Chapter 7

Percentage and Its applications

Exercise 7.1

Question 1.
Convert the following percents into fractions in simplest form:
(i) 25%
(ii) 150%
(iii) $7\frac{1}{2}\%$
(iv) $33\frac{1}{3}\%$

Solution:

$$(i)\ 25\% = \frac{25}{100} = \frac{25 \div 25}{100 \div 25} = \frac{1}{4}$$

$$(ii)\ 150\% = \frac{150}{100} = \frac{150 \div 50}{100 \div 50} = \frac{3}{2}$$

$$(iii)\ 7\frac{1}{2}\% = \frac{15}{2 \times 100} = \frac{3}{40}$$

$$(iv)\ 33\frac{1}{3}\% = \frac{100}{3 \times 100} = \frac{1}{3}$$

Question 2.
Convert the following fractions into percents:
(i) 1/8
(ii) 5/4
(iii) 9/16
(iv) 3/7
(v) 11/15
(vi) $1\frac{3}{8}$

Solution:

$$(i)\ \frac{1}{8} = \frac{1\times100}{8} = \frac{25}{2}\% = 12.5\%$$

$$(ii)\ \frac{5}{4} = \frac{5\times100}{4} = 125\%$$

$$(iii)\ \frac{9}{16} = \frac{9\times100}{16} = \frac{225}{4}\% = 56\frac{1}{4}\%$$

$$(iv)\ \frac{3}{7} = \frac{3\times100}{7} = \frac{300}{7}\% = 42\frac{6}{7}\%$$

$$(v)\ \frac{11}{15} = \frac{11\times100}{15} = \frac{220}{3}\% = 73\frac{1}{3}\%$$

$$(vi)\ 1\frac{3}{8} = \frac{11}{8} \times 100 = \frac{275}{2} = 137\frac{1}{2}\%$$

Question 3.

(i) 6 students out of 40 students in a class are absent. What percentage of students are absent ?

(ii) Antony secured 384 marks out of 500 marks. Find the percentage of marks secured by Antony.

(iii) A shop has 500 shirts, out of which 15 are defective. What percentage of shirts are defective?

(iv) Vani has a collection of bangles. She has 20 gold bangles and 10 silver bangles. What is the percentage of each type of bangles?

(v) There are 120 voters and 90 of them voted. What percent did not vote?

Solution:

(i) 6 students out of 40 are absent

$\frac{6}{40} \times 100 = \frac{600}{40} = 15\%$

(ii) Antony secured 384 marks out of 500 marks

Percentage of secured marks = $\frac{384}{500} \times 100 = 76\frac{1}{5}\% = 76.8\%$

(iii) A shop has 500 shirts

Defective shirts = 15

Percentage of defective shirts = $\frac{15}{500} \times 100 = 3\%$

(iv) Vani has 20 gold and 10 silver bangles

Total bangles = 30

Percentage of gold bangles = $\frac{20}{30} \times 100 = \frac{200}{3} = 66\frac{2}{3}\%$

Percentage of silver bangles = $\frac{10}{30} \times 100 = 33\frac{1}{3}\%$

(v) Out of 120 votes, 90 of them voted

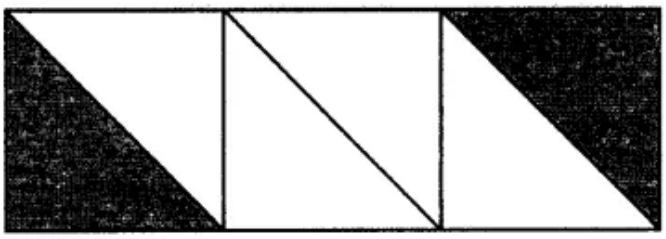
Those who does not voted = 120 − 90 = 30

Percentage = $\frac{30}{120} \times 100 = 25\%$

Question 4.

Estimate the part of the figure which is shaded and hence find the percentage of the part which is shaded.

(*i*)



(*ii*)

(*iii*)

Solution:

(*i*) 3 parts out of 4 = $\frac{3}{4} = \frac{3}{4} \times 100 = 75\%$

(*ii*) 2 parts out of 6 = $\frac{2}{6} = \frac{1}{3} = \frac{1}{3} \times 100 = \frac{100}{3} = 33\frac{1}{3}\%$

(*iii*) 5 parts out of 8 = $\frac{5}{8} = \frac{5}{8} \times 100 = \frac{125}{2}\% = 62\frac{1}{2}\%$ or 62.5%

Question 5.
Convert the following percentage into ratios in sirup rest form:
(i) 14 %
(ii) 134 %
(iii) $33\frac{1}{3}$ %
(iv) 37.5 %
Solution:

$$(i)\ 14\% = \frac{14}{100} = \frac{7}{50} = 7 : 50$$

$$(ii)\ 1\frac{3}{4}\% = \frac{7}{4}\% = \frac{7}{4\times 100}$$

$$= \frac{7}{400} = 7 : 400$$

$$(ii)\ 33\frac{1}{3}\% = \frac{100}{3\times 100} = \frac{1}{3} = 1 : 3$$

$$(iv)\ 37.5\% = 37\frac{1}{2}\% = \frac{75}{2}\%$$

$$= \frac{75}{2\times 100} = \frac{3}{8} = 3 : 8$$

Question 6.
Express the following ratios as percentages:
(i) 5 : 4
(ii) 1 : 1
(iii) 2 : 3
(iv) 9 : 16

Solution:

$$(i)\ 5 : 4 = \frac{5}{4} \times 100 = 125\%$$

$$(ii)\ 1 : 1 = \frac{1}{1} \times 100 = 100\%$$

$$(iii)\ 2 : 3 = \frac{2}{3} \times 100 = \frac{200}{3} = 66\frac{2}{3}\%$$

$$(iv)\ 9 : 16 = \frac{9}{16} \times 100 = \frac{225}{4} = 56\frac{1}{4}\%$$

Question 7.
An alloy consists of 7 parts of zinc and 33 parts of copper. Find the percentage of copper in the alloy ?

Solution:

In an alloy,

7 parts of zinc and 33 parts of copper

Total parts of alloy = 7 + 33 = 40 parts

33 parts out of 40 parts is copper

Percentage of copper = $\frac{33}{40} \times 100$

$= \frac{165}{2}\ \%$

= 82.5%

Question 8.
Chalk contains calcium, carbon and sand in the ratio 12 : 3 : 10. Find the percentage of carbon in the chalk 12%.
Solution:

In chalk, ratio of calcium, carbon and sand = 12 : 3 : 10.

Total of ratio's =12 + 3 + 10 = 25 and carbon = 3

Percentage of carbon in the chalk 3

$= \frac{3}{25} \times 100$

= 12%

Question 9.
If ₹ 2500 is to be divided among Ravi, Raju and Roy, so that Ravi gets two parts, Raju three parts and Roy five parts. How much money will each get? What will it be in percentages?
Solution:

Total amount = ₹ 2500

Ravi gets = 2 parts

Raju gets = 3 parts

and Roy gets = 5 parts

Total parts = 10

Ravi will get = $\frac{2}{10} \times 2500$ = ₹ 500

= $\frac{2}{10} \times 100$ = 20%

Raju will get = $\frac{3}{10} \times 2500$ = ₹ 750

= $\frac{3}{10} \times 100$ = 30%

Roy will get = $\frac{5}{10} \times 2500$ = ₹ 1250

= $\frac{5}{10} \times 100$ = 50%

Question 10.
Convert the following percentages to decimals:
(i) 28%
(ii) 3%
(iii) 0. 44%
(iv) 3712 %
Solution:

$$(i)\ 28\% = \frac{28}{100} = 0.28$$

$$(ii)\ 3\% = \frac{3}{100} = 0.03$$

$$(iii)\ 0.44\% = \frac{0.44}{100} = 0.0044$$

$$(iv)\ 37\frac{1}{2}\% = \frac{75}{2 \times 100} = \frac{75}{200} = 0.375\%$$

Question 11.
Convert the following decimals to percents:

(i) 0.65
(ii) 0.9
(iii) 2.1
(iv) 0.02
Solution:

$$(i)\ 0.65 = \frac{65}{100} = 65\%$$

$$(ii)\ 0.9 = \frac{9}{10} \times \frac{10}{10} = \frac{90}{100} = 90\%$$

$$iii)\ 2.1 = \frac{21}{10} \times \frac{10}{10} = \frac{210}{100} = 210\%$$

$$iv)\ 0.02 = \frac{0.02}{100} = 2\%$$

Question 12.
(i) If 42% of the students in a class are girls, then what percent of the students in the class are boys?
(ii) We have a basket full of apples, oranges, and mangoes if 50% are apples, 30% are oranges, then what percent are mangoes?
Solution:

(i) Number of girls in a class = 42%

Number of boys = 100 − 42 = 58%

(ii) Apples = 50%

Oranges = 30%

and rest mangoes = [100- (50 + 30)]% = (100 − 80)% = 20%

Exercise 7.2

Question 1.
Find:
(i) 15% of 250
(ii) 25% of 120 litres
(iii) 1% of 1 hour
(iv) 75% of 1 kg
(v) 120% of ₹ 250
(vi) 0.6% of 2 km
Solution:

(*i*) 15% of 250

$$= \frac{250 \times 15}{100} = \frac{72}{2} = 37.5$$

(*ii*) 25% of 120 litres

$$= \frac{120 \times 25}{100} = 30 \text{ litres}$$

(*iii*) 1% of 1 hour

= 1 hour = 60 minutes

$$= \frac{1}{100} \times 60 = \frac{3}{5} \text{ min.}$$

$$= \frac{3}{5} \times 60 = 36 \text{ sec.}$$

(*iv*) 75% of 1 kg

1 kg = 1000 m

$$= \frac{75}{100} \times 1000 = 750 \text{ grams}$$

(v) 120% of ₹250

$$= ₹250 = \frac{120}{100} = ₹300$$

(vi) 0.6% of 2 km

1 km = 1000 m

∴ 2 km = 2000 m

$$= \frac{6}{10}\% \text{ of } 2000 \text{ m}$$

$$= \frac{6}{10 \times 100} \times 2000 = 12 \text{ m}$$

Question 2.
8% of children of a class of 25 like getting wet in the rain. How many children like getting wet in the rain?
Solution:

Number of students in a class = 25

Number of children like getting wet in the rain = 8% of 25

$= \frac{8}{100} \times 25 = 2$

Question 3.
Vasundhara ate 3 ice cream cups out of 20 kept in the fridge. What per cent did she eat?
Solution:

Vasundra ate 3 icecream out of 20

Percentage = $\frac{8}{100} \times 100 = 15\%$

Question 4.
Express:
(i) 20 as a percentage of 50
(ii) 60 litres as a percentage of 40 litres
(iii) 90 cm as a percentage of 4.5 m
(iv) 350 g as a percentage of 5.6 kg

Solution:

(i) 20 as a percentage of 50

Percentage = $\frac{20}{50} \times 100 = 40\%$

(ii) 60 litres as a percentage of 40 litres

Percentage = $\frac{60}{40} \times 100 = 150\%$

(iii) 90 cm as a percentage of 4.5 m

4.5 m = 450 cm

Percentage = $\frac{90}{450} \times 100 = 20\%$

(iv) 350 g as a percentage of 5.6 kg

5.6 kg = 5.6 × 1000 gm

$$\therefore \text{ Percentage} = \frac{350}{5.6 \times 1000} \times 100$$

$$= \frac{350 \times 100 \times 10}{1000 \times 56} = \frac{25}{4}\%$$

$$= 6\frac{1}{4}\%$$

Question 5.

What per cent is:

(i) 12 of 80

(ii) 25 paise of 4 rupees

(iii) 300 g of 2 kg

Solution:

(i) 12 of 80

$$= \frac{12}{80} \times 100 = 15\%$$

(*ii*) 25 paise of 4 rupees

= 4 rupees = 4 × 100 paise

$$= \frac{25}{4 \times 100} \times 100$$

$$= \frac{25}{4}\% = 6\frac{1}{4}\%$$

(*iii*) 300 g of 2 kg

2 kg = 2000 gm

$$= \frac{300}{2 \times 1000} \times 100 = 15\%$$

Question 6.
A school team won 6 games this year against 4 games won last year. What is the per cent increase?
Solution:

A school team won 6 games this year against 4 games won last year.

Number of game more won this year = 6 − 4 = 2

Percentage = $\frac{2}{4} \times 100 = 50\%$

Question 7.
The price of a shirt decreased from ₹ 80 to ₹ 60, find the percentage of decrease in the price of the shirt.
Solution:

Price of a shirt decreased from ₹ 80 to ₹ 60

Total decrease = ₹ 80 − ₹ 60 = ₹ 20

Percentage decreased = $\frac{20}{80} \times 100 = 25\%$

Question 8.
My mother says, in her childhood petrol was ₹ 1 per litre. It is ₹ 65 per litre today. By what percentage has the prices of petrol gone up?
Solution:

Some years past, rate of petrol = ₹ 1 per litre

Present rate = ₹ 65 per litre

Increase = $\frac{65}{1} \times 100 = 6500\%$

Question 9.
Rate of basmati rice last year was ₹ 40 a kg. This year they are costly by 20%. What is the price this year?

Solution:

Last year, rate of basmati = ₹ 40 per kg

Increase this year = 20%

$$\therefore \text{ Increased price } = \frac{40 \times (100 + 20)}{100}$$

$$= \frac{40 \times 120}{100} = ₹48 \text{ per kg}$$

Question 10.

300 students took an exam. 28% failed. Calculate the number of students who passed the exam.

Solution:

Total number of students = 300

Failed = 28%

Total failed = 28% of 300

$= \frac{28}{100} \times 300 = 84$

Number of students passed = 300 − 84 = 216

Question 11.

Out of 15000 voters in a constituency, 60% voted. Find the number of voters who did not vote.

Solution:

Total number of voters = 15000

Number of voters who cast their votes

$= 15000 \times \frac{60}{100} = 9000$

Number of voters who did not vote = 15000 − 9000 = 6000

Question 12.

20% of the length of a flagpole is painted green, 45% is painted yellow and the remaining red. If the length of the pole is 18 m, what length of it is painted red?

Solution:

Length of pole = 18 m

Percentage of pole which is painted green = 20%

Percerftage of pole which is painted yellow = 45%

and remaining pole = 100- (20 + 45) = 35%

and it is painted red

Length of pole which is painted red

= 35% of 18 m = $\frac{35}{100} \times 18$

= $\frac{63}{10}$

= 6.3 m

Question 13.

Chalk contains 10% calcium, 3% carbon, 12% oxygen and the remaining sand. Find the amount of carbon and calcium (in grams) in 212 kg of chalk. Also, find the amount of sand (in kg).

Solution:

In chalk,

Calcium = 10%

Carbon = 3%

Oxygen = 12%

Remaining = 100 − (10 + 3 + 12) = 100 − 25 = 75%

Sand = 75%

Weight of chalk = $2\frac{1}{2} = \frac{5}{2}$ **kg**

Amount of carbon $= \frac{5}{2} \times \frac{3}{100} = \frac{3}{40}$ kg

$= \frac{3}{40} \times 1000 = 75$ grams

Amount of calcium $= \frac{5}{2} \times \frac{10}{100} = \frac{1}{4}$ kg

$= 250$ grams

and amount of sand $= \frac{5}{2} \times \frac{75}{100} = \frac{15}{8}$ kg

$= \frac{15}{8} = 1.875$ kg

Question 14.
Find the whole quantity if:
(i) 25% of it is 9
(ii) 75% of it is 15
(iii) 12% of it is ₹ 1080
(iv) 8% of it is 40 litres
Solution:

(*i*) 25% of whole quantity = 9

$\therefore$ Whole quantity $= \frac{9}{25\%} = \frac{9 \times 100}{25} = 36$

(*ii*) 75% of whole quantity = 15

$\therefore$ Whole quantity $= \frac{15}{75\%} = \frac{15 \times 100}{75} = 20$

(*iii*) 12% of whole quantity = ₹1080

$\therefore$ Whole quantity (money) $= \frac{1080}{12\%}$

$= ₹\frac{1080 \times 100}{12} = ₹9000$

(*iv*) 8% of whole quantity = 40 litres

$$\therefore \text{ Whole quantity} = \frac{40}{8\%}$$

$$= \frac{40 \times 100}{8} = 500 \text{ litres}$$

Question 15.
Mohini saves ₹ 400 from her salary. If this is 10% of her salary, then what is her salary?
Solution:

Mohini's savings from her salary = ₹ 400

Which is 10% of her salary

Her salary = ₹ $\frac{400 \times 100}{10}$

= ₹ 4000

Question 16.
16% of the apples in a basket go bad. If there are 42 good apples in the basket, find the total number of apples in the basket.
Solution:

Good apples in the basket = 42

16% of apples in a basket go bad

Remaining good apples = 100 − 16 = 84%

Total apples in the basket = $\frac{42 \times 100}{84}$

= 50 apples

Question 17.
In an examination, a student has to secure 45% marks to pass the exam. If Varun got 251 marks and failed by 19 marks, what are the maximum marks?
Solution:

Pass marks in an examination = 45%

Varun got 251 marks but fails by 19 marks

Pass marks = 251 + 19 = 270

45% of total marks = 270

Total marks = $\frac{270 \times 100}{45}$

= 600 marks

Question 18.

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

Solution:

On a rainy day,

Number of students who were present = 94%

Number of students who were absent = 174

Percentage of absent students = 100 – 94 = 6%

6% of total students = 174

= $\frac{174 \times 100}{6}$

= 2900 students

Question 19.

40% of the population of a town are men and 39% are women. If the number of children is 12600, find the number of men.

Solutions:

Let the whole population be x

Number of men = 40% of x = $\frac{40x}{100}$

Number of women = 39% of x = $\frac{39x}{100}$

Number of children = 12600

According to given condition,

$$x - \left(\frac{40}{100}x + \frac{39}{100}x \right) = 12600$$

$$x-\left(\frac{40x+39x}{100}\right)=12600$$

$$x-\frac{79}{100}x=12600$$

$$\frac{100x-79x}{100}=12600$$

$$\frac{21}{100}x=12600$$

$$x=\frac{12600\times100}{21}=60000.$$

Total population = 60000

Number of men = $\frac{40x}{100}$

= $\frac{40}{100}$ × 60000

= 24000 men

Question 20.

If the price of a watch is increased by 15%, the increase in the price is ₹ 90. What was the price of watching earlier?

Solution:

Let the price of watch earlier be x.

$$\text{Increase} = 15\% \text{ of } x = \frac{15x}{100} = \frac{3x}{20}$$

According to statement,

$$x+\frac{3}{20}x=x+90$$

$$\frac{20x+3x}{20}=x+90$$

$$\frac{23x}{20}=x+90$$

$$\frac{23}{20}x-x=90$$

$$\frac{23x-20x}{20}=90$$

$$\frac{3}{20}x=90$$

$$x=\frac{90\times 20}{3}=600$$

$\therefore$ The price of the watch earlier = ₹600

Question 21.
(i) Find the number which when increased by 30% becomes 39.
(ii) Find the number which when decreased by 8% becomes 506.
Solution:

Let the number be x

According to statement,

x + 30% of x = 39

$x+\frac{30}{100}x=39$

$$\frac{100x+30x}{100}=39$$

$$\frac{130x}{100}=39$$

$$x=\frac{39\times 100}{130}=30$$

Hence the number is 30

(*ii*) Let the number be x

Decrease = 8% of x

$$=\frac{8}{100}x=\frac{2}{25}x$$

According to statement,

$$x-\frac{2}{25}x=506$$

$$\frac{25x-2x}{25}=506$$

$$\frac{23}{25}x=506$$

$$x=\frac{506\times25}{23}=\frac{12650}{23}=550$$

hence the number is 550

Question 22.
The price of a shirt is reduced by 7% to ₹ 465. What is its original price?
Solution:

Let the original price of the shirt be x.

Rate of reduction = 7%

Reduction = 7% of x

$$=\frac{7}{100}x.$$

According to statement,

$$x-\frac{7}{100}x=465$$

$$\frac{100x-7x}{100}=465$$

$$\frac{93}{100}x=465$$

$$x=\frac{465\times100}{93}=500$$

∴ The original price is ₹500

Exercise 7.3

Questions 1.
Rohan bought a calculator for ₹ 760 and sold it for ₹ 874. Find his profit and profit percentage.
Solution:

C.P. of calculate = ₹ 760

and S.P. = ₹ 874

Gain = S.P. − C.P. = ₹ 874 − ₹ 760 = ₹ 114

$$\text{Gain\%} = \frac{\text{Gain} \times 100}{\text{C.P.}} = \frac{114 \times 100}{760} = 15\%$$

Question 2.
Kirti bought a saree for ₹ 2500 and sold it for ₹ 2300. Find her loss and loss percent.
Solution:

C.P. of a saree = ₹ 2500

and S.P. = ₹ 2300

Loss = C.P. − S.P = ₹ 2500 − ₹ 2300 = ₹ 200

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

$$= \frac{200 \times 100}{2500} = 8\%$$

Question 3.
Tell what is profit or loss in the following transactions. Also find profit percent or loss percent in each case:
(i) Gardening shears bought for ₹ 250 and sold for ₹ 325.
(ii) A shirt bought for ₹ 250 and sold at ₹ 150.
Solution:

(i) C.P. of gardening shears = ₹ 250 and S.P. = ₹ 325

Gain = S.P. − C.P. = ₹ 325 − ₹ 250 = ₹ 75

$$\text{Gain\%} = \frac{\text{Gain} \times 100}{\text{C.P.}} = \frac{75 \times 100}{250} = 30\%$$

(ii) C.P. of a shirt = ₹ 250 and S.P. = ₹ 150

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

$$\text{Loss} = \frac{\text{Loss} \times 100}{\text{C.P.}} = \frac{100 \times 100}{250} = 40\%$$

Question 4.

Rajinder bought one almirah for ₹ 4800 and the other for ₹ 3640. He sold the first almirah at a gain of 1313 % and the other at a loss of 15%. How much did he gain or lose in the whole deal?

Solution:

C.P. of one almirah = ₹ 4800

$$\text{Gain\%} = 13\frac{1}{3}\% = \frac{40}{3}\%$$

$$\therefore \text{S.P.} = \frac{\text{C.P.} \times (100 + \text{Gain\%})}{100}$$

$$= \frac{4800 \times \left(100 + \frac{40}{3}\right)}{100}$$

$$= \frac{4800 \times 340}{100 \times 3} = ₹5440$$

C.P. of second almirah = ₹3640

Loss% = 15%

$$\text{S.P.} = \frac{\text{C.P.} \times (100 - \text{Loss\%})}{100}$$

$$= \frac{3640 \times (100 - 15)}{100}$$

$$= ₹\frac{3640 \times 85}{100} = ₹3094$$

C.P. of both the almirahs = ₹ 4800 + ₹ 3640 = ₹ 8440

and S.P. = ₹ 5440 + ₹ 3094 = ₹ 8534

Total gain = S.P. – C.P. = ₹ 8534 – ₹ 8440 = ₹ 94

Question 5.

In a furniture shop, 24 tables were bought at the rate of ₹ 450 per table. The shopkeeper sold 16 of them at the rate of ₹ 600 per table and the remaining at the rate of ₹ 400 per table. Find his gain or loss percent.

Solution:

Price of one table = ₹ 450

C.P. of 24 tables = ₹ 450 × 24 = ₹ 10800

S.P. of 16 tables at the rate of ₹ 600 = ₹ 600 × 16 = ₹ 9600

S.P. of remaining (24 – 16) = 8 tables = ₹ 400 × 8 = ₹ 3200

Total S.P. = ₹ 10800 + ₹ 3200 = ₹ 14400

Gain = S.P. – C.P. = ₹ 14400 – ₹ 10800 = ₹ 3600

$$\text{Gain\%} = \frac{\text{Gain} \times 100}{\text{C.P.}} = \frac{3600 \times 100}{108}$$

$$= \frac{100}{3}\% = 33\frac{1}{3}\%$$

Question 6.

By selling a fan for ₹ 810, a dealer makes a profit of ₹ 60. What is the cost price of the fan? What is his profit percent?

Solution:

S.P. of a fan = ₹ 810

Profit = ₹ 60

Cost price = S.P. – Profit = ₹ 810 – ₹ 60 = ₹ 750

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

$$= \frac{60 \times 100}{750} = 8\%$$

Question 7.

By selling a steel almirah for ₹ 3906, a manufacturer suffers a loss of ₹ 294. Find the

cost price of the almirah and his loss percentage.
Solution:

S.P. of a steel almirah = ₹ 3906

Loss = ₹ 294

C.P. = S.P. + Loss = ₹ 3906 + ₹ 294 = ₹ 4200

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

$$= \frac{294 \times 100}{4200} = 7\%$$

Question 8.
The cost price of a flower vase is ₹ 120. If the shopkeeper sells it at a loss of 10%, find the price at which it was sold.
Solution:

C.P. of a flower vase = ₹ 120

Loss = 10%

$$\therefore \text{ S.P.} = \frac{\text{C.P.} \times (100 - \text{Loss\%})}{100}$$

$$= ₹\frac{120 \times (100 - 10)}{100}$$

$$= ₹\frac{120 \times 90}{100} = ₹108$$

Question 9.
I buy a T.V. for ₹ 10000 and sell it at a profit of 20%. How much money do I get for it?
Solution:

C.P. of a T.V. = ₹ 10000

Profit = 20%

$$\therefore \text{ S.P. of T.V.} = \frac{\text{C.P.} \times (100 + \text{Profit\%})}{100}$$

$$= ₹\frac{10000 \times (100 + 20)}{100}$$

$$= ₹\frac{10000 \times 120}{100} = ₹12000$$

Question 10.
A shopkeeper sells an article at ₹ 300, thus earning a profit of 20%. Find the cost price of the article.
Solution:

S.P. of an article = ₹ 300

Profit = 20%

$$\therefore \text{ Cost price } = \frac{\text{S.P} \times 100}{100 + \text{Profit}\%}$$

$$= \frac{300 \times 100}{100 + 20} = \frac{300 \times 100}{120} = ₹250$$

Question 11.
A shopkeeper sells i n article at ₹ 320, thus suffering a loss of 20%. Find the cost price of the article.
Solution:

S.P. of an article = ₹ 320

Loss = 20%

$$\text{C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss}\%} = \frac{320 \times 100}{100 - 20}$$

$$= \frac{320 \times 100}{80} = ₹400$$

Question 12.
By selling a chair for ₹ 522, a shopkeeper makes a profit of 16%. What is its cost price?

Solution:

S.P. of a chair = ₹ 522

Profit = 16%

$$\therefore \text{ C.P.} = \frac{\text{S.P.} \times 100}{100 + \text{Profit}\%} = \frac{522 \times 100}{100 + 16}$$

$$= ₹\frac{522 \times 100}{116} = ₹450$$

Question 13.
A trader sold some damaged garments for ₹ 7360 at a loss of 8%. Find the cost price of the garments.
Solution:

S.P. of damaged garments = ₹ 7360

Loss = 8%

$$\therefore \text{ C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss}\%} = \frac{7360 \times 100}{100 - 8}$$

$$= \frac{7360 \times 100}{92} = ₹8000$$

Question 14.
By selling a table for ₹ 3168, Rashid loses 12%. Find its cost price. What percent would he gain or lose by selling the table for ₹ 3870?
Solution:

S.P. of a table = ₹ 3168

Loss = 12%

$$\text{C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss}\%} = \frac{3168 \times 100}{100 - 12}$$

$$= \frac{3168 \times 100}{88} = ₹3600$$

If S.P. = ₹3870

Then gain = 3870 – 3600 = ₹270

$$\text{Gain\%} = \frac{\text{Gain} \times 100}{\text{C.P.}} = \frac{270 \times 100}{3600}$$

$$= \frac{15}{2} = 7\frac{1}{2}\% = 7.5\%$$

Question 15.
By selling an article for ₹ 4550, Tony incurs a loss of 9%. What percent would he gain or lose by selling it for ₹ 4825?
Solution:

S.P. of an article = ₹ 4550

Loss = 9%

$$\therefore \text{C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss\%}} = \frac{4550 \times 100}{100 - 9}$$

$$= \frac{4550 \times 100}{91} = ₹5000$$

If S.P. is ₹4825

Then loss = ₹5000 – ₹4825 = ₹175

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

$$= \frac{175 \times 100}{5000} = 3.5\%$$

Exercise 7.4

Question 1.
Find the simple interest on:
(i) ₹ 350 for 2 years at 11% per annum
(ii) ₹ 20000 for 412 years at 812 % per annum
(iii) ₹ 648 for 8 months at 1623 % per annum. Also, find the amount in each case.
Solution:

(i) Principal (P) = ₹ 350

Rate (R) = 11% p.a.

Time (T) = 2 years

$$\therefore \text{ S.I.} = \frac{PRT}{100} = ₹\frac{350 \times 11 \times 2}{100} = ₹77$$

Amount = P + S.I. = ₹ 350 + ₹ 77 = ₹ 427

(ii) Principal (P) = ₹ 20000

Rate (R) = $8\frac{1}{2} = \frac{17}{2}$ % p.a.

Time (T) = $4\frac{1}{2}$ years = $\frac{9}{2}$ years

$$\therefore \text{ S.I.} = \frac{PRT}{100} = \frac{20000 \times 17 \times 9}{100 \times 2 \times 2} = ₹7650$$

and amount = P + S.I. = ₹ 20000 + ₹ 7650 = ₹ 27650

(iii) Principal (P) = ₹ 648

$$\text{Rate (R)} = 16\frac{2}{3}\% = \frac{50}{3}\% \text{ p.a.}$$

$$\text{Time (T)} = 8 \text{ months} = \frac{8}{12} = \frac{2}{3} \text{ years}$$

$$\therefore \text{ S.I.} = \frac{PRT}{100} = \frac{648 \times 50 \times 2}{100 \times 3 \times 3}$$

$$= ₹\frac{648}{9} = ₹72$$

Amount = P + S.I. = ₹ 648 + ₹ 72 = ₹ 720

Question 2.
Find the time when:

(i) simple interest on ₹ 2500 at 4% per annum is ₹ 200
(ii) simple interest on ₹ 12000 at 612 % per annum is ₹ 2730
Solution:

(i) S.I. = ₹ 200

Principal (P) = ₹ 2500

Rate (R) = 4% p.a.

$$\therefore \text{ Time} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}}$$

$$= \frac{200 \times 100}{2500 \times 4} = 2 \text{ years}$$

(*ii*) S.I. = ₹2730

Principal (P) = ₹12000

$$\text{Rate (R)} = 6\frac{1}{2}\% = \frac{13}{2}\% \text{ p.a.}$$

$$\therefore \text{ Time} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}}$$

$$= \frac{2730 \times 100 \times 2}{12000 \times 13} = \frac{7}{2} \text{ years}$$

$$= 3\frac{1}{2} \text{ years}$$

Question 3.
Find the rate of interest when:
(i) simple interest on ₹ 1560 in 3 years is ₹ 585
(ii) simple interest on ₹ 1625 in 212 years is ₹ 325.

Solution:

(i) S.I. = ₹ 585

Principal (P) = ₹ 1560

Time (T) = 3 years

$$\therefore \text{Rate} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{T}} = \frac{585 \times 100}{1560 \times 3}$$

$$= \frac{25}{2} = 12.5\% \text{ p.a.}$$

(*i*) S.I. = ₹325

Principal (P) = ₹1625

$$\text{Time (T)} = 2\frac{1}{2} = \frac{5}{2} \text{ years}$$

$$\therefore \text{Rate} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{T}}$$

$$= \frac{325 \times 100 \times 2}{1625 \times 5} = 8\% \text{ p.a.}$$

Question 4.

Find the principal when:

(i) simple interest at 16% per annum for 212 years is ₹ 3840

(ii) simple interest at 712 % per annum for 2 years 4 months is ₹ 2730.

Solution:

(i) S.I. = ₹ 3840

Rate (R) = 16% p.a.

$$\text{Time (T)} = 2\frac{1}{2} = \frac{5}{2} \text{ years}$$

$$\therefore \text{Principal} = \frac{\text{S.I.} \times 100}{\text{R} \times \text{T}}$$

$$= \frac{3840 \times 100 \times 2}{16 \times 5} = ₹9600$$

(*ii*) S.I. = ₹2730

$$\text{Rate} = 7\frac{1}{2}\% = \frac{15}{2}\% \text{ p.a.}$$

Time (T) = 2 years 4 months

$$= 2\frac{1}{3} = \frac{7}{3} \text{ years}$$

$$\therefore \text{ Principal} = \frac{\text{S.I.} \times 100}{\text{R} \times \text{T}}$$

$$= \frac{2730 \times 100 \times 2 \times 3}{7 \times 15} = ₹15600$$

Question 5.
Find the rate of interest when:
(i) ₹ 1200 amounts to ₹ 1320 in 2 years
(ii) ₹ 300 amounts to ₹ 400 in 2 years.
Solution:

(i) Principal (P) = ₹ 1200

Amount (A) = ₹ 1320

S.I. = A − P = ₹ 1320 − ₹ 1200 = ₹ 120

Time (T) = 2 years

$$\text{Rate \%} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{T}}$$

$$= \frac{120 \times 100}{1200 \times 2} = 5\% \text{ p.a.}$$

(*ii*) Principal (P) = ₹300

Amount (A) = ₹400

$$\therefore \text{ S.I.} = \text{A} - \text{P} = ₹400 - ₹300 = ₹100$$

Time = 2 years

$$\therefore \text{ Rate\%} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{T}} = \frac{100 \times 100}{300 \times 2}$$

$$= \frac{50}{3}\% = 16\frac{2}{3}\% \text{ p.a.}$$

Question 6.
Find the time when:
(i) ₹ 1250 amounts to ₹ 1950 at 16% per annum
(ii) ₹ 6540 amounts to ₹ 8447.50 at 1212 per annum.
Solution:

(i) Principal (P) = ₹ 1250

Amount (A) = ₹ 1950

S.I. = A − P = ₹ 1950 − ₹ 1250 = ₹ 700

Rate = 16% p.a.

$$\therefore \text{Time} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}}$$

$$= \frac{700 \times 100}{1250 \times 16} = \frac{7}{2} \text{ years}$$

$$= 3\frac{1}{2} \text{ years}$$

(ii) Principal (P) = ₹ 6540

Amount (A) = ₹ 8447.50

S.I. = A − P = ₹ 8447.50 − 6540.00 = ₹ 1907.50

$$\text{Rate (R)} = 12\frac{1}{2} = \frac{25}{2}\% \text{ p.a.}$$

$$\therefore \text{Time} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}} = \frac{1907.50 \times 100 \times 2}{6540 \times 25}$$

$$= \frac{3815}{1635} = \frac{7}{3} = 2\frac{1}{3} \text{ years}$$

$$= 2 \text{ years, } 4 \text{ months}$$

Question 7.
₹ 14000 is invested at 4% per annum simple interest. How long will it take for the amount to reach ₹ 16240?

Solution:

Principal (P) = ₹ 14000

Amount (A) = ₹ 16240

S.I. = A − P = ₹ 16240 − ₹ 14000 = ₹ 2240

Rate (R) = 4%

$$\therefore \text{ Time} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}}$$

$$= \frac{2240 \times 100}{14000 \times 4} = 4 \text{ years}$$

Question 8.

An amount of money invested trebled in 6 years. Find the rate of interest earned.

Solution:

Time (T) = 6 years

Let principal = ₹ 100

Then amount = ₹ 100 × 3 = ₹ 300

S.I. = A − P = ₹ 300 − ₹ 100 = ₹ 200

$$\therefore \text{ Rate} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{T}} = \frac{200 \times 100}{100 \times 6}$$

$$= \frac{100}{3}\% = 33\frac{1}{3}\% \text{ p.a.}$$

Question 9.

Find the principal when:

(i) final amount is ₹ 4500 at 20% per annum for 5 years

(ii) final amount is ₹ 2420 at 4% per annum for 212 years.

Solution:

(i) Amount (A) = ₹ 4500

Rate (R) = 20%

Time (T) = 5 years

Let principal (P) = ₹ 100

$$\text{Then S.I.} = \frac{\text{PRT}}{100}$$

$$= \frac{100 \times 20 \times 5}{100} = ₹100$$

and amount = P + S.I = ₹ 100 + ₹ 100 = ₹ 200

If amount is ₹ 200 then principal = ₹ 100

and if amount is ₹ 4500 then principal

$= \frac{100}{200} \times 4500$

= ₹ 2250

(iii) Amount (A) = ₹ 2420

Rate (R) = 4% p.a.

Time (T) = $2\frac{1}{2} = \frac{5}{2}$ years

Let principal = ₹ 100

$$\text{Then S.I.} = \frac{PRT}{100} = \frac{100 \times 4 \times 5}{100 \times 2} = ₹10$$

Amount = P + S.I. = ₹ 100 + ₹ 10 = ₹ 110

If amount is ₹ 110 then principal = ₹ 100

If amount is ₹ 2420, then principal

$= \frac{100 \times 2420}{110}$

= ₹ 2200

Objective Type Questions

Question 1.
Fill in the blanks:
(i) 6% of ₹ 50 = ...
(ii) If 25% of a number is 12, then the number is .....
(iii) The mixed fraction 134 converted to percentage form is
(iv) If a number increases from 20 to 28, then the increasing percentage is .....
(v) If cost price is ₹ 400 and loss is 15%, then the selling price is .....
(vi) The profit or loss percentage is always calculated on .....
(vii) The simple interest on a sum of ₹ 5600 at 8% p.a. for one year is .....
(viii) 135% converted to decimal is .....
(ix) ..... is 50% more than 60.
(x) 25 mL is ..... percent of 5 litres.
Solution:

(i) 6% of ₹ 50 = $\frac{50\times6}{100}$ = ₹ 3.

(ii) If 25% of a number is 12, then the number is .....

25% of a number = 12

$$\therefore \text{ Number} = \frac{12}{25\%} = \frac{12\times100}{25} = 48$$

(iii) The mixed fraction $1\frac{3}{4}$ converted into percentage form is .....

$1\frac{3}{4} = \frac{7}{4}$

$= \frac{7\times100}{4}$

= 175 %

(iv) If a number increases from 20 to 28, then the increase percentage is .....

A number is increases from 20 to 28

Increase = 28 − 20 = 8

Increase% = $\frac{8\times100}{20}$ = 40%

(v) If cost price is ₹ 400 and loss is 15%, then selling price is .....

C.P. = ₹ 400

Loss = 15%

$$S.P. = \frac{C.P. \times (100 - Loss\%)}{100}$$

$$= ₹\frac{400 \times (100 - 15)}{100}$$

$$= ₹\frac{400 \times 85}{100} = ₹340$$

(vi) The profit or loss percentage is always calculated on C.P.

(vii) The simple interest on a sum of ₹ 5600 at 8% p.a. for one year is .....

S.I. on ₹ 5600 for 1 year at 8 % p.a.

$= \frac{5600 \times 1 \times 8}{100}$

= ₹ 448

(viii) 135% converted to decimal is .....

135 % = $\frac{135}{100}$ = 1.35

(ix) ..... is 50% more than 60.

Let required number = x

Then 50% of 60 + 60

= $\frac{50}{100}$ × 60 + 60 = 30 + 60 = 90

90 is 50% more than 60

(x) 25 mL is ..... percent of 5 litres.

25 mL (5 l = 5000mL)

= $\frac{25}{5000}$ × 100

= $\frac{1}{2}$

= 0.5% of 5 litres

To convert CGPA to percentage, all you need to do is multiply your CGPA by 9.5.

Question 2.

State whether the following statements are true (T) or false (F):

(i) 20% more than 30 is 36.

(ii) The ratio 2 : 5 converted to percentage is 60%.

(iii) 614 % expressed as a fraction is 116.

(iv) 80% of 450 m is equal to 360 m.

(v) If a number decreases from 20 to 15, then the decrease is 25%.

(vi) If Feroz obtains 336 marks out of600 marks, then the percentage of marks obtained by him is 33.6.
(vii) 0.018 is equivalent to 8%.
(viii) 250 cm is 4% of 1 km.
(ix) If S.P. of an article is ₹ 540 and loss is ₹ 40, then its C.P. is ₹ 500.
(x) By selling a book for ₹ 50, a shopkeeper suffers a loss of 10%. The cost price of the books is ₹ 60.
Solution:

(i) 20% more than 30 is 36. (True)

Required number = $\frac{20}{100} \times 30 + 30 = 6 + 30 = 36$

(ii) The ratio 2 : 5 converted to percentage is 60%. (False)

Correct:

Ratio 2 : 5 = $\frac{2}{5} \times 100 = 40\%$ not 60%

(iii) $6\frac{1}{4}$ % expressed as a fraction is $\frac{1}{16}$. (True)

$6\frac{1}{4}$ % or $\frac{25}{4}$ %

$= \frac{25}{4 \times 100} = \frac{1}{16}$

(iv) 80% of 450 m is equal to 360 m. (True)

$\frac{80}{100} \times 450$ m = 360

(v) If a number decreases from 20 to 15, then the decrease is 25%. (True)

Total decrease = 20 − 15 = 5

Decrease % = $\frac{5 \times 100}{20}$ = 25%

(vi) If Feroz obtains 336 marks out of600 marks,

then percentage of marks obtained by him is 33.6. (False)

Correct:

336 marks out of 600

Percentage of marks = $\frac{336 \times 100}{600}$

= 56% not 33.6

(vii) 0.018 is equivalent to 8%. (False)

Correct:

0.018 = $\frac{0.018}{1000} = \frac{18 \times 100}{1000}$

= 1.8% not 18%

(viii) 250 cm is 4% of 1 km. (False)

Correct:

1 km = 1000 × 100 cm

= 100000 × $\frac{4}{100}$

= 4000 cm not 250 cm

(ix) If S.P. of an article is ₹ 540 and loss is ₹ 40, then its C.P. is ₹ 500. (False)

Correct:

S.P. of an article = ₹ 540

Loss = ₹ 40

C.P. = ₹ 540 + ₹ 40 = ₹ 580 not ₹ 500

(x) By selling a book for ₹ 50, a shopkeeper suffers a loss of 10%.

The cost price of the books is ₹ 60. (False)

Correct:

S.P. of a book = ₹ 50

Loss = 10%

$$\text{C.P.} = \frac{\text{S.P.} \times 100}{100 - \text{Loss}} = \frac{50 \times 100}{100 - 10}$$

$$= \frac{50 \times 100}{90} = ₹\frac{500}{9} = ₹55\frac{5}{9}$$

Not ₹60.

Multiple Choice Questions

Choose the correct answer from the given four options (3 to 16):

Question 3.

The ratio 2 : 3 expressed as percent is

(a) 40%

(b) 60%

(c) 6623 %

(d) 3313 %

Solution:

$$2 : 3 = \frac{2}{3} \times 100 = \frac{200}{3} = 66\frac{2}{3}\% \qquad \text{(c)}$$

Question 4.

The ratio of Fatima's income to her saving is 4 : 1. The percentage of money saved by her is

(a) 20%
(b) 25%
(c) 40%
(d) 80%
Solution:

Ratio in income and savings = 4 : 1

Percent saving = $\frac{1}{4} \times 100 = 25\%$ (b)

Question 5.
225% is equal to
(a) 2 : 3
(b) 3 : 2
(c) 4 : 9
(d) 9 : 4
Solution:

$225\% = \frac{225}{100} = 9 : 4$ (d)

Question 6.
If 30% of x is 72, then x is equal to
(a) 120
(b) 240
(c) 360
(d) 480
Solution:

30% of x = 72

$$\therefore x = \frac{72}{30\%} = \frac{72 \times 100}{30} = 240$$

Question 7.
If x% of 80 = 12, then x is equal to
(a) 15
(b) 20
(c) 25
(d) 30

Solution:

x% of 80 = 12

$x = \frac{12 \times 100}{80}$ = 15 (a)

Question 8.

0.025 when expressed as a percent is

(a) 250%

(b) 25%

(c) 4%

(d) 2.5%

Solution:

$0.025 = \frac{25}{1000}$ = 2.5% (d)

Question 9.

In class, 45% of students are girls. If there are 22 boys in the class, then the total number of students in the class is

(a) 30

(b) 36

(c) 40

(d) 44

Solution:

Girls one 45% of students in a class

Boys = 100 − 45 = 55%

55% of students = 22

Number of students = $\frac{22 \times 100}{55}$ = 40 (c)

Question 10.

What percent of 17 is 235 ?

(a) 20%

(b) 25%

(c) 30%

(d) 40%

Solution:

$$\text{Let } x\% \text{ of } \frac{1}{7} \text{ is } \frac{2}{35}$$

$$\therefore\ x\% = \frac{2}{35} \times \frac{7}{1} = \frac{2}{5}$$

$$\Rightarrow x = \frac{2}{5} \times 100 = 40\%$$

Question 11.
If a man buys an article for ₹ 80 and sells it for ₹ 100, then gain percentage is
(a) 20%
(b) 25%
(c) 40%
(d) 125%
Solution:
C.P. of an article = ₹ 80 and S.P. = ₹ 100
Gain = ₹ 100 − ₹ 80 = ₹ 20
Gain% = $\frac{20\times100}{80}$ = 25% (b)

Question 12.
If a man buys an article for ₹ 120 and sells it for ₹ 100, then his loss percentage is
(a) 10%
(b) 20%
(c) 25%
(d) 1623%
Solution:
C.P. of an article = ₹ 120
and S.P. = ₹ 100
Loss = ₹ 120 − ₹ 100 = ₹ 20
Loss% = $\frac{20\times10}{120}$
= $\frac{50}{3}$ %
= $16\frac{2}{3}$% (d)

Question 13.
The salary of a man is ₹ 24000 per month. If he gets an increase of 25% in the salary, then the new salary per month is
(a) ₹ 2500
(b) ₹ 28000

(c) ₹ 30000
(d) ₹ 36000
Solution:

Salary of a man = ₹ 24000

Increase = 25%

$$\therefore \text{ Increased salary} = ₹\frac{24000\times(100+25)}{100}$$

$$= ₹\frac{24000\times125}{100} = ₹30000 \qquad \text{(c)}$$

Question 14.
On selling an article for ₹ 100, Renu gains ₹ 20. Her gain percentage is
(a) 25%
(b) 20%
(c) 15%
(d) 40%
Solution:

S.R of an article = ₹ 100

Gain = ₹ 20

C.P. = ₹ 100 – ₹ 20 = ₹ 80

Gain% = $\frac{20\times100}{80}$ = 25% (a)

Question 15.
The simple interest on ₹ 6000 at 8% p.a. for one year is
(a) ₹ 600
(b) ₹ 480
(c) ₹ 400
(d) ₹ 240
Solution:

S.I. on ₹ 6000 for 1 year at 8% p.a.

= $\frac{600\times1\times8}{100}$

= ₹ 480 (b)

Question 16.
If Rohit borrows ₹ 4800 at 5% p.a. simple interest, then the amount he has to return at the end of 2 years is

(a) ₹ 480
(b) ₹ 5040
(c) ₹ 5280
(d) ₹ 5600
Solution:

Principal (P) = ₹ 4800

Rate (R) = 5%

Time (T) = 2 years

$$\therefore \text{ S.P.} = \frac{PRT}{100} = \frac{4800 \times 5 \times 2}{100} = ₹480$$

and Amount = P + S.I. = ₹ 4800 + ₹ 480 = ₹ 5280

Value Based Questions

Question 1.
One bad apple is accidentally mixed with some good apples in a basket. As a result of which 25% of the total apples go bad. Now the number of good apples in the basket is 30. Find the number of good apples kept in the basket previously. What will happen if one bad person is mixed with some good ones?
Solution:

Bad apples in the basket = 25% the total apples

Good apples = 100 − 25 = 75%

Now 75% of the total apples = 30

Total apples = $\frac{30 \times 100}{75}$ = 40

One bad apple which was mixed,

so number of apples in the basket = 40 − 1 = 39

Question 2.
There is a group of 50 people who are patriotic out of which 40% believe in non-violence. Find the number of persons who believe in non-violence. Explain the importance of non-violence in patriotism.

Solution:

Number of people in a group = 50

Number of people who believe non-violence = 40%

Number of people who believe in non-violence = $50 \times \frac{40}{100} = 20$

In order to keep the environment peace find,

we should believe in non-violence and patriotism with violence

can be dangerous for the common people of the country.

Higher Order Thinking Skills (HOTS)

Question 1.

A person preparing medicine wants to convert 15% alcohol solution into 32% alcohol solution. Find how much pure alcohol should he mix with 400 mL of 15% alcohol solution to obtain it.

Solution:

A person wants to convert 15% alcohol solution into 32% alcohol.

There is 400 mL of 15% solution

Quantity of pure alcohol = $400 - \frac{400 \times 15}{100}$

= 400 − 60 mL = 340 mL

Now the order to get 32% mixture the quantity of alcohol = 100 − 32 = 68%

Quantity of alcohol = $\frac{340 \times 100}{68}$ = 50 mL

New pure alcohol to be aded = 500 − 400 = 100 mL

Question 2.

A manufacturer sells an item to an agency at a profit of 25%. The agency sells the item to a shopkeeper at 10% profit and shopkeeper sells the item at a profit of 20%. If the selling price of the item is ₹ 594, find the manufacturing price.

Solution:

S.P. of an item = ₹ 594

Profit = 20%

$\therefore$ C.P. for the shopkeeper = $\frac{\text{S.P.} \times 100}{100 + \text{Profit}\%}$

$= \frac{594 \times 100}{100 + 20} = \frac{594 \times 100}{120} = ₹495$

S.P. for the item to agency = ₹495

Profit = 10%

$\therefore$ C.P. for the agency = $\frac{495 \times 100}{100 + 10}$

$= \frac{495 \times 100}{110} = ₹450$

$\therefore$ S.P. of two items for the manufacturer

= ₹450

Profit = 25%

$\therefore$ C.P. for the manufacturer = $\frac{450 \times 100}{100 + 25}$

$= \frac{450 \times 100}{125} = ₹360$

$\therefore$ Cost price for the manufacterer = ₹360

Check Your Progress

Question 1.
Convert the following percentages into fractions in the simplest form:
(i) 1212 %
(ii) 6623 %
(iii) 813 %
Solution:

$$(i)\ 12\frac{1}{2}\% = \frac{25}{2\times 100} = \frac{1}{8}$$

$$(ii)\ 66\frac{2}{3}\% = \frac{200}{3}\% = \frac{200}{3\times 100} = \frac{2}{3}$$

$$(iii)\ 8\frac{1}{3}\% = \frac{25}{3}\% = \frac{25}{3\times 100} = \frac{1}{12}$$

Question 2.
Express each of the following fractions as a percentage:
(i) 58
(ii) 1340
(iii) 76
Solution:

$$(i)\ \frac{5}{8} = \frac{5\times 100}{8}\% = \frac{125}{2}\% = 66\frac{1}{2}\%$$

$$(ii)\ \frac{13}{40} = \frac{13\times 100}{40}\% = \frac{65}{2}\% = 32\frac{1}{2}\%$$

$$(iii)\ \frac{7}{6} = \frac{7\times 100}{6}\% = \frac{350}{3}\% = 116\frac{2}{3}\%$$

Question 3.
Express each of the following percentages as a decimal:
(i) 122%
(ii) 2.2%
(iii) 318 %

Solution:

$$(i)\ 122\% = \frac{122}{100} = 1.22$$

$$(ii)\ 2.2\% = \frac{2.2}{100} = 0.022$$

$$(iii)\ 3\frac{1}{8}\% = \frac{25}{8\times 100} = \frac{1}{32} = 0.03125$$

Question 4.
Express 0.0345 as a percentage.
Solution:

0.0345 as percentage = $\frac{0.0345}{100}$ = 3.45 %

Question 5.
Convert each part of the ratio 5 : 6 : 9 to a percentage.
Solution:

5 : 6 : 9

Sum of ratio = 5 + 6 + 9 = 20

$$\text{Now, } \frac{5}{20} = \frac{5\times 100}{20} = 25\%$$

$$\frac{6}{20} = \frac{6\times 100}{20} = 30\%$$

$$\frac{9}{20} = \frac{9\times 100}{20} = 45\%$$

Question 6.
(i) What percent of a day is half an hour?
(ii) What percent is 34 metres of 412 metres?

Solution:

(i) Half an hour = $\frac{1}{2}$ hour

Hours in a day = 24 hours

$$\therefore \text{ Percent } = \frac{1}{2 \times 24} \times 100 = \frac{25}{12} = 2\frac{1}{12}\%$$

$$(ii)\ \frac{3}{4}\text{ m of } 4\frac{1}{2}\text{ m}$$

$$\text{Percent } = \frac{\frac{3}{4}}{\frac{9}{2}} \times 100\%$$

$$= \frac{3 \times 2}{4 \times 9} \times 100$$

$$= \frac{50}{3}\% = 16\frac{2}{3}\%$$

Question 7.

The population of a town decreased from 25000 to 24500. Find the percentage decrease.

Solution:

Decrease in population of a town = 25000 − 24500 = 500

Decrease % = $\frac{500 \times 100}{25000}$ = 2%

Question 8.

Arun bought a car for ₹ 350000. The next year, the price went upto ₹ 370000. What was the precentage increase in the price?

Solution

C.P. of a car = ₹ 350000

Next year, price of car was = ₹ 320000

Increase = ₹ 370000 − ₹ 350000 = ₹ 20000

Increase % = $\frac{20600 \times 100}{350000}$

= $\frac{40}{7}$ % = $5\frac{5}{7}$ %

Question 9.
The population of a village has decreased by 6%. If the original population was 3650, find the population after decrease.
Solution:

Decrease in population of a village = 6%

Original population = 3650

$$\therefore \text{ Decreased population} = \frac{3650 \times (100 - 6)}{100}$$

$$= \frac{3650 \times 94}{100} = 3431$$

Question 10.
43% of the students in a school are girls. If the number of boys is 1482, find:
(i) the total strength of the school
(ii) number of girls in the school.
Solution:

In a school, percentage of girls = 43%

Percentage of boys = 100 − 43 = 57%

Number of boys = 1482

(i) 52% of total students = 1482

Total students = $\frac{1482 \times 100}{57}$ = 2600 students

(ii) Number of girls = 2600 − 1482 = 1118 girls

Question 11.
Rohan bought a calculator for ₹ 760 and sold it for ₹ 874. Find his profit and profit percentage.
Solution:

C.P. of a calculator = ₹ 760 and S.P. = ₹ 874

Profit = S.P. − C.P. = ₹ 874 − ₹ 760 = ₹ 114

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

$$= \frac{114 \times 100}{760} = 15\%$$

Question 12.
On selling an article for ₹ 1027, Meena suffered a loss of ₹ 273. Find her loss percentage.
Solution:

S.P. of an article = ₹ 1027

Loss = ₹ 273

C.P. = S.P. + Loss = ₹ 1027 + ₹ 273 = ₹ 1300

$$\text{and loss\%} = \frac{\text{Loss} \times 100}{\text{C.P.}}$$

$$= \frac{273 \times 100}{1300} = 21\%$$

Question 13.
By selling a fan for ₹ 710, a trader suffers a loss of ₹ 40. Find the cost price of the fan. At what price this fan should be sold in order to gain 10%?
Solution:

S.P. of a fan = ₹ 710

Loss = ₹ 40

C.P. = S.P. + Loss = ₹ 710 + ₹ 40 = ₹ 750

If Gain = 10%

$$\text{Then S.P.} = \frac{\text{C.P.} \times (100 + \text{Gain\%})}{100}$$

$$= \frac{750 \times (100 + 10)}{100} = ₹\frac{750 \times 110}{100}$$

$$= ₹825$$

Question 14.
A shopkeeper sells an article at ₹ 300, thus earning a profit of 20%. Find the cost price of the article.

Solution:

S.P. of an article = ₹ 300

Profit = 20%

$$\therefore \text{ Cost price } = \frac{\text{S.P.} \times 100}{(100 + \text{Profit}\%)}$$

$$= \frac{300 \times 100}{100 + 20} = ₹\frac{300 \times 100}{120} = ₹250$$

Question 15.
A shopkeeper sells an article at ₹ 320, thus suffering a loss of 20%. Find the cost price of the article.
Solution:

S.P. of an article = ₹ 320

Loss = 20%

$$\therefore \text{ Cost price } = \frac{\text{S.P.} \times 100}{(100 - \text{Loss}\%)} = ₹\frac{320 \times 100}{100 - 20}$$

$$= ₹\frac{320 \times 100}{80} = ₹400$$

Question 16.
If ₹ 6000 is borrowed at 6.5% per annum simple interest, find the interest and the amount to be paid at the end of 3 years.
Solution:

Principal (P) = ₹ 1600

Rate (R) = 6.5% p.a.

Time (T) = 3 years

$$\therefore \text{ S.I. } = \frac{\text{PRT}}{100} = \frac{6000 \times 6.5 \times 3}{100}$$

$$= \frac{6000 \times 65 \times 3}{100 \times 10} = ₹1170$$

and amount = P + S.I. = ₹ 6000 + ₹ 1170 = ₹ 7170

Question 17.
How long will it take for ₹ 1860 invested at the rate of 9.5% per annum simple interest to amount to ₹ 2449?
Solution:

Principal (P) = ₹ 1860

Amount (A) = ₹ 12449

S.I. = A − P = ₹ 2445 − ₹ 1860 = ₹ 589

$$\text{Rate (R)} = 9.5\% \text{ p.a.} = \frac{19}{2}\% \text{ p.a.}$$

$$\therefore \text{ Time} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{R}}$$

$$= \frac{589 \times 106 \times 2}{1860 \times 19} = \frac{10}{3} \text{ years}$$

$$= 3\frac{1}{3} \text{ years} = 3 \text{ years } 4 \text{ months}$$

Question 18.
At what rate will ₹ 7200 fetch a simple interest of ₹ 3024 in 4 years?
Solution:

Principal (P) = ₹ 7200

S.I. = ₹ 3024

Time = 4 years

$$\therefore \text{ Rate} = \frac{\text{S.I.} \times 100}{\text{P} \times \text{T}} = \frac{3024 \times 100}{7200 \times 4}$$

$$= \frac{21}{2} = 10.5\%$$

Question 19.
What sum of money will yield a simple interest of ₹ 1155in 3 years 6 months at 11% p.a.?

Solution:

S.I. = ₹ 1155

Rate (R) = 11% p.a.

Time (T) = 3 years 6 months

$$= 3\frac{1}{2} = \frac{7}{2} \text{ years}$$

$$\therefore \text{ Principal} = \frac{\text{S.I.} \times 100}{\text{R} \times \text{T}}$$

$$= \frac{1155 \times 100 \times 2}{11 \times 7} = ₹3000$$