expenses = $350/500 = 7/10 \Rightarrow$ Answer: 7 : 10

(iii) increased expenses to increase in expenses = $500/150 = 10/3 \Rightarrow$ Answer: 10 : 3

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

Total = 30, Football = 6, Cricket = 12, Tennis = $30 - (6 + 12) = 12$

(i) number of students liking football to number of students liking tennis = $6/12 = 1/2 \Rightarrow$ Answer: 1 : 2

(ii) number of students liking cricket to total number of students = $12/30 = 2/5 \Rightarrow$ Answer: 2 : 5

10. Which ratio is greater?

(i) 3 : 4 or 2 : 3 $\Rightarrow 3/4 = 9/12, 2/3 = 8/12 \Rightarrow$ Answer: 3 : 4 is greater

(ii) 11 : 21 or 15 : 28 $\Rightarrow 11/21 = 308/588, 15/28 = 315/588 \Rightarrow$ Answer: 15 : 28 is greater

11. Divide ₹560 between Ramu and Munni in the ratio 3 : 2.

Sum of ratio parts = $3 + 2 = 5$

Ramu's share = $(3/5) * 560 = ₹336$

Munni's share = $(2/5) * 560 = ₹224$

Answer: Ramu gets ₹336 and Munni gets ₹224

12. Two people invested ₹15000 and ₹25000 respectively to start a business. They decided to share the profits in the ratio of their investments. If their profit is ₹12000, how much does each get?

Ratio of investments = 15000 : 25000 = 3 : 5

Sum of ratio parts = 3 + 5 = 8

First person's share = $(3/8) \times 12000 = ₹4,500$

Second person's share = $(5/8) \times 12000 = ₹7,500$

Answer: First person gets ₹4,500, Second person gets ₹7,500

13. The ratio of Ankur's money to Roma's money is 9 : 11. If Ankur has ₹540, how much money does Roma have?

Ankur / Roma = 9/11

540 / Roma = 9/11 $\Rightarrow$ Roma = $(540 \times 11) / 9 = 60 \times 11 = ₹660$

Answer: Roma has ₹660

14. The ratio of weights of tin and zinc in an alloy is 2 : 5. How much zinc is there in 31.5 g of alloy?

Sum of ratio parts = 2 + 5 = 7

Amount of zinc = $(5/7) \times 31.5 = 5 \times 4.5 = 22.5$ g

Answer: 22.5 g of zinc

Exercise 8.2

1. Check whether the given two ratios form a proportion or not:

(i) 4 : 6 and 12 : 18 $\Rightarrow 4/6 = 2/3, 12/18 = 2/3 \Rightarrow$ Answer: Yes, they form a proportion.

(ii) 15 : 45 and 40 : 120 $\Rightarrow 15/45 = 1/3, 40/120 = 1/3 \Rightarrow$ Answer: Yes, they form a proportion.

(iii) 14 : 4 and 18 : 6 $\Rightarrow 14/4 = 7/2, 18/6 = 3/1 \Rightarrow$ Answer: No, they do not form a proportion.

(iv) 12 : 18 and 28 : 12 $\Rightarrow 12/18 = 2/3, 28/12 = 7/3 \Rightarrow$ Answer: No, they do not form a proportion.

2. Write true (T) or false (F) against each of the following statements:

(i) 16 : 24 = 20 : 30 $\Rightarrow 16/24 = 2/3, 20/30 = 2/3 \Rightarrow$ Answer: True (T)

(ii) 16 : 24 = 30 : 20 $\Rightarrow 16/24 = 2/3, 30/20 = 3/2 \Rightarrow$ Answer: False (F)

(iii) 21 : 6 :: 35 : 10 $\Rightarrow 21/6 = 7/2, 35/10 = 7/2 \Rightarrow$ Answer: True (T)

(iv) $5.2 : 3.9 :: 3 : 4 \Rightarrow 5.2/3.9 = 4/3 \neq 3/4 \Rightarrow$ Answer: False (F)

3. Find which of the following are in proportion:

(i) 12, 16, 6, 8 $\Rightarrow 12 * 8 = 96, 16 * 6 = 96 \Rightarrow$ Answer: In proportion

(ii) 2, 3, 4, 5 $\Rightarrow 2 * 5 = 10, 3 * 4 = 12 \Rightarrow$ Answer: Not in proportion

(iii) 18, 10, 9, 5 $\Rightarrow 18 * 5 = 90, 10 * 9 = 90 \Rightarrow$ Answer: In proportion

(iv) 18, 9, 10, 5 $\Rightarrow 18 * 5 = 90, 9 * 10 = 90 \Rightarrow$ Answer: In proportion

4. Are the following statements true?

(i) 39 kg : 36 kg = 26 men : 24 men $\Rightarrow 39/36 = 13/12, 26/24 = 13/12 \Rightarrow$ Answer: True

(ii) 45 km : 60 km = 12 hours : 15 hours $\Rightarrow 45/60 = 3/4, 12/15 = 4/5 \Rightarrow$ Answer: False

(iii) 40 people : 200 people = ₹1000 : ₹5000 $\Rightarrow 40/200 = 1/5, 1000/5000 = 1/5 \Rightarrow$
Answer: True

(iv) 7.5 litres : 15 litres = 15 children : 30 children $\Rightarrow 7.5/15 = 1/2, 15/30 = 1/2 \Rightarrow$
Answer: True

5. Determine if the following ratios form a proportion. Also write the middle terms and extreme terms when the ratios form a proportion:

(i) 25 cm : 1 m (100 cm) and ₹40 : ₹160

$25/100 = 1/4, 40/160 = 1/4 \Rightarrow$ Proportion: Yes

Answer: Extreme terms = 25 cm and ₹160 | Middle terms = 1 m and ₹40

(ii) 39 litre : 65 litre and 6 bottles : 10 bottles

$39/65 = 3/5, 6/10 = 3/5 \Rightarrow$ Proportion: Yes

Answer: Extreme terms = 39 litres and 10 bottles | Middle terms = 65 litres and 6 bottles

(iii) 2 kg : 80 kg and 30 sec : 5 minutes (300 sec)

$2/80 = 1/40, 30/300 = 1/10 \Rightarrow$ Proportion: No

Answer: Does not form a proportion

(iv) 200 g : 2.5 kg (2500 g) and ₹4 : ₹50

$200/2500 = 2/25, 4/50 = 2/25 \Rightarrow$ Proportion: Yes

Answer: Extreme terms = 200 g and ₹50 | Middle terms = 2.5 kg and ₹4

Exercise 8.3

1. If the cost of 9 m cloth is ₹378, find the cost of 4 m cloth.

Cost of 1 m cloth = ₹378 / 9 = ₹42

Cost of 4 m cloth = 42 * 4 = ₹168

Answer: ₹168

2. The weight of 36 books is 12 kg. What is weight of 75 such books?

Weight of 1 book = $12 / 36 = 1/3$ kg

Weight of 75 books = $(1/3) * 75 = 25$ kg

Answer: 25 kg

3. Five pens cost ₹115. How many pens can you buy in ₹207?

Cost of 1 pen = $₹115 / 5 = ₹23$

Number of pens for ₹207 = $207 / 23 = 9$ pens

Answer: 9 pens

4. A car consumes 8 litres of petrol in covering a distance of 100 km. How many kilometres will it travel in 26 litres of petrol?

Distance per litre = $100 / 8 = 12.5$ km

Distance in 26 litres = $12.5 * 26 = 325$ km

Answer: 325 km

5. 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?

Diesel per km = $108 / 594 = 2/11$ litres

Diesel for 1650 km = $(2/11) * 1650 = 300$ litres

Answer: 300 litres

6. A transport company charges ₹5400 to carry 80 quintals of weight. What will it charge to carry 126 quintals of weight (same distance)?

Charge per quintal = $₹5400 / 80 = ₹67.50$

Charge for 126 quintals = $67.50 * 126 = ₹8505$

Answer: ₹8505

7. 42 metres of cloth is required to make 20 shirts of the same size. How much cloth will be required to make 36 shirts of that size?

Cloth per shirt = $42 / 20 = 2.1$ m

Cloth for 36 shirts = $2.1 * 36 = 75.6$ m

Answer: 75.6 m

8. Cost of 5 kg of local rice in a village is ₹107.50.

(i) What will be the cost of 8 kg of rice?

Cost per kg = $107.50 / 5 = ₹21.50$ => Cost for 8 kg = $21.50 * 8 = ₹172$

Answer: ₹172

(ii) What quantity of rice can be purchased in ₹64.5?

Quantity for ₹64.5 = $64.50 / 21.50 = 3$ kg

Answer: 3 kg

9. 20 tons of iron costs ₹6,00,000. Find the cost of 560 kg of iron. (1 ton = 1000 kg)

20 tons = 20,000 kg

Cost per kg = $6,00,000 / 20,000 = ₹30$

Cost of 560 kg = $30 * 560 = ₹16,800$

Answer: ₹16,800

10. Cost of 4 dozen bananas is ₹180. How many bananas can be purchased for ₹37.50?

4 dozen = 48 bananas

Cost per banana = $₹180 / 48 = ₹3.75$

Bananas for ₹37.50 = $37.50 / 3.75 = 10$ bananas

Answer: 10 bananas

11. Aman purchases 12 pens for ₹156 and Payush buys 9 pens for ₹108. Can you say who got the pens cheaper?

Aman: $₹156 / 12 = ₹13$ per pen

Payush: $₹108 / 9 = ₹12$ per pen

Answer: Payush got the pens cheaper.

12. Rohit made 42 runs in 6 overs and Virat made 63 runs in 7 overs. Who made more runs per over?

Rohit = $42 / 6 = 7$ runs/over

Virat = $63 / 7 = 9$ runs/over

Answer: Virat made more runs per over.

Exercise 8.4

1. Find the value of :

(i) 18% of ₹450 = $(18/100) * 450 = ₹81 \Rightarrow$ Answer: ₹81

(ii) 14% of 16 (2/3) kg = $(14/100) * (50/3) = 7/3$ kg $\Rightarrow$ Answer: 2 (1/3) kg or 2.33 kg

(iii) 27 (3/4)% of ₹1200 = $(111/400) * 1200 = ₹333 \Rightarrow$ Answer: ₹333

(iv) (5/8)% of 600 m = $(5/800) * 600 = 15/4$ m $\Rightarrow$ Answer: 3 (3/4) m or 3.75 m

(v) 6 (1/4)% of 1 hour 20 minutes (80 min) = $(25/400) * 80 = 5$ minutes $\Rightarrow$ Answer: 5 minutes

(vi) 0.6% of 5 km (5000 m) = $(0.6/100) \times 5000 = 30$ m $\Rightarrow$ Answer: 30 m

2. In a class of 60 students, 45% are girls. Find the number of boys in the class.

Percentage of boys = $100\% - 45\% = 55\%$

Number of boys = 55% of 60 = $(55/100) \times 60 = 33$

Answer: 33 boys

3. Mr. Malkani saves 22% of his salary every month. If his salary is ₹12750 per month, what is his expenditure?

Expenditure percentage = $100\% - 22\% = 78\%$

Expenditure = 78% of ₹12750 = $(78/100) \times 12750 = ₹9,945$

Answer: ₹9,945

4. On a rainy day, 94% of the students were present in a school. If the number of students absent on that day was 174, find the total strength of the school.

Absent percentage = $100\% - 94\% = 6\%$

Let total strength = $x \Rightarrow 6\%$ of $x = 174 \Rightarrow (6/100) \times x = 174 \Rightarrow x = 2900$

Answer: 2,900 students

Exercise 8.5

1. The speed of a car is 105 $(1/5)$ km/h, find the distance covered by it in 3 $(3/5)$ hours.

Speed = $526/5$ km/h, Time = $18/5$ hours

Distance = Speed $\times$ Time = $(526/5) \times (18/5) = 9468/25 = 378.72$ km

Answer: 378.72 km (or 378 $18/25$ km)

2. If the speed of a car is 50.4 km/h, find the distance covered in 3.6 hours.

Distance = Speed $\times$ Time = $50.4 \times 3.6 = 181.44$ km

Answer: 181.44 km

3. If a car covers a distance of 201.25 km in 3.5 hours, find the speed of the car.

Speed = Distance / Time = $201.25 / 3.5 = 57.5$ km/h

Answer: 57.5 km/h

4. A bus travels 160 km in 4 hours and a train travels 320 km in 5 hours at uniform speeds, then find the ratio of the distances travelled by them in one hour.

Bus distance in 1 hour = $160 / 4 = 40$ km

Train distance in 1 hour = $320 / 5 = 64$ km

Ratio = $40 / 64 = 5 / 8$

Answer: 5 : 8