CHAPTER – 7

PERCENTAGE

Exercise – 7.1

1. Express the following percentages as fractions:

(i) 356%

(ii) $2\frac{1}{2}$%

(iii) $16\frac{2}{2}$ %

Solution:

(i) 356%

It can be written as

$= \frac{356}{100}$

By further simplification

$= \frac{89}{25}$

$= 3\frac{14}{25}$

(ii) $2\frac{1}{2}$%

It can be written as

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

By further calculation

$= \frac{5}{(2 \times 100)}$

$= \frac{1}{40}$

(iii) $16\frac{2}{3}\%$

It can be written as

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

By further calculation

$= \frac{50}{3} \times \frac{1}{100}$

$= \frac{1}{6}$

2. Express the following fractions as percentages:

(i) $\frac{3}{2}$

(ii) $\frac{9}{20}$

(iii) $1\frac{1}{4}$

Solution:

(i) $\frac{3}{2}$

It can be written as

$= \frac{3}{2} \times 100\%$

$= 150\%$

(ii) $\frac{9}{20}$

It can be written as

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

$= 45\%$

(iii) $1\ \frac{1}{4}$

It can be written as

$= \frac{5}{4} \times 100\%$

$= 125\%$

3. Express the following fractions as decimals. Then express the decimals as percentages:

(i) $\frac{3}{4}$

(ii) $\frac{5}{8}$

(iii) $\frac{3}{16}$

Solution:

(i) $\frac{3}{4} = 0.75$

It can be written as

$\frac{3}{4} = \frac{3}{4} \times 100\%$

By further calculation

$= 3 \times 25\%$

$= 75\%$

(ii) $\frac{5}{8} = 0.625$

It can be written as

$\frac{5}{8} = \frac{5}{8} \times 100\%$

By further calculation

$= \frac{5}{2} \times 25\%$

$= \frac{125}{2}\%$

$= 62.5\%$

(iii) $\frac{3}{16} = 0.1875$

It can be written as

$\frac{3}{16} = \frac{3}{16} \times 100\%$

By further calculation

$= \frac{3}{4} \times 25\%$

$= \frac{75}{4}\%$

$= 18.75\%$

4. Express the following fractions as decimals correct to four decimal places. Then express the decimals as percentages:

(i) $\frac{2}{3}$ **(ii)** $\frac{5}{6}$ **(iii)** $\frac{4}{7}$

Solution:

(i) $\frac{2}{3} = 0.6667$

By correcting to four decimal places

$\frac{2}{3} = 0.6667 \times 100\% = 66.67\%$

$$
\begin{array}{r|l}
3 & \begin{array}{r} 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 2 \end{array} \quad 0.66666
\end{array}
$$

(ii) $\frac{5}{6} = 0.8333$

By correcting to four decimal places

$\frac{5}{6} = 0.8333 \times 100\% = 83.33\%$

$$
\begin{array}{r|l}
6 & \begin{array}{r} 50 \\ 488 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 20 \\ 18 \\ \hline 2 \end{array} \quad 0.83333
\end{array}
$$

(iii) $\frac{4}{7} = 0.5714$

By correcting to four decimal places

$\frac{4}{7} = 0.5714 \times 100\% = 57.14\%$

```
7 | 40000 | 0.5714
    35
    ----
     50
     49
    ----
      10
       7
    ----
      30
      28
    ----
       2
    ----
```

5. Express the following ratios as percentages:

(i) 17: 20

(ii) 13: 18

(iii) 93: 80

Solution:

(i) 17: 20

It can be written as

$17: 20 = \frac{17}{20}$

By further calculation

$= \frac{17}{20} \times 100\%$

So we get

$= 17 \times 5\%$

$= 85\%$

(ii) 13: 18

It can be written as

$13: 18 = \frac{13}{18}$

By further calculation

$= \frac{13}{18} \times 100\%$

So we get

$= \frac{13}{9} \times 50\%$

$= \frac{650}{9}\ \%$

$= 72\frac{2}{9}\%$

(iii) 93: 80

It can be written as

$93: 80 = \frac{93}{80}$

By further calculation

$= \frac{93}{80} \times 100\%$

So we get

$= \frac{93}{4} \times 5\%$

$= \frac{465}{4}\ \%$

$= 116.25\ \%$

6. Express the following percentages as decimals:

(i) 20%

(ii) 2%

(iii) $3\frac{1}{4}$ %

Solution:

(i) 20%

It can be written as

$= \frac{20}{100}$

So we get

= 0.20

= 0.2

(ii) 2%

It can be written as

$= \frac{2}{100}$

So we get

= 0.02

(iii) $3\frac{1}{4}$

It can be written as

$= \frac{13}{4}$

Multiply the denominator by 100

$= \frac{13}{(4 \times 100)}$

$= \frac{13}{400}$

By further calculation

$= \frac{3.25}{100}$

$= 0.325$

7. Find the value of:

(i) 27 % of ₹ 50

(ii) $6\frac{1}{4}$ % of 25 kg

Solution:

(i) 27 % of ₹ 50

It can be written as

$= \frac{27}{100}$ of ₹50

By further calculation

$= \frac{27}{100} \times 50$

So we get

$= \frac{27}{2}$

= ₹ 13.50

(ii) $6\frac{1}{4}$ % of 25 kg

It can be written as

$= \frac{25}{4}$ % of 25 kg

By further calculation

$= \frac{25}{(4 \times 100)}$ of 25 kg

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

So we get

$= \frac{25}{16}$

$= 1\frac{9}{16}$ kg

8. What percent is:

(i) 300 g of 2 kg

(ii) ₹ 7.50 of ₹ 6

Solution:

(i) Required percentage = $\left[\frac{300 \text{ gram}}{2 \text{ kg}} \times 100\right]$ %

It can be written as

$= \left[\frac{300 \text{ gram}}{(2 \times 1000 \text{ gram})} \times 100\right]$ %

By further calculation

$= \left[\frac{300}{(2 \times 1000)} \times 100\right]$ %

So we get

$= \left(\frac{30}{2}\right)$ %

= 15 %

(ii) Required percentage = $\left[\frac{₹7.50}{₹ 6 \times 100}\right]$ %

It can be written as

$= \left[\frac{7.50}{6} \times 100\right] \%$

By further calculation

$= \left[\frac{7.50}{3} \times 50\right] \%$

So we get

$= [2.50 \times 50] \%$

$= 125\%$

9. What percent of:

(i) 50 kg is 65 kg

(ii) ₹ 9 is ₹ 4

Solution:

(i) Consider x% of 50 kg as 65 kg

x% of 50 kg = 65 kg

It can be written as

$\frac{x}{100} \times 50 = 65$

By further calculation

$\frac{x}{2} = 65$

By cross multiplication

x = 130

Therefore 130% of 50 kg is 65 kg.

(ii) Consider x% of ₹ 9 is ₹ 4

x% of ₹ 9 = ₹ 4

It can be written as

$\frac{x}{100} \times 9 = 4$

By further calculation

$x = 4 \times \frac{100}{9}$

So we get

$x = \frac{400}{9}$

$x = 44\frac{4}{9}$

Therefore, $44\frac{4}{9}$ % of ₹ 9 is ₹ 4.

10. (i) If $16\frac{2}{3}$ % of a number is 25, find the number.

(ii) If 13.25 % of a number is 159, find the number.

Solution:

(i) Consider the number as x

$16\frac{2}{3}$ % of x = 25

By further calculation

$\frac{50}{3}$ % of x = 25

It can be written as

$\frac{50}{3} \times \frac{1}{100}$ of x = 25

So we get

$x = \frac{(25 \times 3 \times 100)}{50}$

$x = 150$

Therefore, the number is 150.

(ii) Consider the number as x

13.25% of x = 159

It can be written as

$\frac{13.25}{100}$ of x = 159

By further calculation

$x = \frac{(159 \times 100)}{13.25}$

Multiply and divide by 100

$x = \frac{(159 \times 100 \times 100)}{1325}$

So we get

$x = \frac{(159 \times 4 \times 100)}{53}$

$x = 3 \times 4 \times 100$

$x = 1200$

Therefore, the number is 1200.

11. (i) Increase the number 60 by 30 %

(ii) Decrease the number 750 by 10%

Solution:

(i) New number = $\left(1 + \frac{30}{100}\right)$ of 60

By further calculation

$= \left(1 + \frac{3}{10}\right) \times 60$

So we get

$= \frac{13}{10} \times 60$

$= 78$

(ii) New number = $\left(1 - \frac{10}{100}\right)$ of 750

By further calculation

$= \left(1 - \frac{1}{10}\right) \times 750$

So we get

$= \frac{9}{10} \times 750$

$= 9 \times 75$

$= 675$

12. (i) What number when increased by 15% becomes 299?

(ii) On decreasing the number by 18%, it becomes 697. Find the number.

Solution:

(i) Consider the original number as x

Here

New number = $\left(1 + \frac{15}{100}\right)$ of original number

Substituting the values

$299 = \left(1 + \frac{3}{20}\right) \times x$

Taking LCM

$299 = \left[\frac{(20 + 3)}{20}\right] \times x$

By further calculation

$299 = \frac{23}{20} \times x$

So we get

$x = \frac{(299 \times 20)}{23}$

$x = 13 \times 20$

$x = 260$

Therefore, the original number is 260.

(ii) Consider the original number as x

Here

New number = $\left(1 - \frac{18}{100}\right)$ of original number

Substituting the values

$697 = \left(1 - \frac{18}{100}\right)$ of x

Taking LCM

$697 = \left[\frac{100 - 18}{100}\right] \times x$

By further calculation

$697 = \frac{82}{100} \times x$

So we get

$x = \frac{(697 \times 100)}{82}$

$x = \frac{(697 \times 50)}{41}$

By further simplification

$x = 17 \times 50$

$x = 850$

Therefore, the original number is 850.

13. Mr. Khanna spent 83% of his salary and saved ₹ 1870. Calculate his monthly salary.

Solution:

It is given that

Mr. Khanna spent 83% of his salary

Savings = 100 – 83 = 17%

So 17% of his salary = ₹ 1870

We know that

His salary = ₹ $\frac{(1870 \times 100)}{17}$

= ₹ 11000

14. In school, 38% of the students are girls. If the number of boys is 1023, find the total strength of the school.

Solution:

It is given that

No. of girls in school = 38%

No. of boys in school = (100 – 38) % = 62%

Consider x as the total strength of school

62% of x = 1023

It can be written as

$\frac{62}{100} \times x = 1023$

By further calculation

$x = 1023 \times \frac{100}{62}$

So we get

$x = 1023 \times \frac{50}{31}$

$x = 33 \times 50$

$x = 1650$

Therefore, the total strength of the school is 1650.

15. The price of an article increases from ₹ 960 to ₹ 1080. Find the percentage increase in the price.

Solution:

It is given that

Increase in the price of an article = 1080 – 960 = ₹ 120

We know that

Percentage increase in the price = $\frac{120}{960} \times 100\%$

By further calculation

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

So we get

$= \frac{100}{8}\ \%$

$= \frac{25}{2}\ \%$

$= 12.5\ \%$

16. In a straight contest, the loser polled 42% votes and lost by 14400 votes. Find the total number of votes polled. If the total number of eligible voters was 1 lakh, find what percentage of voters did not vote.

Solution:

It is given that

Losing candidate got 42% of the votes polled

Votes secured by winning candidate = (100 – 42) % of the votes polled

= 58 % of the votes polled

So the difference of votes = 58% – 42% = 16% of the votes polled

We know that

16% of the votes polled = 14400

16%/100 of the votes polled = 14400

So the votes polled = $14400 \times \frac{100}{16}$

By further calculation

$= 900 \times 100$

$= 90000$

Here

Total number of eligible voters = 100000

No. of voters who did not vote = 100000 – 90000 = 10000

Percentage of voters did not vote = $\left[\frac{10000}{100000} \times 100\right]$ %

By further calculation

= 10000/1000 %

= 10 %

17. Out of 8000 candidates, 60% were boys. If 80% of the boys and 90% of the girls passed the exam, find the number of candidates who failed.

Solution:

It is given that

Total number of candidates = 8000

No. of boys = 60% of 8000

By further calculation

= $\frac{60}{100} \times 8000$

So we get

= 60 × 80

= 4800

No. of girls = 8000 – 4800 = 3200

No. of passed boys = 80% of No. of boys

It can be written as

$= \frac{80}{100} \times 4800$

So we get

$= 80 \times 48$

$= 3840$

No. of passed girls = 90% of No. of girls

It can be written as

$= \frac{90}{100} \times 3200$

So we get

$= 90 \times 32$

$= 2880$

No. of passed candidates = 3840 + 2880 = 6720

No. of failed candidates = 8000 – 6720 = 1280

Therefore, the number of candidates who failed is 1280.

18. In an exam, ¼ of the students failed both in English and Maths, 35% of the students failed in Maths and 30% failed in English.

(i) Find the percentage of students who failed in any of the subjects.

(ii) Find the percentage of students who passed in both subjects.

(iii) If the number of students who failed only in English was 25, find the total number of students.

Solution:

Consider the total number of students = x

No. of students who failed both in English and Maths = ¼ of x = x/4

No. of students who failed in Maths = 35% of x

It can be written as

$= \frac{35}{100}$ of x

By further calculation

$= \frac{7}{20} \times$ x

$= \frac{7x}{20}$

No. of students who failed in English = 30% of x

It can be written as

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

By further calculation

$= \frac{3}{10} \times$ x

$= \frac{3x}{10}$

(i) No. of students who failed in any of the subject = $\left(\frac{7x}{20} + \frac{3x}{10}\right) - \frac{x}{4}$

Taking LCM

$= \frac{(7x + 6x)}{20} - \frac{x}{4}$

So we get

$= \frac{(13x - 5x)}{20}$

$= \frac{8x}{20}$

Percentage of students who failed in any of the subject = $\frac{\frac{8x}{20}}{x} \times 100\%$

We can write it as

$= \frac{8x}{20} \times \frac{1}{x} \times 100\%$

By further calculation

$= 8 \times 1 \times 5\%$

$= 40\%$

(ii) Percentage of students who passed in both the subjects = 100 – 40 = 60%

(iii) It is given that

No. of students who failed only in English = 25

We can write it as

$\frac{3x}{10} - \frac{x}{4} = 25$

No. of students who failed only in English = $\frac{3x}{10} - \frac{x}{4}$

Taking LCM

$\frac{(6x - 5x)}{20} = 25$

By further calculation

x = 25 × 20

x = 500

Therefore, the total number of students is 500.

19. On increasing the price of an article by 16%, it becomes ₹ 1479. What was its original price?

Solution:

Consider the original price of an article = ₹ x

1479 = $\left(1 + \frac{16}{100}\right)$ of original price

It can be written as

1479 = $\left[\frac{(100 + 16)}{100}\right] \times$ ₹ x

By further calculation

$1479 = \frac{116}{100} \times x$

So we get

$\frac{116x}{100} = 1479$

By separating the terms

$x = \frac{(1479 \times 100)}{116}$

$x = \frac{(1479 \times 25)}{29}$

By division

$x = 51 \times 25$

$x = 1275$

Therefore, the original price of an article is ₹ 1275.

20. Pratibha reduced her weight by 15%. If now she weighs 59.5 kg, what was her earlier weight?

Solution:

It is given that

Weight reduced by Pratibha = 15%

Present weight of Pratibha = 59.5 kg

Consider her original weight = 100

Reduced weight = 100 – 15 = 85%

Here

85% of her original weight = 59.5 kg

So her original weight = $\frac{(59.5 \times 100)}{85}$

By further calculation

= 0.7 × 100

= 70 kg

21. In a sale, a shop reduces all its prices by 15%. Calculate:

(i) The cost of an article which was originally priced at ₹ 40.

(ii) The original price of an article which was sold for ₹ 20.40.

Solution:

It is given that

Rate of reduction = 15%

(i) Original price of an article = ₹ 40

Rate of reduction = 15%

By further calculation

Reduction = $\frac{(40 \times 15)}{100}$ = ₹ 6

So the sale price = 40 – 6 = ₹ 34

(ii) Sale price = ₹ 20.40

Rate of reduction = 15%

We know that

Cost price = $\frac{(\text{SP} \times 100)}{(100 - \text{reduction } \%)}$

Substituting the values

$= \frac{(20.40 \times 100)}{(100 - 15)}$

By further calculation

$= \frac{(2040 \times 100)}{(100 \times 85)}$

= ₹ 24

22. Increase the price of ₹ 200 by 10% and then decrease the new price by 10%. Is the final price same as the original one?

Solution:

It is given that

Rate of increase = 10%

Rate of decrease = 10%

Price of article = ₹ 200

Here

Increased price = ₹ 200 $\times \frac{(100 + 10)}{100}$

By further calculation

= ₹ 200 $\times \frac{110}{100}$

= ₹ 220

We know that

Decreased price = ₹ 200 × $\frac{(100 - 10)}{100}$

So we get

= ₹ 220 × $\frac{90}{100}$

= ₹ 198

No, the final price is not as same as the original one.

23. Chandani purchased some parrots. 20% flew away and 5% died. Of the remaining, 45% were sold. Now 33 parrots remain. How many parrots had Chandani purchased?

Solution:

Consider Chandani purchased x parrots

No. of parrots flew away = 20% of x

It can be written as

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

So we get

= $\frac{1}{5} \times$ x

= $\frac{x}{5}$

No. of parrots died = 5% of x

It can be written as

= $\frac{5}{100} \times x$

= $\frac{x}{20}$

No. of parrots remaining = $x - \left(\frac{x}{5} + \frac{x}{20}\right)$

Taking LCM

$= x - \left[\frac{(4x + x)}{20}\right]$

By further calculation

$= x - \frac{5x}{20}$

$= x - \frac{x}{4}$

Taking LCM

$= \frac{(4x - x)}{4}$

$= \frac{3x}{4}$

No. of sold parrots = 45% of $\frac{3x}{4}$

It can be written as

$= \frac{45}{100} \times \frac{3x}{4}$

By further calculation

$= \frac{9}{20} \times \frac{3x}{4}$

$= \frac{27x}{80}$

No. of parrots which are not sold = $\frac{3x}{4} - \frac{27}{80}$

Taking LCM

$= \frac{(60x - 27x)}{80}$

$= \frac{33x}{80}$

Based on the question

$\frac{33x}{80} = 33$

By cross multiplication

$33x = 33 \times 80$

So we get

$x = \frac{(33 \times 80)}{33}$

$x = 80$

Therefore, Chandani purchased 80 parrots.

24. A candidate who gets 36% marks in an examination fails by 24 marks but another candidate, who gets 43% marks, gets 18 more marks than the minimum pass marks. Find the maximum marks and the percentage of pass marks.

Solution:

Consider x as the maximum marks

Marks secured by the first candidate = 36% of x

It can be written as

$= \frac{36}{100} \times x = \frac{36x}{100}$

Marks secured by another candidate = 43% of x

It can be written as

$= \frac{43}{100} \times x = \frac{43x}{100}$

The qualifying marks are same for both the candidates

So according to the question

$\frac{36x}{100} + 24 = \frac{43x}{100} - 18$

By further calculation

$24 + 18 = \frac{43x}{100} - \frac{36x}{100}$

Taking LCM

$42 = \frac{(43x - 36x)}{100}$

$42 = \frac{7x}{100}$

By cross multiplication

$x = 42 \times \frac{100}{7}$

$x = 6 \times 100$

$x = 600$

Here the maximum marks = 600

Marks secured by first candidate = $\frac{36}{100} \times 600 = 36 \times 6 = 216$

Qualifying marks = 216 + 24 = 240

So the percentage of qualifying marks = $\left(\frac{240}{600} \times 100\right)$ %

By further calculation

$= \frac{240}{6}$ %

= 40 %

Hence, the maximum mark is 600 and the percentage of pass marks is 40%.

Exercise 7.2

1. Find the profit or loss percentage, when:

(i) C.P. = ₹ 400, S.P. = ₹ 468

(ii) C.P. = ₹ 13600, S.P. = ₹ 12104

Solution:

(i) It is given that

C.P. = ₹ 400, S.P. = ₹ 468

Profit = S.P. – C.P.

Substituting the values

= 468 – 400

= ₹ 68

Here

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

Substituting the values

= $\frac{(68 \times 100)}{400}$

= 17 %

(ii) It is given that

C.P. = ₹ 13600, S.P. = ₹ 12104

Loss = C.P. – S.P.

Substituting the values

= 13600 – 12104

= ₹ 1496

Here

Loss % = $\left[\frac{\text{Loss}}{\text{C.P.}} \times 100\right]$ %

Substituting the values

= $\left[\frac{1496}{13600} \times 100\right]$ %

So we get

= $\frac{1496}{136}$ %

= 11 %

2. By selling an article for ₹ 1636.25, a dealer gains ₹ 96.25. Find his gain per cent.

Solution:

It is given that

S.P. of an article = ₹ 1636.25

Gain = ₹ 96.25

So the C.P. = S.P. – Gain

Substituting the values

= 1636.25 – 96.25

= ₹ 1540

We know that

Gain % = $\left[\frac{\text{Gain}}{\text{C.P.}} \times 100\right]$ %

Substituting the values

$= \left[\frac{96.25}{1540} \times 100\right] \%$

By further calculation

$= \frac{9625}{1540} \%$

$= \frac{1925}{308} \%$

So we get

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

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

3. By selling an article for ₹ 770, a man incurs a loss of ₹ 110. Find his loss percentage.

Solution:

It is given that

S.P. of an article = ₹ 770

Loss = ₹ 110

We know that

C.P. = S.P. + Loss

Substituting the values

= 770 + 110

= ₹ 880

Here

Loss % = $\left[\frac{\text{Loss}}{\text{C.P.}} \times 100\right] \%$

Substituting the values

$= \left[\frac{110}{880} \times 100\right] \%$

By further calculation

$= \frac{100}{8} \%$

So we get

$= \frac{25}{2} \%$

$= 12.5 \%$

4. Rashida bought 25 dozen eggs at the rate of ₹ 9.60 per dozen. 30 eggs were broken in the transaction and she sold the remaining eggs at one rupee each. Find her gain or loss percentage.

Solution:

It is given that

C.P. of one dozen eggs = ₹ 9.60

C.P. of 25 dozen eggs = 25 × 9.60 = ₹ 240

No. of eggs = 25 dozen = 25 × 12 = 300

No. of eggs broken in transaction = 30

No. of remaining eggs = 300 – 30 = 270

We know that

S.P. of one egg = ₹ 1

S.P. of 270 eggs = 1 × 270 = ₹ 270

So the profit = S.P. – C.P.

Substituting the values

= 270 – 240

= ₹ 30

Here

Profit % = $\left[\frac{\text{Profit}}{\text{C.P.}} \times 100\right]$ %

Substituting the values

= $\left[\frac{30}{240} \times 100\right]$ %

So we get

= $\frac{100}{8}$ %

= $\frac{25}{2}$ %

= 12.5 %

5. The cost of an article was ₹ 20000 and ₹ 1400 were spent on its repairs. If it is sold for a profit of 20 %, find the selling price of the article.

Solution:

It is given that

Cost of an article = ₹ 20000

Cost of its repair = ₹ 1400

So the total cost = 20000 + 1400 = ₹ 21400

Profit = 20 %

We know that

S.P. = $\frac{[\text{C.P.} \times (100 + \text{Profit \%})]}{100}$

Substituting the values

$= \frac{[21400 \times (100 + 20)]}{100}$

By further calculation

$= \frac{(21400 \times 120)}{100}$

= ₹ 25680

‘6. A shopkeeper buys 200 bicycles at ₹ 1200 per bicycle. He spends ₹ 30 per bicycle on transportation. He also spends ₹ 4000 on advertising. Then he sells all the bicycles at ₹ 1350 per piece. Find his profit or loss. Also, calculate it as a percentage.

Solution:

It is given that

C.P. of one bicycle = ₹ 1200

C.P. of 200 bicycle = 1200 × 200 = ₹ 240000

Expenditure on transportation for one bicycle = ₹ 30

Expenditure on transportation for 200 bicycle = 30 × 200 = ₹ 6000

Expenditure on advertising = ₹ 4000

We know that

Net C.P. of the bicycle = 240000 + 6000 + 4000 = ₹ 250000

S.P. of 200 bicycle at ₹ 1350 per bicycle = 200 × 1350 = ₹ 270000

So profit = S.P – C.P.

Substituting the values

= 270000 – 250000

= ₹ 20000

Here

Profit % = $\left[\frac{\text{Profit}}{\text{C.P.}} \times 100\right]$ %

Substituting the values

= $\left[\frac{20000}{250000} \times 100\right]$ %

So we get

= $\frac{200}{25}$ %

= 8%

7. The cost price of an article is 90% of its selling price. Find his profit percentage.

Solution:

Consider ₹ x as the S.P. of an article

C.P. of an article = 90% of ₹ x

It can be written as

= $\frac{90}{100}$ × ₹ x

= ₹ $\frac{9x}{10}$

We know that

Profit = S.P. – C.P.

Substituting the values

= x – $\frac{9x}{10}$

Taking LCM

$= \frac{(10x - 9x)}{10}$

$= ₹ \frac{x}{10}$

Here

Profit % $= \left[\frac{\text{Profit}}{\text{C.P.}} \times 100\right]\%$

Substituting the values

$= \left[\frac{\frac{x}{10}}{\frac{9x}{10}} \times 100\right] \%$

It can be written as

$= \left[\frac{x}{10} \times \frac{10}{9x} \times 100\right] \%$

So we get

$= \frac{100}{9} \%$

$= 11\frac{1}{9} \%$

8. Rao bought notebooks at the rate of 4 for ₹ 35 and sold them at the rate of 5 for ₹ 58. Calculate

(i) his gain percentage.

(ii) the number of notebooks he should sell to earn a profit of ₹ 171.

Solution:

Consider the number of note books bought = 20

Here the LCM of 4 and 5 is 20

C.P. of the note books = $\frac{35}{4} \times 20$

= 35 × 5

= ₹ 175

S.P. of the note books = $\frac{58}{5} \times 20$

= 58 × 4

= ₹ 232

(i) We know that

Gain = S.P. – C.P.

Substituting the values

= 232 – 175

= ₹ 57

Here

Gain % = $\left[\frac{\text{Gain}}{\text{C.P.}} \times 100\right]\%$

Substituting the values

= $\left[\frac{57}{175} \times 100\right]\%$

By further calculation

= $\left[\frac{57}{7} \times 4\right]$ %

So we get

= $\frac{228}{7}$ %

= $32\frac{4}{7}$ %

(ii) When the profit is ₹ 57, the number of note books sold = 20

When the profit is ₹ 1, the number of note books sold = $\frac{20}{57}$

When the profit is ₹ 171, the number of note books sold = $\frac{20}{57} \times 171$

= 20 × 3

= 60

9. A vendor buys bananas at 3 for a rupee and sells at 4 for a rupee. Find his profit or loss percentage.

Solution:

Consider the number of bananas bought = 12

Here LCM f 3 and 4 is 12

We know that

C.P. of bananas = $\frac{1}{3} \times 12$ = ₹ 4

S.P. of bananas = $\frac{1}{4} \times 12$ = ₹ 3

Here

Loss = C.P. – S.P.

Substituting the values

= 4 – 3

= ₹ 1

Loss % = $\left[\frac{\text{Loss}}{\text{C.P.}} \times 100\right]$ %

Substituting the values

= $\left[\frac{1}{4} \times 100\right]$ %

So we get

$= \frac{100}{4}$ %

= 25 %

10. A shopkeeper buys a certain number of pens. If the selling price of 5 pens is equal to the cost price of 7 pens, find his profit or loss percentage.

Solution:

Consider ₹ x as the C.P. of 7 pens

C.P. of 1 pen = ₹ x/7

Based on the question

S.P. of 5 pens = ₹ x

S.P. of 1 pen = ₹ $\frac{x}{5}$

Profit = S.P. – C.P.

Substituting the values

$= \frac{x}{7} - \frac{x}{5}$

Taking LCM

$= \frac{(7x - 5x)}{35}$

= ₹ $\frac{2x}{35}$

We know that

Profit % = $\left[\frac{\text{Profit}}{\text{C.P.}} \times 100\right]$ %

Substituting the values

$= \frac{\frac{2x}{35}}{\frac{x}{7}} = \times 100\ \%$

It can be written as

$= \frac{2x}{35} \times \frac{7}{x} \times 100\ \%$

By further calculation

$= \frac{2}{5} \times 100\ \%$

So we get

$= 2 \times 20\ \%$

$= 40\ \%$

11. Find the selling price, when:

(i) Cost price = ₹ 2360, Profit = 8 %

(ii) Cost price = ₹ 380, Loss = 7.5 %

Solution:

(i) It is given that

Cost price = ₹ 2360, Profit = 8%

We know that

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

Substituting the values

$= \frac{(100 + 8)}{100 \times 2360}$

By further calculation

$= \frac{108}{100} \times 2360$

So we get

$= \frac{108}{10} \times 236$

= ₹ 2548.80

(ii) It is given that

Cost price = ₹ 380, Loss = 7.5 %

We know that

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

Substituting the values

$= \frac{(100 - 7.5)}{100 \times 380}$

By further calculation

$= \frac{92.5}{100} \times 380$

So we get

= 9.25 × 38

= ₹ 351.50

12. A dealer bought a number of eggs at ₹ 18 a dozen and sold them at 50% profit. Find the selling price per egg.

Solution:

It is given that

C.P. of one dozen eggs = 12 eggs = ₹ 18

Profit = 15%

We know that

S.P. of 12 eggs = $\left[1 + \frac{50}{100}\right]$ of ₹ 18

It can be written as

$= \left(\frac{150}{100} \times 18\right)$

By further calculation

$= \left(\frac{3}{2} \times 18\right)$

So we get

$= 3 \times 9$

= ₹ 27

S.P. of 1 egg = ₹ $\frac{27}{12}$

So we get

= ₹ $\frac{9}{4}$

= ₹ 2.25

Exercise 7.3

1. Find the discount and the selling price, when:

(i) the marked price = ₹ 575, discount = 12%

(ii) the printed price = ₹ 12750, discount = $8\frac{1}{3}$%

Solution:

(i) the marked price = ₹ 575, discount = 12%

Here

Amount of discount = 12 % of ₹ 575

It can be written as

$= \left(\frac{12}{100} \times 575\right)$

By further calculation

$= \left(\frac{12}{4} \times 23\right)$

So we get

$= 3 \times 23$

= ₹ 69

We know that

Net sale price = M.P. – discount

Substituting the values

= 575 – 69

= ₹ 506

(ii) the printed price = ₹ 12750, discount = $8\frac{1}{3}\% = \frac{25}{3}\%$

Here

Amount of discount = $\frac{25}{3}$ % of ₹ 12750

It can be written as

= $\left[\frac{25}{(3 \times 100)} \times 12750\right]$

By further calculation

= $\left(\frac{25}{30} \times 1275\right)$

So we get

= $\left(\frac{5}{6} \times 1275\right)$

= ₹ 1062.50

We know that

Net sale price = M.P. – discount

Substituting the values

= 12750 – 1062.50

= ₹ 11687.50

2. Find the discount and the discount percentage, when:

(i) marked price = ₹ 780, selling price = ₹ 721.50

(ii) advertised price = ₹ 28500, selling price = ₹ 24510

Solution:

(i) marked price = ₹ 780, selling price = ₹ 721.50

We know that

Discount = M.P. – Selling price

Substituting the values

= 780 – 721.50

= ₹ 58.50

Here

Discount % = [Discount/M.P. × 100] %

Substituting the values

$= \left[\frac{58.50}{780} \times 100\right]$ %

By further calculation

$= \frac{5850}{780}$ %

So we get

$= \frac{585}{78}$ %

= 7.5 %

(ii) advertised price = ₹ 28500, selling price = ₹ 24510

We know that

Discount = Advertised price – Selling Price

Substituting the values

= 28500 – 24510

= ₹ 3990

Here

Discount % = $\left[\frac{\text{Discount}}{\text{advertised price}} \times 100\right]$ %

Substituting the values

$= \left[\frac{3990}{28500} \times 100\right] \%$

So we get

$= \frac{3990}{285} \%$

$= 14 \%$

3. A notebook is marks at ₹ 30. Find the price a student pays for a dozen notebooks if he gets 15% discount.

Solution:

It is given that

M.P. of one notebook = ₹ 30

M.P. of one dozen notebooks = 30 × 12 = ₹ 360

Discount = 15%

We know that

Amount of discount = 15% of M.P.

It can be written as

= 15% of ₹ 360

By further calculation

$= \left(\frac{15}{100} \times 360\right)$

So we get

$= \left(\frac{15}{10} \times 36\right)$

$= \left(\frac{3}{2} \times 36\right)$

On further simplification

= 3 × 18

= ₹ 54

Price a student pays for a dozen notebooks = 360 – 54 = ₹ 306

4. A dealer gave 9% discount on an electric fan and charges ₹ 728 from the customer. Find the marked price of the fan.

Solution:

Consider ₹ x as the M.P. of the fan

Discount = 9%

We know that

Amount of discount = 9% of ₹ x

It can be written as

$= \frac{9}{100} \times x$

$= ₹ \frac{9x}{100}$

Here

Charges for customer = ₹ x – $₹\frac{9x}{100}$

Substituting the values

$728 = \frac{(100x - 9x)}{100}$

By further calculation

$728 = \frac{91x}{100}$

So we get

$x = \frac{(728 \times 100)}{91}$

$x = 8 \times 100$

$x = 800$

Therefore, the marked price of the fan is ₹ 800.

5. The list price of an article is ₹ 800 and a dealer is selling it at a discount of 20 %. Find:

(i) The selling price of the article.

(ii) The cost price of the article if he makes 25% profit on selling it.

Solution:

(i) It is given that

M.P. = ₹ 800

Discount = 20%

We know that

S.P. = $\left[1 - \frac{d}{100}\right]$ of M.P.

Substituting the values

S.P. = $\left[1 - \frac{20}{100}\right]$ of ₹ 800

By further calculation

S.P. = $\frac{80}{100} \times 800$

S.P. = ₹ 640

Therefore, the selling price is ₹ 640.

(ii) It is given that

S.P. = ₹ 640

Profit = 25%

We know that

S.P. = $\left[1 + \frac{P}{100}\right]$ of C.P.

Substituting the values

640 = $\left[1 + \frac{25}{100}\right]$ of C.P.

By further calculation

640 = $\frac{125}{100}$ of C.P.

So we get

C.P. = $\left[640 \times \frac{100}{125}\right]$

C.P. = 128 × 4

C.P. = ₹ 512

6. A shopkeeper marks his goods at such a price that would give him a profit of 10% after allowing a discount of 12%. If an article is marked at ₹ 2250, find its:

(i) Selling price

(ii) Cost price.

Solution:

(i) It is given that

M.P. of an article = ₹ 2250

Discount = 12 %

We know that

S.P. = $\left[1 - \frac{d}{100}\right]$ of M.P.

Substituting the values

S.P. = $\left[1 - \frac{12}{100}\right]$ of ₹ 2250

By taking LCM

S.P. = $\frac{(100 - 12)}{100} \times 2250$

By further calculation

S.P. = $\frac{88}{100} \times 2250$

So we get

S.P. = $\frac{88}{4} \times 90$

S.P. = 22×90

S.P. = ₹ 1980

(ii) It is given that

S.P. = ₹ 1980

Profit = 10%

We know that

S.P. = $\left[1 + \frac{P}{100}\right]$ of C.P.

Substituting the values

1980 = $\left[1 + \frac{10}{100}\right]$ of C.P.

By further calculation

1980 = $\frac{110}{100}$ of C.P.

So we get

C.P. = $1980 \times \frac{100}{100}$

C.P. = 18 × 100

C.P. = ₹ 1800

Therefore, the cost price is ₹ 1800.

7. A shopkeeper purchased a calculator for ₹ 650. He sells it at a discount of 20% and still makes a profit of 20%. Find:

(i) The selling price

(ii) Marked price

Solution:

(i) It is given that

C.P. = ₹ 650

Profit = 20%

We know that

S.P. = $\left[1 + \frac{P}{100}\right]$ of C.P.

Substituting the values

= $\left[1 + \frac{20}{100}\right] \times 650$

By further calculation

= $\frac{120}{100} \times 650$

So we get

$= 12 \times 65$

$= ₹\ 780$

Therefore, the selling price of the calculator is ₹ 780.

(ii) It is given that

S.P. = ₹ 780

Discount = 20%

We know that

S.P. $= \left[1 - \frac{d}{100}\right]$ of M.P

Substituting the values

$780 = \left[1 - \frac{20}{100}\right]$ of M.P.

By further calculation

$780 = \frac{80}{100}$ of M.P.

It can be written as

M.P. $= 780 \times \frac{100}{80}$

So we get

M.P. $= 780 \times \frac{10}{8}$

M.P. $= \frac{7800}{8}$

M.P. = ₹ 975

Therefore, the marked price of the calculator is ₹ 975.

8. A shopkeeper buys a dinner set for ₹ 1200 and marks it 80% above the cost price. If he gives 15 % discount on it, find:

(i) The marked price

(ii) The selling price

(iii) His profit percentage.

Solution:

(i) It is given that

C.P. of a dinner set = ₹ 1200

We know that

M.P. = 1200 + 80% of ₹ 1200

By further calculation

$= 1200 + \frac{80}{100} \times 1200$

So we get

$= 1200 + 80 \times 12$

By multiplication

$= 1200 + 960$

$= ₹\ 2160$

(ii) It is given that

M.P. = ₹ 2160

Discount = 15%

We know that

S.P. $= \left(1 - \frac{d}{100}\right)$ of M.P.

Substituting the values

$= \left(1 - \frac{15}{100}\right) \times 2160$

By further calculation

$= \frac{85}{100} \times 2160$

So we get

$= \frac{17}{20} \times 2160$

$= 17 \times 108$

$= ₹\ 1836$

(iii) We know that

Profit = S.P. – C.P.

Substituting the values

$= 1836 - 1200$

$= ₹\ 636$

Here

Profit % $= \left[\frac{\text{Profit}}{\text{C.P.}} \times 100\right]\%$

Substituting the values

$= \left(\frac{636}{1200} \times 100\right)\ \%$

By further calculation

$= \frac{636}{12}\ \%$

$= 53\ \%$

9. The cost price of an article is ₹ 1600, which is 20% below the marked price. If the article is sold at a discount of 16%, find:

(i) The marked price

(ii) The selling price

(iii) Profit percentage.

Solution:

(i) It is given that

C.P. = ₹ 1600

C.P of an article is 20% below the M.P.

Take ₹ x as the M.P. of an article

We know that

C.P. = M.P. – 20% of M.P.

Substituting the values

1600 = x – 20% of x

It can be written as

$1600 = x - \frac{20}{100} \times x$

By further calculation

$1600 = \frac{80x}{100}$

So we get

$x = 1600 \times \frac{100}{80}$

$x = 20 \times 100$

x = ₹ 2000

Therefore, the M.P. of an article is ₹ 2000.

(ii) It is given that

M.P. = ₹ 2000

Discount = 16%

We know that

S.P. = $\left[1 - \frac{16}{100}\right]$ of M.P.

Taking LCM

= $\frac{(100 - 16)}{100}$ of ₹ 2000

By further calculation

= $\frac{84}{100} \times 2000$

So we get

= 84 × 20

= ₹ 1680

(iii) It is given that

Profit = S.P. – C.P.

Substituting the values

= 1680 – 1600

= ₹ 80

We know that

Profit % = $\left[\frac{\text{Profit}}{\text{C.P.}} \times 100\right]$ %

Substituting the values

$= \left[\frac{80}{1600} \times 100\right] \%$

So we get

$= \frac{80}{16} \%$

$= 5 \%$

10. A shopkeeper allows 20% discount on his goods and still earns a profit of 20%. If an article is sold for ₹ 360, find:

(i) The marked price

(ii) The cost price.

Solution:

(i) It is given that

Dealer allows a discount of 20%

S.P. $= \left[1 - \frac{d}{100}\right]$ of M.P.

Substituting the values

$360 = \left[1 - \frac{20}{100}\right]$ of M.P.

By further calculation

$360 = \frac{80}{100}$ of M.P.

It can be written as

M.P. $= 360 \times \frac{100}{80}$

M.P. $= 360 \times \frac{10}{8}$

So we get

M.P. = 45 × 10

M.P. = ₹ 450

(ii) Consider ₹ x as the C.P. of the article

Profit = 20%

S.P. = ₹ 360

We know that

S.P. = $\left[1 + \frac{P}{100}\right]$ of C.P.

Substituting the values

360 = $\left[1 + \frac{20}{100}\right]$ of x

By further calculation

360 = $\left[1 + \frac{1}{5}\right]$ of x

So we get

360 = $\frac{6x}{5}$

By cross multiplication

x = 360 × $\frac{5}{6}$

x = 60 × 5

x = ₹ 300

Therefore, the C.P. of the article is ₹ 300.

Exercise 7.4

1. Find the buying price of each of the following when 5% S.T. is added on the purchase of

(i) A towel of ₹ 50

(ii) 5 kg of flour at ₹ 15 per kg.

Solution:

(i) It is given that

S.T. = 5%

Cost of towel = ₹ 50

We know that

Total S.T. = $\frac{(50 \times 5)}{100}$ = ₹ 2.50

So the buying price = 50 + 2.50 = ₹ 52.50

(ii) We know that

C.P. of 5 kg of flour at the rate of ₹ 15 per kg = 15 × 5 = ₹ 75

Rate of S.T. = 5%

Here

Total tax = $\frac{(75 \times 5)}{100}$

So we get

= 375/100

= ₹ 3.75

So the total price of the flour = 75 + 3.75 = ₹ 8.75

2. If 8% of VAT is included in the prices, find the original price of

(i) A TV bought for ₹ 13500

(ii) A shampoo bottle bought for ₹ 180.

Solution:

(i) It is given that

Total price of TV including VAT = ₹ 13500

Rate of VAT = 8%

We know that

Original price of TV = $\frac{(13500 \times 100)}{(100 + 8)}$

By further calculation

= $\frac{(13500 \times 100)}{108}$

= ₹ 12500

(ii) It is given that

Total cost of shampoo bottle including VAT = ₹ 180

Rate of VAT = 8%

We know that

Original price of shampoo = $\frac{(180 \times 100)}{(100 + 8)}$

By further calculation

= $\frac{(180 \times 100)}{108}$

So we get

= $\frac{500}{3}$ = ₹ 166.67

3. Utkarsh bought an AC for ₹ 34992 including a VAT of 8%. Find the price of AC before VAT was added.

Solution:

It is given that

Cost of AC including VAT = ₹ 34992

Rate of VAT charged = 8%

We know that

Original price of AC = $\frac{(34992 \times 100)}{(100 + 8)}$

By further calculation

= $\frac{(34992 \times 100)}{108}$

= ₹ 32400

4. Gaurav bought a shirt for ₹1296 including VAT. If the original price of the shirt is ₹ 1200, find the rate of VAT.

Solution:

It is given that

Cost of shirt including VAT = ₹ 1296

Original price of shirt = ₹ 1200

We know that

Amount of VAT = 1296 – 1200 = ₹ 96

Here

Rate of VAT = $\frac{(\text{VAT} \times 100)}{\text{C.P.}}$

Substituting the values

$= \frac{(96 \times 100)}{1200}$

= 8 %

5. Anjana buys a purse for ₹ 523.80 including 8% VAT. Find the new selling price of the purse if VAT increases to 10%.

Solution:

It is given that

Total C.P. of purse including VAT = ₹ 523.80

Rate of VAT = 8%

We know that

Actual cost of the purse = $\frac{(523.80 \times 100)}{(100 + 8)}$

By further calculation

$= \frac{(523.80 \times 100)}{108}$

= ₹ 485

Here

New rate of VAT = 10%

Amount of VAT = $485 \times \frac{10}{100}$

So we get

$= \frac{4850}{100}$

= ₹ 48.50

So the total cost of the purse = 485 + 48.50 = ₹ 535.50

6. A wall hanging is marked for ₹ 4800. The shopkeeper offers 10% discount on it. If VAT is received 8% from the customer, find the amount paid by the customer to purchase the wall hanging.

Solution:

It is given that

Marked price of wall hanging = ₹ 4800

Discount offered = 10%

We know that

Net sale price = $\left[4800 \times \frac{(100 - 10)}{100}\right]$

By further calculation

$= \frac{(4800 \times 90)}{100}$

= ₹ 4320

Here

Rate of VAT charged = 8%

So the sale price including VAT = $\left[4320 \times \frac{(100 + 8)}{100}\right]$

By further calculation

$= \frac{(4320 \times 108)}{100}$

$= \frac{466560}{100}$

= ₹ 4665.60

7. Amit goes to a shop to buy a washing machine. The marked price of the washing machine is ₹ 10900 excluding 9% VAT. Amit bargains

with the shopkeeper and convinces him for ₹ 10900 including VAT as the final cost of the washing machine. Find the amount reduced by the shopkeeper.

Solution:

It is given that

M.P. of washing machine = ₹ 10900

Rate of VAT = 9%

Consider ₹ x as the reduced price of machine

We know that

VAT at the rate of 9% = $x \times \frac{9}{100} = ₹\frac{9x}{100}$

So the amount paid = $x + \frac{9x}{100} = \frac{109x}{100}$

By equating the values

$\frac{109x}{100} = 10900$

By further calculation

x = $\frac{(10900 \times 100)}{109}$

x = 10000

Amount reduced by the shopkeeper = 10900 – 10000

= ₹ 900

Therefore, the amount reduced by the shopkeeper is ₹ 900.

Mental Maths

Question 1: Fill in the blanks:

(i) Percentage is the numerator of a fraction with denominator ……..

(ii) 15% of …….. is 135.

(iii) $\frac{3}{4}$ = ……..%

(iv) 50 paise = …….. % of 8 rupees.

(v) A shopkeeper earns a profit if S.P. is …….. Than C.P.

(vi) Loss or profit % is always calculated on …….. price.

(vii) The additional expenses on transportation, labour, repairing etc. are called ……..expenses.

(viii)Amount deducted from the marked price of an article is called ……..

(ix) Discount = Marked price – …….. price.

(x) These days, sales tax is known as ……..

Solution:

(i) Percentage is the numerator of a fraction with denominator 100.

(ii) 15% of 900 is 135. $\left\{\because \frac{135\times100}{15} = 900\right\}$

(iii) $\frac{3}{4} = 75\%$ $\left\{\because \frac{3\times100}{4} = 75\%\right\}$

(iv) 50 paise = 6.25% of 8 rupees.

$\left\{\because \frac{50\times100}{100\times8} = \frac{25}{4}\% = 6.25\%\right\}$

(v) A shopkeeper earns a profit if S.P. is more than C.P.

(vi) Loss or profit % is always calculated on cost price.

(vii) The additional expenses on transportation, labour, repairing etc. are called overheads expenses.

(viii)Amount deducted from the marked price of an article is called discount.

(ix) Discount = Marked price – selling price.
(x) These days, sales tax is known as VAT.

Question 2.
State whether the following statements are true (T) or false (F):
(i) Discount is always calculated on marked price.
(ii) Two successive discounts of 20% and 20% are equivalent to single discount of 40%.
(iii) Overheads are always added to the original cost to get the total cost.
(iv) If S.P. is less than C.P. then shopkeeper suffers a loss.
(v) Sales tax is always calculated on selling price.
Solution:
(i) Discount is always calculated on the marked price. True
(ii) Two successive discounts of 20% and 20%
are equivalent to a single discount of 40%. False
Correct:
It will be $20 + \frac{20\times80}{100} = 20 + 16 = 36\%$
(iii) Overheads are always added to the original cost to get the total cost. True
(iv) If S.P. is less than C.P. then shopkeeper suffers a loss. True
(v) Sales tax is always calculated on selling price. True

Multiple Choice Questions

Choose the correct answer from the given four options (3 to 18):

Question 3: $3\frac{1}{8}$ % of 75 kg is equal to

(a) $3\frac{11}{32}$ kg (b) $2\frac{11}{32}$ kg

(c) $3\frac{11}{32}$ kg (d) $2\frac{11}{32}$ g

Solution:

$3\frac{1}{8}\%$ of 75 kg $\Rightarrow \frac{25}{8}\%$ of 75

$= \frac{75\times25}{8\times100} = \frac{75}{32}$ kg

$= 2\frac{11}{32}$ kg (b)

Question 4: $2\frac{1}{12}\%$ is equivalent to

(a) $\frac{3}{48}$ **(b) $\frac{5}{48}$**

(c) $\frac{1}{48}$ **(d) None of these**

Solution:

$2\frac{1}{12}\% = \frac{25}{2}\% = \frac{25}{12\times100} = \frac{1}{48}$ (d)

Question 5: $1\frac{11}{16}$ is equivalent to

(a) 168.75%

(b) 169.75%

(c) 170.75%

(d) 167.75%

Solution:

$1\frac{11}{16} = \frac{27}{6} \times 100 = 275 = 168.75$ (a)

Question 6: 21 : 80 is equivalent to

(a) 26%

(b) 26.50%

(c) 26.75%

(d) 26.25%
Solution:
21 : 80 = $\frac{21}{80}$ × 100 = $\frac{105}{4}$ = 26.25% (d)

Question 7: If 5% of a number is 42, then the number is
(a) 800
(b) 820
(c) 840
(d) 860
Solution:
5% a number = 42
∴ Number = $\frac{42}{5\%} = \frac{42\times100}{5}$ = 840 (c)

Question 8: What % of 150 is 30?
(a) 50%
(b) 10%
(c) 15%
(d) 20%
Solution:
Let x% of 150 = 30
$x\% = \frac{30}{150} = \frac{30\times100}{150} = 20\%$ (b)

Question 9: A number increased by 25% gives 155. The number is
(a) 132
(b) 128
(c) 124
(d) 120
Solution:

Increase in a number = 25%
Let number be = x, then

$x \times \frac{125}{100} = 155 \Rightarrow x = 155 \times \frac{100}{125} = 124$

∴ Number = 124 (c)

Question 10: Naman buys a game for ₹60 and sells it for ₹75, his profit % is
(a) 15%
(b) 20%
(c) 25%
(d) 30%
Solution:
C.P. of an article = ₹60 and S.P. = ₹75
Profit = S.P. – C.P. = ₹75 – ₹60 = ₹15
% profit = $\frac{15\times100}{60}$ = 25% (c)

Question 11: Cost price of a watch is ₹680. If Rishabh sells it at a profit of 35%, then S.P. is
(a) ₹918
(b) ₹919
(c) ₹920
(d) ₹921
Solution:
C.P. of an article = ₹680
Profit = 35%

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

$= \frac{680\times(100+35)}{100}$

$= \frac{680 \times 135}{100} = ₹918$ (a)

Question 12: On selling an article for ₹ 150, Renu gains ₹30. Her gain percentage is
(a) 15%
(b) 20%
(c) 25%
(d) 30%
Solution:
S.P. of an article = ₹150
Profit = ₹30
∴ C.P. = S.P. – Profit = ₹150 – ₹30 = ₹120
Profit % = $\frac{30 \times 100}{120}$

$\left(\text{Profit \%} = \frac{\text{Gain} \times 100}{\text{C.P.}}\right)$

= 25% (c)

Question 13: If the cost price of 5 articles is equal to the selling price of 6 articles, then there is
(a) gain
(b) loss
(c) no gain no loss
(d) none of these
Solution:
C.P. of 5 articles = S.P. of 6 articles = 100 (suppose)
∴ C.P. of 1 article = $\frac{100}{5} = ₹20$
S.P. of 1 article = $\frac{100}{6} = ₹ \frac{50}{3}$

∴ Loss = C.P. – S.P. = $20 - \frac{50}{3}$

$= \frac{60-50}{3} = \frac{10}{3}$ (b)

Question 14: Marked price of an article is ₹675. If it is sold at a discount of 20%, then S.P. is

(a) ₹540

(b) ₹525

(c) ₹510

(d) ₹500

Solution:

M.P. of an article = ₹675

Discount = 20%

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

$= \frac{675 \times 80}{100} = ₹540$ (a)

Question 15: A jacket is marked for ₹2590. If the S.P. of the jacket is ₹2331, then discount % is

(a) 5%

(b) 10%

(c) 15%

(d) 20%

Solution:

M.P. of jacket = ₹2590

S.P. of jacket = ₹2331

∴ Discount = M.P. – S.P. = ₹2590 – ₹2331

Discount % = $\frac{259 \times 100}{\text{M.P.}} = \frac{259 \times 100}{2590}$ = 10% (b)

Question 16: Marked price of a showpiece is ₹950. S.P. of showpiece after two successive discounts of 10% and 10% is
(a) ₹ 769.50
(b) ₹ 760
(c) ₹ 855
(d) None of these.
Solution:
M.P. of a showpiece = ₹950
Two successive discounts = 10% and 10%

$\therefore$ S.P. = ₹950 $\times \frac{(100-10)}{100} \times \frac{(100-10)}{100}$

= ₹950 $\times \frac{90}{100} \times \frac{90}{100} = 769.50$ (a)

Question 17: S.P. of a video game is ₹749 including 7% VAT. The original price of video game is
(a) ₹801.43
(b) ₹742
(c) ₹700
(d) None of these
Solution:
S.P. of a video game including VAT = ₹749
Rate of VAT = 7%
Original price = $\frac{749\times100}{100+4}$ = ₹700 (c)

Question 18: List price of an article is ₹1050. If 6% sales tax is charged, then bill amount is
(a) ₹1056
(b) ₹1113
(c) ₹1131

(d) ₹1311

Solution:

List price of an article = ₹1050

S.T. = 6%

The amount of the bill =₹ $\frac{1050\times(100+6)}{100}$

= ₹ $\frac{1050\times106}{100}$ = ₹1113 (b)

Value Based Questions

Question 1: Out of 500 students in a school, 60% of students read Hindi Newspaper, 30% of students read English Newspaper and remaining students do not read any newspaper. Find

(i) What % of students do not read any newspaper?

(ii) Number of students who read Hindi newspaper.

(iii) Number of students who read English newspaper.

Is reading newspaper a good habit? What are the advantages of reading newspaper?

Solution:

Total number of students = 500

No. of students who read Hindi newspaper

= 60% of 500 = $\frac{60}{100}$ × 600 = 300

And No. of students who read English newspaper

= $\frac{30}{100}$× 500= 150

(i) ∴ Remaining students who do not read any paper

= 500 – (300 + 150) = 500 – 450 = 50

Percentage = $\frac{50\times100}{500}$= 10%

(ii) No. of students who read Hindi newspaper = 300

(iii) Number of students who read English newspaper =150

Reading a newspaper is a good habit. It increases the knowledge.

Question 2: In an exam at least 35% marks are required to pass the exam. Ramesh uses unfair means and tries to pass the exam but fails by 15 marks. If he scored 160 marks, find the maximum marks.

Is using unfair means in exam is good? Why should we not use unfair means?

Solution:

In an examination pass marks = 35%
Ramesh got 160 marks but fails by 15 marks
∴ Pass marks = 160 + 15 = 175
∴ 35% of total marks =175
∴ Total marks = $\frac{175\times100}{35}$ = 500
Cheating and using unfair means in the examination is not good.
It ruins the life of students.

Question 3: A shopkeeper was involved in tax evasion. To save sales tax he never give receipts to his customers. He sold an article for ₹550 including 10% VAT. Find the amount of VAT not paid by him to the Government. Is tax evasion correct? Why should we pay tax? What measures should we adopt to stop tax evasions?

Solution:
S.P. of an article (including VAT) = ₹500
Rate of VAT = 10%

Original price of the article = ₹ $\frac{550\times100}{100+10}$

= ₹ $\frac{550\times100}{110}$ = ₹500

VAT = ₹550 – ₹500 = ₹50

Not paying tax to the government is ruins the economy of the country or state.

So, we should pay the tax to the government honestly and properly.

Higher Order Thinking Skills (Hots)

Question 1: Marked price of an article is ₹2860 and rate of VAT is 8%. Shopkeeper allows a discount of 20% and still makes a profit of 10%. If he spent 4% as overheads, then find the original cost price of the article and final selling price including VAT.

Solution:

Marked price of an article = ₹2860

Rate of VAT = 8%

Discount = 20%

∴ Actual cost price = $\frac{2246.40\times100}{100+4}$

= $\frac{2246.40\times100}{104}$ = ₹2160

∴ Sale price = $\frac{\text{M.P.}\times(100-\text{Discount})}{100}$

= ₹$\frac{2860\times(100-20)}{100}$ = ₹$\frac{2860\times80}{100}$

= ₹2288

VAT = 8%

∴ Total VAT = $\frac{2288\times8}{100}$ = ₹$\frac{18304}{100}$ = ₹183.04

Sale price = ₹2288 + 183.04 = 2471.04

Gain % = 10%

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

$= \frac{2471.04\times 100}{100+10} = \frac{2471.04\times 100}{110}$

= ₹2246.40

Overhead charges = 4%

Check Your Progress

Question 1: Convert $\frac{7}{24}$ into a percentage correct to four significant figures.

Solution:

$$\frac{7}{24} = \frac{7}{24} \times 100\%$$

$$= \frac{7}{6} \times 25\%$$

$$= \frac{175}{6}\%$$

$$= 29.17\%$$

(Correct to 4 significant figures)

```
6 | 175  | 29.166
  | 12   |
  |------|
  |  55  |
  |  54  |
  |------|
  |   10 |
  |    6 |
  |------|
  |   40 |
  |   36 |
  |------|
  |    40|
  |    36|
  |------|
  |     4|
  |______|
```

Question 2: Express 750 mL as a percentage of 4 litres.

Solution:

Required Percentage

$= \left(\frac{750\ mL}{4\ l} \times 100\right)\%$

$= \left(\frac{750\ mL}{4 \times 100\ mL} \times 100\right)\% \qquad \{\because 1\ l = 1000\ mL\}$

$= \frac{750}{40}\% = \frac{75}{4}\%$

= 18.75%

Question 3: A football team won 9 matches out of the total number of matches they played. If their win percentage was 45, then how many matches did they play in all?

Solution:

Let total matches = x

Matches won by a team = 9

Percentage = 45%

45% of x = 9

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

∴ No. of matches played = 20

Question 4: In a straight student election, Rahul got 66% of the votes polled. If the defeated student got 187 votes, find the total number of votes polled.

Solution:

Rahul got votes in student election = 66%

Defeated student got votes = (100 – 66%) = 34%

Let the total number of votes = x

According to given,

34% of x = 187

$\Rightarrow \frac{34}{100} \times x = 187$

$\Rightarrow x = \frac{187 \times 100}{34}$

$\Rightarrow x = \frac{187 \times 50}{17}$

$\Rightarrow x = 11 \times 50$

$\Rightarrow x = 550$

Hence total number of votes = 550

Question 5: 36 kg of gunpowder contains 27 kg nitre, 5.4 kg charcoal and rest sulphur. Find the percentage content of sulphur in the gunpowder.

Solution:

Total mixture of gunpowder = 36 kg

Quantity of nitre = 27 kg

Quantity of charcoal = 5.4 kg

Rest quantity of sulphur = 36 – (27 + 5.4)kg

= 36 – 32.4 = 3.6 kg

∴ Percentage of sulphur = $\frac{3.6 \times 100}{36}$ % = 10%

Question 6: 75% of the students in a class passed an exam. If 2 more students had passed the exam. 80% would have been successful. How many students are there in the class?

Solution:

Let the total number of students in the class be x,

Number of passed students in the class = 75% of x

$= \frac{75}{100} \times x = \frac{75x}{100}$

According to given,

$\frac{75x}{100} + 2 = 80\%$ of x

$\Rightarrow \frac{75x}{100} + 2 = \frac{80}{100} \times x$

$\Rightarrow \frac{75x}{100} + 2 = \frac{80x}{100}$

$\Rightarrow 2 = \frac{80x}{100} - \frac{75x}{100}$

$\Rightarrow 2 = \frac{5x}{100} \Rightarrow 2 = \frac{x}{20}$

$\Rightarrow \frac{x}{20} = 2x = 2 \times 20$

$\Rightarrow x = 40$

Hence the total number of students in class = 40

Question 7: The monthly salary of a school teacher in 2007 was ₹12000. It increased by 10% in 2008 and again by 10% in 2009. What is his salary in 2009?

Solution:
Total salary in 2007 = ₹ 12000
Increase in 2008 = 10%
and again increase in 2009 = 10%
∴ Salary in 2009

$= ₹12000 \times \frac{(100+10)}{100} \times \frac{(100+10)}{100}$

$= ₹12000 \times \frac{110}{100} \times \frac{110}{100}$

= ₹14520

Question 8: Price of a commodity decreased by 10% last year and increased by 20% this year. Find the percentage change in two years.

Solution:

Let the Price of commodity = ₹ x
When the price of commodity decreased by 10% in last year
Then Price of a commodity in Last year

$= \left(1 - \frac{10}{100}\right) \times ₹x$

$= ₹\frac{90}{100}x = ₹\frac{9x}{10}$

When the price of commodity increased by 20% in this year
then price of commodity in this year

$= \left(1 + \frac{20}{100}\right) \times ₹\frac{9x}{10}$

$= ₹\left(1 + \frac{1}{5}\right) \times \frac{9x}{10}$

$= ₹\frac{6}{5} \times \frac{9x}{10} = ₹\frac{27}{25}x$

Increased of price of commodity in these 2 years

$= \frac{27x}{25} - x = \frac{27x-25x}{25}$

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

% Increases of price of commodity in these 2 years

$= \frac{\frac{2x}{25}}{x} \times 100\% = \frac{2x}{25\times x} \times 100\%$

$= 2 \times 4\% = 8\%$

Question 9: A shop gives 15% discount. What would the sale price of each of these be?

(i) A dress marked at ₹150
(ii) A pair of shoes marked at ₹800.
Solution:
Rate of discount = 15%
(i) A dress marked at ₹ 150

∴ Sale price = ₹ $\frac{150\times(100-15)}{100}$

= ₹$\frac{150\times85}{100}$ = ₹$\frac{255}{2}$ = ₹127.50

(ii) Marked price of a pair of shoes = ₹800

∴ Sale price = ₹ $\frac{800\times(100-15)}{100}$

= ₹$\frac{800\times85}{100}$ = ₹680

Question 10: A refrigerator marked at ₹18000 is available for ₹17100. Find the discount given and the discount percent.

Solution:
Marked price of a refrigerator = ₹ 18000
Sale price = ₹17100
∴ Discount = ₹18000 – ₹17100 = ₹900
Rate of discount = $\frac{900\times100}{18000}$ = 5%

Question 11: Ramu purchased 20 parrots at ₹30 each. Two parrots flew away and Ramu sold the rest of the parrots at ₹40 each. Calculate the profit or loss percentage of Ramu.

Solution:
C.P. of one parrot = ₹30
C.P. of 20 parrots = ₹30 × 20 = ₹600

The Number of parrots flew away = 2
Number of rest of the parrots = 20 – 2 = 18
Then S.P. of remaining parrots = ₹40 × 18 = ₹ 720
Profit = S.P. – C.P. = ₹720 – ₹600 = ₹120

$$\text{Profit \%} = \left(\frac{\text{profit}}{\text{C.P.}} \times 100\right)\%$$

$$= \left(\frac{120}{600} \times 100\right)\ \%$$

$$= \frac{120}{6}\% = 20\%$$

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

$$= ₹\frac{1800 \times (100-8)}{100}$$

$$= ₹\frac{1800 \times 92}{100} = ₹1656$$

C.P. of second table = ₹1800

Profit = 12%

$$\therefore \text{S.P.} = ₹\frac{1800 \times (100+12)}{100}$$

$$= ₹\frac{1800 \times 112}{100} = ₹2016$$

∴ Total cost of two table = ₹1800 + ₹1800 = ₹3600

Question 12: Reena bought two tables for ₹ 1800 each. She sold one at a loss of 8% and the other at a profit of 12%. Find the selling price of each. Also, find out the total profit or loss.

Solution:
C.P. of one table = ₹1800
Loss = 8%

∴ Gain = S.P. – C.P. = ₹3672 – ₹3600 = ₹72

Gain % = $\frac{72\times100}{C.P.} = \frac{72\times100}{3600}$ = 2%

Question 13. Ajit bought an old car ₹78000. He spent ₹2000 on repairs and repainting the car. He sold the car to Anju at a gain of 15%. Anju sold it to Anthony at a loss of 5%. What did the car cost to Anthony?

Solution:

C.P. of car = ₹78000

Money spent on repairs and repainting ₹2000

Total C.P. of car = ₹78000 + ₹2000 = ₹80000

Ajit sold the car to Anju at a gain of 15%

∴ S.P. of car = $\left(1+\frac{5}{100}\right)$ of ₹80000

= $\left(\frac{100+15}{100}\right)$ of ₹80000

= ₹$\frac{115}{100}\times 80000$

= ₹$115 \times 800 = ₹92000$

But this amount of car is C.P. for Anju.

∴ For Anju,

C.P. of Car = ₹92000

Loss = 5%

∴ S.P. = $\left(1-\frac{5}{100}\right)$ of ₹92000

= $\left(1-\frac{1}{20}\right)$ of ₹92000

= ₹$\frac{19}{20}\times 92000$

= ₹$19 \times 4600 = ₹87400$

Hence the car cost to Anthony = ₹87400

Question 14: Gaurav sold an article at a profit of 12%. Had it been sold for ₹16 more, the profit would have been 20%. Find the C.P. of the article.

Solution:

Let the cost price of the article = ₹x,

Profit = 12%

S.P. = $\left(1+\frac{P}{100}\right)$ of C.P.

$= \left(1+\frac{12}{100}\right)$ of ₹x

$= \frac{112}{100}$ of ₹$x = ₹\frac{112x}{100}$

To obtain 20% Profit,

S.P. = $\left(1+\frac{20}{100}\right)$ of ₹x

$\left(\frac{100+20}{100}\right)$ of ₹$x = ₹\frac{120x}{100} = ₹\frac{12x}{10}$

According to given information,

$\frac{12x}{10} = \frac{112x}{100} + 16$

$\Rightarrow \frac{12x}{10} - \frac{112x}{100} = 16$

$\Rightarrow \frac{120x-112x}{100} = 16$

$\Rightarrow \frac{8x}{100} = 16$

$\Rightarrow x = ₹16 \times \frac{100}{8}$

$\Rightarrow x = ₹2 \times 100$

$\therefore x = ₹200$

Hence the cost price of the article = ₹200

Question 15: A shopkeeper allows 8% discount on his goods and still earns a profit of 15%. If an article is sold for ₹460, find:
(i) the marked price
(ii) the cost price.
Solution:
(i) Since the shopkeeper allows a discount of 8%

$\therefore$ S.P. = $\left(1 - \frac{d}{100}\right)$ of M.P.

$\Rightarrow ₹460 = \left(1 - \frac{8}{100}\right)$ of M.P.

$\Rightarrow ₹460 = \left(\frac{100-8}{100}\right)$ of M.P.

$\Rightarrow ₹460 = \frac{92}{100}$ of M.P.

$\Rightarrow$ M.P. = $₹460 \times \frac{100}{92}$

= ₹5 × 100 = ₹500

(ii) Let the cost price of the article be ₹x ;
Profit = 15%
Also, S.P. = ₹460

$\therefore$ S.P. = $\left(1 - \frac{P}{100}\right)$ of C.P.

$\Rightarrow ₹460 = \left(1 + \frac{15}{100}\right)$ of x

$\Rightarrow ₹460 = \frac{115}{100}$ of x

$\Rightarrow x = ₹460 \times \frac{100}{115}$

= ₹4 × 100 = ₹400.

Hence, the cost price of the article = ₹400

Question 16: Rajesh bought an A.C. for ₹38500 including 10% VAT. Find the price of A.C. before VAT was added.

Solution:

Total C.P. of an A.C. = ₹38500

VAT = 10%

Original price of AC = ₹ $\frac{38500\times100}{100+10\%}$

$= \frac{38500\times100}{110}$ = ₹35000

Question 17: A DVD player is marked for ₹3000. The shopkeeper offers 10% discount on it. If VAT is received 8%. Find the amount paid by the customer.

Solution:

Marked price of a DVD player = ₹3000

Discount = 10%

∴ Sale price = ₹$\frac{3000\times(100-10)}{100}$

= ₹$\frac{3000\times90}{100}$ = ₹2700

Rate of VAT = 8%

∴ Amount paid by the customer

= ₹$\frac{2700\times(100+8)}{100}$

= ₹ $\frac{2700\times108}{100}$ = 2916