Mathematics

(Chapter – 8) (Comparing Quantities)
(Class – VII)

Exercise 8.1

Question 1:

Find the ratio of:

   (a) ₹5 to 50 paise
   (b) 15 kg to 210 g

   (c) 9 m to 27 cm
   (d) 30 days to 36 hours

 Answer 1:

To find ratios, both quantities should be in same unit.

   (a) ₹5 to 50 paise

   $\Rightarrow$ 5 x 100 paise to 50 paise   [∵ ₹ 1 = 100 paise]

   $\Rightarrow$ 500 paise to 50 paise

   Thus, the ratio is = $\dfrac{500}{50} = \dfrac{10}{1}$ = 10 : 1

   (b) 15 kg to 210 g

   $\Rightarrow$ 15 x 1000 g to 210 g   [∵ 1 kg = 1000 g]

   $\Rightarrow$ 15000 g to 210 g

   Thus, the ratio is = $\dfrac{15000}{210} = \dfrac{500}{7}$ = 500 : 7

   (c) 9 m to 27 cm

   $\Rightarrow$ 9 x 100 cm to 27 cm   [∵ 1 m = 100 cm]

   $\Rightarrow$ 900 cm to 27 cm

   Thus, the ratio is = $\dfrac{900}{27} = \dfrac{100}{3}$ = 100 : 3

   (d) 30 days to 36 hours

   $\Rightarrow$ 30 x 24 hours to 36 hours   [∵ 1 day = 24 hours]

   $\Rightarrow$ 720 hours to 36 hours

   Thus, the ratio is = $\dfrac{720}{36} = \dfrac{20}{1}$ = 20 : 1

Question 2:

In a computer lab, there are 3 computers for every 6 students. How many computers will be needed for 24 students?

Answer 2:

∵   6 students need = 3 computers

∴   1 student needs = $\dfrac{3}{6}$ computers

∴   24 students need = $\dfrac{3}{6} \times 24 = 12$ computers

Thus, 12 computers will be needed for 24 students.

Question 3:

Population of Rajasthan = 570 lakhs and population of U.P. = 1660 lakhs. Area of Rajasthan = 3 lakh km^2 and area of U.P. = 2 lakh km^2.

     (i)   How many people are there per km^2 in both states?

     (ii)   Which state is less populated?

Answer 3:

     (i)   People present per km^2 = $\dfrac{\text{Population}}{\text{Area}}$

         In Rajasthan = $\dfrac{570 \text{ lakhs}}{3 \text{ lakhs per km}^2}$ = 190 people km^2

         In U.P. = $\dfrac{1660 \text{ lakhs}}{2 \text{ lakh per km}^2}$ = 830 people per km^2

     (ii)   Rajasthan is less populated.

Exercise 8.2

Question 1:

Convert the given fractional numbers to percent:

(a) $\dfrac{1}{8}$ (b) $\dfrac{5}{4}$ (d) $\dfrac{2}{7}$ _

Answer 1:   (c) $\dfrac{4}{0}$

(a) $\dfrac{1}{8} = \dfrac{1}{8} \times 100\% = \dfrac{25}{2}\% = 12.5\%$

(b) $\dfrac{5}{4} = \dfrac{5}{4} \times 100\% = 5 \times 25\% = 125\%$

(c) $\dfrac{3}{40} = \dfrac{3}{40} \times 100\% = \dfrac{3}{2} \times 5\% = \dfrac{15}{2}\% = 7.5\%$

(d) $\dfrac{2}{7} = \dfrac{2}{7} \times 100\% = \dfrac{200}{7}\% = 28\dfrac{4}{7}\%$

Question 2:

Convert the given decimal fractions to per cents:

(a) 0.65   (b) 2.1   (c) 0.02   (d) 12.35

Answer 2:
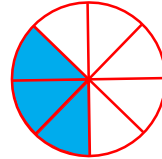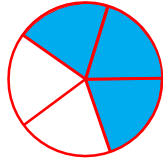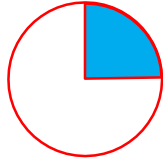
(a) $0.65 = \dfrac{65}{100} \times 100\% = 65\%$

(b) $2.1 = \dfrac{2.1}{100} \times 100\% = 210\%$

(c) $0.02 = \dfrac{2}{100} \times 100\% = 2\%$

(b) $12.35 = \dfrac{12.35}{100} \times 100\% = 1235\%$

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Question 3:

Estimate what part of the figures is coloured and hence find the percent which is coloured.

Answer 3:

(i) Coloured part = $\dfrac{1}{4}$

$\therefore$ Percent of coloured part = $\dfrac{1}{4} \times 100\%$ = 25%

(ii) Coloured part = $\dfrac{3}{5}$

$\therefore$ Percent of coloured part = $\dfrac{3}{5} \times 100\%$ = 60%

(iii) Coloured part = $\dfrac{3}{8}$

$\therefore$ Percent of coloured part = $\dfrac{3}{8} \times 100\%$ = $\dfrac{3}{2} \times 25\%$

= 37.5%

Question 4:

Find:

(a) 15% of 250   (b) 1% of 1 hour

(c) 20% of ₹2500   (d) 75% of 1 kg

Answer 4:

(a) 15% of 250 = $\dfrac{15}{100} \times 250$ = 15 x 2.5 = 37.5

(b) 1% of 1 hours = 1% of 60 minutes = 1% of (60 x 60) seconds

= $\dfrac{1}{100} \times 60 \times 60$ = 6 x 6 = 36 seconds

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(c) 20% of ₹2500 = $\dfrac{20}{100} \times 2500$ = 20 x 25 = ₹ 500

(d) 75% of 1 kg = 75% of 1000 g = $\dfrac{75}{100} \times 1000$ = 750 g = 0.750 kg

Question 5:

Find the whole quantity if:

    (a) 5% of it is 600   (b) 12% of it is ₹1080

    (c) 40% of it is 500 km   (d) 70% of it is 14 minutes

    (e) 8% of it is 40 litres

Answer 5:

Let the whole quantity be x in given questions:

(a) 5% of x = 600

$\Rightarrow \dfrac{5}{100} \times x = 600$

$\Rightarrow x = \dfrac{600 \times 100}{5} = 12,000$

(b) 12% of x = ₹1080

$\Rightarrow \dfrac{12}{100} \times x = 1080$

$\Rightarrow x = \dfrac{1080 \times 100}{12}$ = ₹ 9,000

(c) 40% of x = 500 km

$\Rightarrow \dfrac{40}{100} \times x = 500$

$\Rightarrow x = \dfrac{500 \times 100}{40}$ = 1,250 km

(d) 70% of x = 14 minutes

$\Rightarrow \dfrac{70}{100} \times x = 14$

$\Rightarrow x = \dfrac{14 \times 100}{70}$ = 20 minutes

(e) 8% of x = 40 litres

$\Rightarrow \dfrac{8}{100} \times x = 40$

$\Rightarrow x = \dfrac{40 \times 100}{8}$ = 500 litres

Question 6:

Convert given per cents to decimal fractions and also to fractions in simplest forms:

(a) 25%   (b) 150%   (c) 20%   (d) 5%

Answer 6:

S. No.	Per cents	Fractions	Simplest form	Decimal form
(a)	25%	$\dfrac{25}{100}$	$\dfrac{1}{4}$	0.25
(b)	150%	$\dfrac{150}{100}$	$\dfrac{3}{2}$	1.5
(c)	20%	$\dfrac{20}{100}$	$\dfrac{1}{5}$	0.2
(d)	5%	$\dfrac{5}{100}$	$\dfrac{1}{20}$	0.05

Question 7:

In a city, 30% are females, 40% are males and remaining are children. What percent are children?

Answer 7:

Given: Percentage of females = 30%

Percentage of males = 40%

Total percentage of females and males = 30 + 40 = 70%

Percentage of children = Total percentage – Percentage of males and females

= 100% – 70%

= 30%

Hence, 30% are children.

Question 8:

Out of 15,000 voters in a constituency, 60% voted. Find the percentage of voters who did not vote. Can you now find how many actually did not vote?

Answer 8:

Total voters = 15,000

Percentage of voted candidates = 60%

Percentage of not voted candidates = 100 – 60 = 40%

Actual candidates, who did not vote = 40% of 15000

$$= \frac{40}{100} \times 15000 = 6,000$$

Hence, 6,000 candidates did not vote.

Question 9:

Meeta saves ₹ 400 from her salary. If this is 10% of her salary. What is her salary?

Answer 9:

Let Meera's salary be ₹ x.

Now, 10% of salary = ₹ 400

$\Rightarrow$ 10% of x = ₹ 400

$\Rightarrow$ $\dfrac{10}{100} \times x = 400$

$\Rightarrow$ $x = \dfrac{400 \times 100}{10}$

$\Rightarrow$ $x = 4{,}000$

Hence, Meera's salary is ₹ 4,000.

Question 10:

A local cricket team played 20 matches in one season. It won 25% of them. How many matches did they win?

Answer 10:

Number of matches played by cricket team = 20

Percentage of won matches   = 25%

Total matches won by them   = 25% of 20

= $\dfrac{25}{100} \times 20$

= 5

Hence, they won 5 matches.

Exercise 8.3

Question 1:

Tell what is the profit or loss in the following transactions. Also find profit percent or loss percent in each case.

    (a) Gardening shears bought for ₹ 250 and sold for ₹ 325.

    (b) A refrigerator bought ₹12,000 and sold at ₹ 13,500.

    (c) A cupboard bought for ₹ 2,500 and sold at ₹ 3,000.

    (d) A skirt bought for ₹ 250 and sold at ₹ 150.

Answer 1:

    (a) Cost price of gardening shears = ₹ 250

        Selling price of gardening shears = ₹ 325

        Since,   S.P. > C.P.,   therefore here is profit.

        ∴   Profit = S.P. – C.P. = ₹325 – ₹250 = ₹ 75

$$\text{Now} \quad \text{Profit\%} = \frac{\text{Profit}}{\text{C.P.}} \times 100$$

$$= \frac{75}{250} \times 100 = 30\%$$

        Therefore, Profit = ₹75 and Profit% = 30%

    (b) Cost price of refrigerator = ₹ 12,000

        Selling price of refrigerator = ₹13,500

        Since,   S.P. > C.P.,   therefore here is profit.

        ∴   Profit = S.P. – C.P. = ₹13500 – ₹12000 = ₹1,500

$$\text{Now} \quad \text{Profit\%} = \frac{\text{Profit}}{\text{C.P.}} \times 100$$

$$= \frac{1500}{12000} \times 100 = 12.5\%$$

        Therefore, Profit = ₹1,500 and Profit% = 12.5%

    (c) Cost price of cupboard = ₹ 2,500

        Selling price of cupboard = ₹ 3,000

        Since,   S.P. > C.P.,   therefore here is profit.

        ∴   Profit = S.P. – C.P. = ₹3,000 – ₹2,500 = ₹ 500

$$\text{Now Profit\%} = \frac{\text{Profit}}{\text{C.P.}} \times 100$$

$$= \frac{500}{2500} \times 100 = 20\%$$

        Therefore, Profit = ₹ 500 and Profit% = 20%

(d) Cost price of skirt = ₹ 250

Selling price of skirt = ₹ 150

Since,   C.P. > S.P.,   therefore here is loss.

∴   Loss = C.P. – S.P. = ₹250 – ₹150 = ₹100

Now Loss% = $\dfrac{\text{Loss}}{\text{C.P.}} \times 100$

$= \dfrac{100}{250} \times 100 = 40\%$

Therefore, Profit = ₹ 100 and Profit% = 40%

Question 2:

Convert each part of the ratio to percentage:

(a) 3 : 1 (b) 2 : 3 : 5 (c) 1 : 4 (d) 1 : 2 : 5

Answer 2:

(a) 3 : 1

Total part = 3 + 1 = 4

Therefore,   Fractional part = $\dfrac{3}{4} : \dfrac{1}{4}$

⇒   Percentage of parts = $\dfrac{3}{4} \times 100 : \dfrac{1}{4} \times 100$

⇒   Percentage of parts = 75% : 25%

(b) 2 : 3 : 5

Total part = 2 + 3 + 5 = 10

Therefore, Fractional part = $\dfrac{2}{10} : \dfrac{3}{10} : \dfrac{5}{10}$

⇒   Percentage of parts = $\dfrac{2}{10} \times 100 : \dfrac{3}{10} \times 100 : \dfrac{5}{10} \times 100$

⇒   Percentage of parts = 20% : 30% : 50%

(c) 1 : 4

Total part = 1 + 4 = 5

Therefore,   Fractional part = $\dfrac{1}{5} : \dfrac{4}{5}$

⇒   Percentage of parts = $\dfrac{1}{5} \times 100 : \dfrac{4}{5} \times 100$

⇒   Percentage of parts = 20% : 80%

(d) 1 : 2 : 5

    Total part = 1 + 2 + 5 = 8

    Therefore,   Fractional part = $\dfrac{1}{8}:\dfrac{2}{8}:\dfrac{5}{8}$

  $\Rightarrow$ Percentage of parts = $\dfrac{1}{8}\times100:\dfrac{2}{8}\times100:\dfrac{5}{8}\times100$

  $\Rightarrow$ Percentage of parts = 12.5% : 25% : 62.5%

Question 3:

The population of a city decreased from 25,000 to 24,500. Find the percentage decrease.

Answer 3:

    The decreased population of a city from 25,000 to 24,500.

    Population decreased = 25,000 – 24,500 = 500

    Decreased Percentage = $\dfrac{\text{Population decreased}}{\text{Original population}}\times100$

               $= \dfrac{500}{25000}\times100 = 2\%$

    Hence, the percentage decreased is 2%.

Question 4:

Arun bought a car for ₹3,50,000. The next year, the price went up to ₹3,70,000. What was the percentage of price increase?

Answer 4:

    Increased in price of a car from ₹ 3,50,000 to ₹ 3,70,000.

    Amount change = ₹ 3,70,000 – ₹ 3,50,000 = ₹ 20,000.

    Therefore,   Increased percentage = $\dfrac{\text{Amount of change}}{\text{Original amount}}\times100$

               $= \dfrac{20000}{350000}\times100 = 5\dfrac{5}{7}\%$

    Hence, the percentage of price increased is $5\dfrac{5}{7}\%$.

Question 5:

I buy a T.V. for ₹10,000 and sell it at a profit of 20%. How much money do I get for it?

Answer 5:

The cost price of T.V. = ₹ 10,000

Profit percent = 20%

Now,   Profit = Profit% of C.P.

$$= \frac{20}{100} \times 10000$$

$$= ₹ 2,000$$

Selling price = C.P. + Profit = ₹10,000 + ₹2,000 = ₹ 12,000

Hence, he gets ₹12,000 on selling his T.V.

Question 6:

Juhi sells a washing machine for ₹13,500. She loses 20% in the bargain. What was the price at which she bought it?

Answer 6:

Selling price of washing machine = ₹13,500

Loss percent = 20%

Let the cost price of washing machine be ₹ x.

Since,   Loss = Loss% of C.P.

$\Rightarrow$ Loss = 20% of ₹ x $= \frac{20}{100} \times x = \frac{x}{5}$

Therefore,   S.P. = C.P. – Loss

$\Rightarrow$ $13500 = x - \dfrac{x}{5}$

$\Rightarrow$ $13500 = \dfrac{4x}{5}$

$\Rightarrow$ $x = \dfrac{13500 \times 5}{4}$ = ₹16,875

Hence, the cost price of washing machine is ₹16,875.

Question 7

(i) Chalk contains Calcium, Carbon and Oxygen in the ratio 10:3:12. Find the percentage of Carbon in chalk.

(ii) If in a stick of chalk, Carbon is 3 g, what is the weight of the chalk stick?

Answer 7:

(i) Given ratio = 10 : 3 : 12

Total part = 10 + 3 + 12 = 25

Part of Carbon = $\dfrac{3}{25}$

Percentage of Carbon part in chalk = $\dfrac{3}{25} \times 100 = 12\%$

(ii) Quantity of Carbon in chalk stick = 3 g

Let the weight of chalk be x g.

Then, 12% of x = 3

$\Rightarrow \quad \dfrac{12}{100} \times x = 3$

$\Rightarrow \quad x = \dfrac{3 \times 100}{12} = 25$ g

Hence, the weight of chalk stick is 25 g.

Question 8:

Amina buys a book for ₹275 and sells it at a loss of 15%. How much does she sell it for?

Answer 8:

The cost of a book = ₹275

Loss percent = 15%

Loss = Loss% of C.P.   = 15% of ₹275

$= \dfrac{15}{100} \times 275 = ₹ 41.25$

Therefore,   S.P. = C.P. – Loss = ₹275 – ₹41.25 = ₹233.75

Hence, Amina sells a book for ₹233.75.

Question 9:
Find the amount to be paid at the end of 3 years in each case:

(a) Principal = ₹1,200 at 12% p.a.

(b) Principal = ₹ 7,500 at 5% p.a.

Answer 9:

(a) Here, Principal (P) = ₹1,200, Rate (R) = 12% p.a., Time (T) = 3 years

Simple Interest = $\dfrac{P \times R \times T}{100}$ = $\dfrac{1200 \times 12 \times 3}{100}$

= ₹ 432

Now, Amount = Principal + Simple Interest

= ₹1200 + ₹432

= ₹1,632

(b) Here, Principal (P) = ₹7,500, Rate (R) = 5% p.a., Time (T) = 3 years

Simple Interest = $\dfrac{P \times R \times T}{100}$ = $\dfrac{7500 \times 5 \times 3}{100}$

= ₹1,125

Now, Amount = Principal + Simple Interest

= ₹7,500 + ₹1,125

= ₹ 8,625

Question 10:
What rate gives ₹ 280 as interest on a sum of ₹ 56,000 in 2 years?

Answer 10:

Here, Principal (P) = ₹56,000, Simple Interest (S.I.) = ₹280, Time (T) = 2 years

Simple Interest = $\dfrac{P \times R \times T}{100}$

$\Rightarrow$ $280 = \dfrac{56000 \times R \times 2}{100}$

$\Rightarrow$ $R = \dfrac{280 \times 100}{56000 \times 2}$

$\Rightarrow$ R = 0.25%

Hence, the rate of interest on sum is 0.25%.

Question 11:

If Meena gives an interest of ₹45 for one year at 9% rate p.a. What is the sum she has borrowed?

Answer 11:

Simple Interest = ₹45, Rate (R) = 9% p.a., Time (T) = 1 years

Simple Interest = $\dfrac{P \times R \times T}{100}$

$\Rightarrow \quad 45 = \dfrac{P \times 9 \times 1}{100}$

$\Rightarrow \quad P = \dfrac{45 \times 100}{9 \times 1}$

$\Rightarrow \quad P = ₹\ 500$

Hence, she borrowed ₹ 500.