12 Ratio and Proportion

Learn and Remember

Ratio : The ratio of two quantities of the same kind and in the same unit is a fraction that shows how many times the one quantity is of the other.

1. A ratio of a number 'a' to another number 'b' is a fraction $\frac{a}{b}$ and is written as $a : b$.
2. A ratio is said to be in the simplest form if its two terms have no common factor other than 1.
3. The ratio of two quantities is an abstract quantity *i.e.,* it has no unit in itself.

Proportion : An equality of two ratios is called a proportion.

1. If $a : b = c : d$, then we write $a : b :: c : d$.
2. The numbers a, b, c, d are in proportion if the ratio of the first two is equal to the ratio of last two *i.e.,* $a : b = c : d$.
3. If four numbers a, b, c, d are in proportion, then a and d are known as extreme terms and b and c are called middle term.
4. Four numbers are in proportion if the product of extreme terms is equal to the product of the middle terms *i.e.,* $a : b :: c : d$ if and only if $ad = bc$.
5. If $a : b = b : c$, then a, b, c are said to be in continued proportion.
6. If a, b, c are in continued proportion *i.e.,* $a : b :: b : c$, then b is called the mean proportional between a and c.

TEXTBOOK QUESTIONS SOLVED

EXERCISE 12.1

Q1. 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?

Sol. (a) The ratio of girls to that of boys $= \frac{20}{15} = \frac{4}{3} = 4 : 3.$

(b) The ratio of girls to total students $= \frac{20}{20+15} = \frac{20}{35} = \frac{4}{7} = 4 : 7.$

Q2. 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.

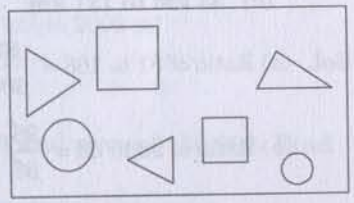
Sol. Total number of students = 30
Number of students like football = 6
Number of students like cricket = 12
Thus number of students like tennis = 30 – 6 – 12 = 12.

(a) The ratio of students like football that of tennis $= \frac{6}{12} = \frac{1}{2} = 1 : 2$

(b) The ratio of students like cricket to that of total student

$$= \frac{12}{30} = \frac{2}{5} = 2 : 5.$$

Q3. 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.



Sol. (a) Ratio of number of triangles to that of circles $= \frac{3}{2} = 3 : 2$

(b) Ratio of number of squares to all figures $= \frac{2}{7} = 2 : 7$

(c) Ratio of number of circles to all figures $= \frac{2}{7} = 2 : 7.$

Q4. 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.

Sol. Speed $= \frac{\text{Distance}}{\text{Time}}$

Speed of Hamid $= \frac{9 \text{ km}}{1 \text{ h}} = 9 \text{ km/h}$

Speed of Akhtar $= \frac{12 \text{ km}}{1 \text{ h}} = 12 \text{ km/h}$

Ratio of speed of Hamid to that of speed of Akhtar $= \frac{9}{12} = \frac{3}{4} = 3 : 4.$

Q5. Fill in the following blanks:

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

Sol. $\frac{15}{18} = \frac{5}{6}$

$\frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$

$\frac{5}{6} \times \frac{5}{5} = \frac{25}{30}$

$\therefore \quad \frac{15}{18} = \frac{\boxed{5}}{6} = \frac{10}{\boxed{12}} = \frac{\boxed{25}}{30}$.

Ans. 5, 12, 25, Yes.

Q6. 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**

Sol. (a) Ratio of 81 to 108 $= \frac{\cancel{81}}{\cancel{108}} = \frac{\cancel{9}}{\cancel{12}} = \frac{3}{4} = 3 : 4$

(b) Ratio of 98 to 63 $= \frac{\cancel{98}}{\cancel{63}} = \frac{14}{9} = 14 : 9$

(c) Ratio of 33 km to 121 km $= \frac{\cancel{33}}{\cancel{121}} = \frac{3}{11} = 3 : 11$

(d) Ratio of 30 minutes to 45 minutes $= \frac{\cancel{30}}{\cancel{45}} = \frac{\cancel{6}}{\cancel{9}} = \frac{2}{3} = 2 : 3.$

Q7. Find the ratio of the following:

(a) 30 minutes to 1.5 hours **(b) 40 cm to 1.5 m**

(c) 55 paise to Re. 1 **(d) 500 ml to 2 litres**

Sol. (a) 1.5 hours $= \frac{\cancel{1.5}}{\cancel{10}} = \frac{3}{2}$ hours

1 hour = 60 minutes

$\frac{3}{2}$ hours $= \frac{3}{\cancel{2}} \times \cancel{60} = 90$ minutes

Ratio of 30 minutes to 1.5 h = 30 minutes to 90 minutes

$$= \frac{\cancel{30}}{\cancel{90}} = \frac{1}{3} = 1 : 3.$$

(b) 1.5 m $= \frac{\cancel{15}}{\cancel{10}} = \frac{3}{2}$ m

1 m = 100 cm

$\frac{3}{2}$ m $= \frac{3}{\cancel{2}} \times \cancel{100} = 150$ cm

40 cm to 1.5 m = 40 cm to 150 cm

$$= \frac{4\cancel{0}}{15\cancel{0}} = \frac{4}{15} = 4 : 15.$$

(c) Re. 1 = 100 paise

$\therefore$ 55 paise to Re. 1 = 55 paise to 100 paise

$$= \frac{\cancel{55}}{\cancel{100}} = \frac{11}{20} = 11 : 20.$$

(d) 1 litre = 1000 ml

2 litres = 2 × 1000 ml = 2000 ml

Ratio of 500 ml to 2 litres = 500 ml to 2000 ml

$$= \frac{\cancel{500}}{\cancel{2000}} = \frac{1}{4} = 1 : 4.$$

Q8. In a year, Seema earns ₹ 1,50,000 and saves ₹ 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.

Sol. Total earning = Rs. 1,50,000

Saving = Rs. 50,000

$\therefore$ Money spent = Rs. 1,50,000 – ₹ 50,000 = ₹ 1,00,000

(a) Ratio of money earned to money saved $= \frac{15\cancel{0000}}{5\cancel{0000}} = \frac{\cancel{15}}{\cancel{5}} = \frac{3}{1}$

$= 3 : 1$

(b) Ratio of money saved to money spend $= \frac{5\cancel{0000}}{10\cancel{0000}} = \frac{\cancel{5}}{\cancel{10}} = \frac{1}{2}$

$= 1 : 2.$

Q9. There are 102 teachers in a school of 3300 students. Find the ratio of the number of teachers to the number of students.

Sol. Ratio of teachers to that of students $= \frac{\cancel{102}}{\cancel{3300}} = \frac{\cancel{51}}{\cancel{1650}} = \frac{17}{550}$

$= 17 : 550.$

Q10. 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.

Sol. Total number of students in school = 4320

Number of girls = 2300

Therefore number of boys = 4320 – 2300 = 2020

(a) Ratio of girls to total number of students = $\frac{2300}{4320} = \frac{115}{216}$

= 115 : 216

(b) Ratio of boys to that of girls = $\frac{202\cancel{0}}{230\cancel{0}} = \frac{101}{115}$ = 101 : 115

(c) Ratio of boys to total number of students = $\frac{202\cancel{0}}{432\cancel{0}} = \frac{101}{216}$

= 101 : 216.

Q11. Out of 1800 students in a school, 750 opted basketball, 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.

Sol. Total number of students : 1800

Number of students opted basketball = 750

Number of students opted cricket = 800

Therefore number of students opted tennis = 1800 – (750 + 800) = 250.

(a) Ratio of students opting basketball to that of opting table tennis

$= \frac{750}{250} = \frac{3}{1} = 3 : 1$

(b) Ratio of students opting cricket to that of opting basketball

$= \frac{80\cancel{0}}{75\cancel{0}} = \frac{16}{15} = 16 : 15$

(c) Ratio of students opting basketball to the total number of students

$= \frac{75\cancel{0}}{180\cancel{0}} = \frac{\cancel{15}}{\cancel{36}} = \frac{5}{12} = 5 : 12.$

Q12. Cost of a dozen pens is ₹ 180 and cost of 8 ball pens is ₹ 56. Find the ratio of the cost of a pen to the cost of a ball pen.

Sol. Cost of a dozen pens *i.e.*, 12 pens = ₹ 180

∴ Cost of 1 pen = 180 ÷ 12 = ₹ 15

Cost of 8 ball pens = ₹ 56

∴ Cost of 1 ball pen = 56 ÷ 8 = ₹ 7

Ratio of cost of one pen to that of ball pen = $\frac{15}{7}$ = 15 : 7.

Q13. 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 metres)	**10**	☐	**40**
Length of the hall (in metres)	**25**	**50**	☐

Sol. Ratio of breadth to length = 2 : 5 = $\frac{2}{5}$

Other equivalent ratios are = $\frac{2}{5} \times \frac{10}{10} = \frac{20}{50}$

$= \frac{2}{5} \times \frac{20}{20} = \frac{40}{100}$

Thus

Breadth of the hall (in metres)	10	20	40
Length of the hall (in metres)	25	50	100

Q14. Divide 20 pens between Sheela and Sangeeta in the ratio of 3 : 2.

Sol. Given ratio between Sheela and Sangeeta = 3 : 2

Total of these terms = 3 + 2 = 5

Thus Sheela share in total = $\frac{3}{5}$ of total pens

Sangeeta share in = $\frac{2}{5}$ of total pens

Thus Sheela gets = $\frac{3}{\cancel{5}} \times \cancel{20} = 12$ pens

Sangeeta gets = $\frac{2}{\cancel{5}} \times \cancel{20} = 8$ pens.

Q15. Mother wants to divide ₹ 36 between her daughters Shreya and Bhoomika in the ratio of their ages. If the age of Shreya is 15

years and age of Bhoomika is 12 years, find how much Shreya and Bhoomika will get.

Sol. Ratio of Shreya age to that of Bhoomika = $\frac{\cancel{15}}{\cancel{12}} = \frac{5}{4} = 5 : 4$

Thus ₹ 36 divide among Shreya and Bhoomika in ratio of 5 : 4

Shreya get = $\frac{5}{9}$ of total money = $\frac{5}{\cancel{9}} \times \cancel{36} =$ ₹ 20

Bhoomika get = $\frac{4}{9}$ of total money = $\frac{4}{\cancel{9}} \times \cancel{36} =$ ₹ 16

Thus Shreya gets ₹ 20 while Bhoomika gets ₹ 16.

Q16. 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.

Sol. (a) Ratio of father's present age to son = $\frac{42}{14} = \frac{3}{1} = 3 : 1$

(b) When son was 12 years (two years ago) then father was (42 – 2) = 40 years

The ratio of their age = $\frac{\cancel{40}}{\cancel{12}} = \frac{10}{3} = 10 : 3$

(c) Age of father after ten years = 42 + 10 = 52 years

Age of son after ten years = 14 + 10 = 24 years

Ratio of father's age to that of son = $\frac{\cancel{52}}{\cancel{24}} = \frac{13}{6} = 13 : 6$

(d) When father was 30 years old (12 years ago) then son was 14 – 12 = 2 years old

Then age of father to that of son = $\frac{30}{2} = \frac{15}{1} = 15 : 1.$

EXERCISE 12.2

Q1. Determine if the following are in proportion:

(a) 15, 45, 40, 120 **(b) 33, 121, 9, 96** **(c) 24, 28, 36, 48**

(d) 32, 48, 70, 210 **(e) 4, 6, 8, 12** **(f) 33, 44, 75, 100**

Sol. (a) $15 : 45 = \frac{\cancel{15}}{\cancel{45}} = \frac{1}{3} = 1 : 3$

$40 : 120 = \frac{\cancel{40}}{\cancel{120}} = \frac{1}{3} = 1 : 3$

Since 15 : 45 = 40 : 120

∴ 15, 45, 40, 120 are in proportion.

(b) $33 : 121 = \frac{\cancel{33}}{\cancel{121}} = \frac{3}{11} = 3 : 11$

$9 : 96 = \frac{\cancel{9}}{\cancel{96}} = \frac{3}{32} = 3 : 32$

Since 33 : 121 ≠ 9 : 96

∴ 33, 121, 9, 96 are not in proportion.

(c) $24 : 28 = \frac{\cancel{24}}{\cancel{28}} = \frac{6}{7} = 6 : 7$

$36 : 48 = \frac{\cancel{36}}{\cancel{48}} = \frac{3}{4} = 3 : 4$

Since 24 : 28 ≠ 36 : 48

∴ 24, 28, 36, 48 are not in proportion.

(d) $32 : 48 = \frac{\cancel{32}}{\cancel{48}} = \frac{\cancel{8}}{\cancel{12}} = \frac{2}{3} = 2 : 3$

$70 : 210 = \frac{7\cancel{0}}{21\cancel{0}} = \frac{1}{3} = 1 : 3$

Since 32 : 48 ≠ 70 : 210

∴ 32, 48, 70, 210 are not in proportion.

(e) $4 : 6 = \frac{\cancel{4}}{\cancel{6}} = \frac{2}{3} = 2 : 3$

$8 : 12 = \frac{\cancel{8}}{\cancel{12}} = \frac{2}{3} = 2 : 3$

Since 4 : 6 = 8 : 12

∴ 4, 6, 8, 12 are in proportion.

(f) $33 : 44 = \frac{\cancel{33}}{\cancel{44}} = \frac{3}{4} = 3 : 4$

$75 : 100 = \frac{\cancel{75}}{\cancel{100}} = \frac{3}{4} = 3 : 4$

Since 33 : 44 = 75 : 100

∴ 33, 44, 75, 100 are in proportion.

Q2. Write True (T) or False (F) against each of the following statements:

(a) 16 : 24 : : 20 : 30 **(b) 21 : 6 : : 35 : 10**

(c) 12 : 18 : : 28 : 12 **(d) 8 : 9 : : 24 : 27**

(e) 5.2 : 3.9 : : 3 : 4 **(f) 0.9 : 0.36 : : 10 : 4**

Sol. (a) 16 : 24 : : 20 : 30

$\Rightarrow \frac{16}{24} = \frac{20}{30}$

$\frac{2}{3} = \frac{2}{3}$

Ans. True

(b) 21 : 6 : : 35 : 10

$\Rightarrow \frac{21}{6} = \frac{35}{10}$

$\frac{7}{2} = \frac{7}{2}$

Ans. True

(c) 12 : 18 : : 28 : 12

$\Rightarrow \frac{12}{18} = \frac{28}{12}$

Since $\frac{2}{3} \neq \frac{7}{3}$

Ans. False

(d) 8 : 9 : : 24 : 27

$\Rightarrow \frac{8}{9} = \frac{24}{27}$

$\frac{8}{9} = \frac{8}{9}$

Ans. True

(e) 5.2 : 3.9 : : 3 : 4

$\Rightarrow \frac{5.2}{3.9} = \frac{3}{4}$

$\frac{4}{3} \neq \frac{3}{4}$

Ans. False

(f) 0.9 : 0.36 : : 10 : 4

$\Rightarrow \frac{0.9}{0.36} = \frac{10}{4}$

Since $\frac{5}{2} = \frac{5}{2}$

Ans. True.

Q3. Are the following statements true?

(a) 40 persons : 200 persons = ₹ 15 : ₹ 75

(b) 7.5 litres : 15 litres = 5 kg : 10 kg

(c) 99 kg : 45 kg = ₹ 44 : ₹ 20

(d) 32 m : 64 m = 6 sec : 12 sec

(e) 45 km : 60 km = 12 hours : 15 hours

Sol. (a) 40 persons : 200 persons $= \frac{40}{200} = \frac{1}{5} = 1 : 5$

₹ 15 : ₹ 75 $= \frac{15}{75} = \frac{1}{5} = 1 : 5$

Thus the statement is true.

(b) 7.5 litres : 15 litres $= \frac{7.5}{15} = \frac{75}{150} = \frac{1}{2} = 1 : 2$

5 kg : 10 kg $= \frac{5}{10} = \frac{1}{2} = 1 : 2$

Thus the statement is true.

(c) 99 kg : 45 kg $= \frac{99}{45} = \frac{11}{5} = 11 : 5$

₹ 44 : ₹ 20 $= \frac{44}{20} = \frac{11}{5} = 11 : 5$

Thus the statement is true.

(d) 32 m : 64 m $= \frac{32}{64} = \frac{1}{2} = 1 : 2$

6 sec : 12 sec $= \frac{6}{12} = \frac{1}{2} = 1 : 2$

Thus the statement is true.

(e) 45 km : 60 km $= \frac{45}{60} = \frac{3}{4} = 3 : 4$

12 hours : 15 hours $= \frac{12}{15} = \frac{4}{5} = 4 : 5$

Since the two ratios are not equal.

Thus the statement is not true.

Q4. Determine if the following ratios form a proportion. Also, write the middle terms and extreme terms where the ratios form a proportion:

(a) 25 cm : 1 m and ₹ 40 : ₹ 160

(b) 39 litres : 65 litres and 6 bottles : 10 bottles

(c) 2 kg : 80 kg and 25 g : 625 g

(d) 200 ml : 2.5 litres and ₹ 4 : ₹ 50

Sol. (a) 25 cm : 1 m = 25 cm : (1 × 100) cm

= 25 cm : 100 cm

$= \frac{25}{100} = \frac{1}{4} = 1 : 4$

₹ 40 : ₹ 160 = $\frac{40}{160} = \frac{1}{4} = 1 : 4$

Since the ratios are equal, they are in proportion

Middle terms = 1 m, ₹ 40

Extreme terms = 25 cm, ₹ 160.

(*b*) 39 litres : 65 litres = $\frac{\cancel{39}}{\cancel{65}} = \frac{3}{5} = 3 : 5$

6 bottles : 10 bottles = $\frac{6}{10} = 3 : 5$

Since the ratios are equal, they are in proportion

Middle terms : 65 litres, 6 bottles

Extreme terms : 39 litres, 10 bottles.

(*c*) 2 kg : 80 kg = $\frac{2}{80} = \frac{1}{40} = 1 : 40$

25 g : 625 g = $\frac{25}{625} = \frac{1}{25} = 1 : 25$

Since the ratios are not equal, therefore they are not in proportion.

(*d*) 200 ml : 2.5 litres

= 200 ml : (2.5 × 1000) ml

= 200 ml : 2500 ml

= $\frac{2\cancel{00}}{25\cancel{00}} = 2 : 25$

₹ 4 : ₹ 50 = $\frac{4}{50} = \frac{2}{25} = 2 : 25$

Since the ratios are equal, therefore they are in proportion.

Middle terms : 2.5 litres, ₹ 4

Extreme terms : 200 ml, ₹ 50.

EXERCISE 12.3

Q1. If the cost of 7 m of cloth is ₹ 294, find the cost of 5 m of cloth.

Sol. Cost of 7 m of cloth = ₹ 294

Cost of 1 m of cloth = ₹ $\frac{\cancel{294}}{\cancel{7}}$ = ₹ 42

Therefore cost of 5 m of cloth = ₹ 42 × 5 = ₹ 210.

Thus cost of 5 m of cloth is ₹ 210.

Q2. Ekta earns ₹ 1500 in 10 days. How much will she earn in 30 days?

Sol. Earning of 10 days = ₹ 1500

Earning of 1 day = $\frac{\text{Rs. } 150\cancel{0}}{1\cancel{0}}$ = ₹ 150

Therefore earning of 30 days = 30 × 150 = ₹ 4500.

Thus earning of 30 days will be ₹ 4500.

Q3. If it has rained 276 mm in the last 3 days, how many cm of rain will fall in one full week (7 days)? Assume that the rain continues to fall at the same rate.

Sol. Rain in 3 days = 276 mm

Rain in 1 day = $\frac{276}{3}$ mm = 92 mm

Therefore rain in 7 days = 7 × 92 = 644 mm.

Thus the rain in 7 days is 644 mm.

Q4. Cost of 5 kg of wheat is ₹ 30.50.

(*a*) What will be the cost of 8 kg of wheat?

(*b*) What quantity of wheat can be purchased in ₹ 61?

Sol. (*a*) Cost of 5 kg of wheat = ₹ 30.50

Cost of 1 kg of wheat = $\frac{30.50}{5}$ = ₹ 6.10

Cost of 8 kg of wheat = 6.10 × 8 = ₹ 48.80.

(*b*) From ₹ 30.50, quantity of wheat that can be purchased = 5 kg

From ₹ 1, quantity of wheat = $\frac{5}{30.50}$

From ₹ 61, quantity of wheat that can be purchased

= $\frac{5}{\cancel{30.50}} \times \cancel{61}$ = 10 kg.

Q5. The temperature dropped 15 degree celsius in the last 30 days. If the rate of temperature drop remains the same, how many degrees will the temperature drop in the next ten days?

Sol. Degree of temperature dropped in last 30 days = 15 degrees

Degree of temperature dropped in 1 day = $\frac{\cancel{15}}{\cancel{30}} = \frac{1}{2}$ degree

Degree of temperature dropped in 10 days = $\frac{1}{2} \times 10 = 5$ degrees.

Thus 5 degree temperature dropped in 10 days.

Q6. Shaina pays ₹ 7500 as rent for 3 months. How much does she has to pay for a whole year, if the rent per month remains same?

Sol. Rent paid for 3 months = ₹ 7500

Rent paid for 1 month = $\frac{7500}{3}$ = ₹ 2500

Rent paid for 12 months = 12 × 2500 = ₹ 30,000

Thus the total rent of one year is ₹ 30,000.

Q7. Cost of 4 dozens bananas is ₹ 60. How many bananas can be purchased for ₹ 12.50?

Sol. Cost of 4 dozens bananas = 60

No. of bananas in 4 dozens = 48

So 60 ₹ = 48 bananas

1 Re. = $\frac{48}{60}$ banana

12.50 ₹ = $\frac{48}{60} \times 12.50$ bananas

$= \frac{48}{60} \times \frac{125}{10}$

$= \frac{24}{30} \times \frac{25}{2}$

$= \frac{25}{30} \times 12$

$= 5 \times 2$

= 10 bananas.

10 bananas can be purchased for ₹ 12.50.

Q8. The weight of 72 books is 9 kg what is the weight of 40 such books?

Sol. The weight of 72 books = 9 kg

Weight of 1 book = $\frac{9 \text{ kg}}{72}$

So, weight of 40 books = $\frac{9}{72} \times 40$ kg = 5 kg

The weight of 40 books is 5 kilogram.

Q9. 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?

Sol. A truck requires 108 litres of diesel for covering 594 km

So 594 km require = 108 litres

1 km requires = $\frac{108}{594}$ litres

1650 km require = $\frac{108}{594} \times 1650$ = 300 litres

Thus 300 litres diesel will be required by the truck to cover a distance of 1650 km.

Q10. Raju purchases 10 pens for ₹ 150 and Manish buys 7 pens for ₹ 84. Can you say who got the pens cheaper?

Sol. Raju purchases 10 pens for ₹ 150

10 pens = 150 ₹

1 pen = $\frac{150}{10}$ ₹ = 15 ₹

So Raju purchase 1 pen at 15 ₹

Manish purchases 7 pens for 84 ₹

7 pen = 84 ₹

1 pen = $\frac{84}{7}$ ₹ = 12 ₹

So Manish purchase 1 pen at 12 ₹

Thus Manish got the pens cheaper.

Q11. Anish made 42 runs in 6 overs and Anup made 63 runs in 7 overs. Who made more runs per over?

Sol. Anish made 42 runs in 6 overs

42 runs = 6 overs

1 over = $\frac{42}{6}$ runs = 7 runs

So Anish's runs per over = 7

Anup made 63 runs in 7 over

63 runs = 7 over

1 over = $\frac{63}{7}$ runs = 9 runs

Anup runs per over = 9

Thus Anup made more runs per over.

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