

EXERCISE 7.1**1. Express the following percentages as fractions:****(i) 356%****(ii) $2\frac{1}{2}\%$** **(iii) $16\frac{2}{3}\%$** **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

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

$$= 125/2\%$$

$$= 62.5\%$$

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

It can be written as

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

By further calculation

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

$$= 75/4\%$$

$$= 18.75\%$$

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

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

$$\begin{array}{r}
 3 \overline{) 20} \quad 0.66666 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 2
 \end{array}$$

(ii) $5/6 = 0.8333$

By correcting to four decimal places

$5/6 = 0.8333 \times 100\% = 83.33\%$

$$\begin{array}{r}
 6 \overline{) 50} \quad 0.83333 \\
 \underline{48} \\
 20 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 20 \\
 \underline{18} \\
 2
 \end{array}$$

(iii) $4/7 = 0.5714$

By correcting to four decimal places

$4/7 = 0.5714 \times 100\% = 57.14\%$

$$\begin{array}{r}
 7 \overline{) 40000} \quad 0.5714 \\
 \underline{35} \\
 50 \\
 \underline{49} \\
 10 \\
 \underline{7} \\
 30 \\
 \underline{28} \\
 2
 \end{array}$$

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

$$17: 20 = 17/20$$

By further calculation

$$= 17/20 \times 100\%$$

So we get

$$= 17 \times 5\%$$

$$= 85\%$$

(ii) 13: 18

It can be written as

$$13: 18 = 13/18$$

By further calculation

$$= 13/18 \times 100\%$$

So we get

$$= 13/9 \times 50\%$$

$$= 650/9 \%$$

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

(iii) 93: 80

It can be written as

$$93: 80 = 93/80$$

By further calculation

$$= 93/80 \times 100\%$$

So we get

$$= 93/4 \times 5\%$$

$$= 465/4\%$$

$$= 116.25 \%$$

6. Express the following percentages as decimals:

(i) 20%

(ii) 2%

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

Solution:

(i) 20%

It can be written as

$$= 20/100$$

So we get

$$= 0.20$$

$$= 0.2$$

(ii) 2%

It can be written as

$$= 2/100$$

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

$$= \frac{27}{100} \text{ of ₹}50$$

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

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

By further calculation

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

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

So we get

$$= \frac{25}{16}$$

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

8. What percent is:

(i) 300 g of 2 kg

(ii) ₹ 7.50 of ₹ 6

Solution:

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

It can be written as

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

By further calculation

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

So we get

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

$$= 15 \%$$

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

It can be written as

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

By further calculation

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

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

$$x\% \text{ of } 50 \text{ kg} = 65 \text{ kg}$$

It can be written as

$$x/100 \times 50 = 65$$

By further calculation

$$x/2 = 65$$

By cross multiplication

$$x = 130$$

Therefore 130% of 50 kg is 65 kg.

(ii) Consider $x\%$ of ₹ 9 is ₹ 4

$$x\% \text{ of } ₹ 9 = ₹ 4$$

It can be written as

$$x/100 \times 9 = 4$$

By further calculation

$$x = 4 \times 100/9$$

So we get

$$x = 400/9$$

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

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

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

By further calculation

$$50/3 \% \text{ of } x = 25$$

It can be written as

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

So we get

$$x = (25 \times 3 \times 100) / 50$$

$$x = 150$$

Therefore, the number is 150.

(ii) Consider the number as x

$$13.25\% \text{ of } x = 159$$

It can be written as

$$13.25/100 \text{ of } x = 159$$

By further calculation

$$x = (159 \times 100) / 13.25$$

Multiply and divide by 100

$$x = (159 \times 100 \times 100) / 1325$$

So we get

$$x = (159 \times 4 \times 100) / 53$$

$$x = 3 \times 4 \times 100$$

$$x = 1200$$

Therefore, the number is 1200.

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

(ii) Decrease the number 750 by 10%

Solution:

(i) New number = $(1 + 30/100)$ of 60

By further calculation

$$= (1 + 3/10) \times 60$$

So we get

$$= 13/10 \times 60$$

$$= 78$$

(ii) New number = $(1 - 10/100)$ of 750

By further calculation

$$= (1 - 1/10) \times 750$$

So we get

$$= 9/10 \times 750$$

$$= 9 \times 75$$

$$= 675$$

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 = $(1 + 15/100)$ of original number

Substituting the values

$$299 = (1 + 3/20) \times x$$

Taking LCM

$$299 = [(20 + 3) / 20] \times x$$

By further calculation

$$299 = 23/20 \times x$$

So we get

$$\begin{aligned}x &= (299 \times 20) / 23 \\x &= 13 \times 20 \\x &= 260\end{aligned}$$

Therefore, the original number is 260.

(ii) Consider the original number as x
Here

New number = $(1 - 18/100)$ of original number

Substituting the values

$$697 = (1 - 18/100) \text{ of } x$$

Taking LCM

$$697 = [(100 - 18) / 100] \times x$$

By further calculation

$$697 = 82/100 \times x$$

So we get

$$x = (697 \times 100) / 82$$

$$x = (697 \times 50) / 41$$

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

$$\text{Savings} = 100 - 83 = 17\%$$

So 17% of his salary = ₹ 1870

We know that

$$\begin{aligned}\text{His salary} &= ₹ (1870 \times 100) / 17 \\ &= ₹ 11000\end{aligned}$$

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

$$62\% \text{ of } x = 1023$$

It can be written as

$$62/100 \times x = 1023$$

By further calculation

$$x = 1023 \times 100/62$$

So we get

$$x = 1023 \times 50/31$$

$$x = 33 \times 50$$

$$x = 1650$$

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

$$\text{Increase in the price of an article} = 1080 - 960 = ₹ 120$$

We know that

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

By further calculation

$$= 1/8 \times 100\%$$

So we get

$$= 100/8 \%$$

$$= 25/2 \%$$

$$= 12.5 \%$$

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

$$\begin{aligned} \text{Votes secured by winning candidate} &= (100 - 42) \% \text{ of the votes polled} \\ &= 58 \% \text{ of the votes polled} \end{aligned}$$

$$\begin{aligned} \text{So the difference of votes} &= 58\% - 42\% \\ &= 16\% \text{ of the votes polled} \end{aligned}$$

We know that

$$16\% \text{ of the votes polled} = 14400$$

$$16\%/100 \text{ of the votes polled} = 14400$$

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

By further calculation

$$= 900 \times 100$$

$$= 90000$$

Here

$$\text{Total number of eligible voters} = 100000$$

$$\begin{aligned} \text{No. of voters who did not vote} &= 100000 - 90000 \\ &= 10000 \end{aligned}$$

$$\text{Percentage of voters did not vote} = [10000/100000 \times 100] \%$$

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

$$= 60 \times 80$$

$$= 4800$$

$$\text{No. of girls} = 8000 - 4800 = 3200$$

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

$$= 90 \times 32$$

$$= 2880$$

$$\text{No. of passed candidates} = 3840 + 2880 = 6720$$

$$\text{No. of failed candidates} = 8000 - 6720 = 1280$$

Therefore, the number of candidates who failed is 1280.

18. In an exam, $\frac{1}{4}$ 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 = $\frac{1}{4}$ of $x = \frac{x}{4}$

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

It can be written as

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

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

$$= 30/100 \times x$$

By further calculation

$$= 3/10 \times x$$

$$= 3x/10$$

(i) No. of students who failed in any of the subject = $(7x/20 + 3x/10) - x/4$

Taking LCM

$$= (7x + 6x)/20 - x/4$$

So we get

$$= (13x - 5x)/20$$

$$= 8x/20$$

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

We can write it as

$$= 8x/20 \times 1/x \times 100\%$$

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

$$3x/10 - x/4 = 25$$

No. of students who failed only in English = $3x/10 - x/4$

Taking LCM

$$(6x - 5x)/20 = 25$$

By further calculation

$$x = 25 \times 20$$

$$x = 500$$

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

$1479 = (1 + 16/100)$ of original price

It can be written as

$$1479 = [(100 + 16)/100] \times ₹ x$$

By further calculation

$$1479 = 116/100 \times x$$

So we get

$$116x/100 = 1479$$

By separating the terms

$$x = (1479 \times 100)/116$$

$$x = (1479 \times 25)/29$$

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 = $(59.5 \times 100) / 85$
By further calculation
 $= 0.7 \times 100$
 $= 70$ 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 = $(40 \times 15) / 100 = ₹ 6$
So the sale price = $40 - 6 = ₹ 34$

(ii) Sale price = ₹ 20.40
Rate of reduction = 15%

We know that
Cost price = $(SP \times 100) / (100 - \text{reduction } \%)$
Substituting the values
 $= (20.40 \times 100) / (100 - 15)$
By further calculation
 $= (2040 \times 100) / (100 \times 85)$
 $= ₹ 24$

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 × (100 + 10)/ 100

By further calculation

= ₹ 200 × 110/100

= ₹ 220

We know that

Decreased price = ₹ 200 × (100 – 10)/ 100

So we get

= ₹ 220 × 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

= 20/100 × x

So we get

= 1/5 × x

= x/5

No. of parrots died = 5% of x

It can be written as

= 5/100 × x

= x/20

No. of parrots remaining = x – (x/5 + x/20)

Taking LCM

= x – [(4x + x)/ 20]

By further calculation

= x – 5x/20

= x – x/4

Taking LCM

= (4x – x)/ 4

= 3x/4

No. of sold parrots = 45% of 3x/4

It can be written as

= 45/100 × 3x/4

By further calculation

$$= 9/20 \times 3x/4$$
$$= 27x/80$$

No. of parrots which are not sold = $3x/4 - 27/80$

Taking LCM

$$= (60x - 27x)/ 80$$
$$= 33x/80$$

Based on the question

$$33x/80 = 33$$

By cross multiplication

$$33x = 33 \times 80$$

So we get

$$x = (33 \times 80)/ 33$$

$$x = 80$$

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

$$= 36/100 \times x$$

$$= 36x/ 100$$

Marks secured by another candidate = 43% of x

It can be written as

$$= 43/100 \times x$$

$$= 43x/ 100$$

The qualifying marks are same for both the candidates

So according to the question

$$36x/100 + 24 = 43x/100 - 18$$

By further calculation

$$24 + 18 = 43x/100 - 36x/ 100$$

Taking LCM

$$42 = (43x - 36x)/ 100$$

$$42 = 7x/100$$

By cross multiplication

$$x = 42 \times 100/7$$

$$x = 6 \times 100$$

$$x = 600$$

Here the maximum marks = 600

Marks secured by first candidate = $36/100 \times 600 = 36 \times 6 = 216$

Qualifying marks = $216 + 24 = 240$

So the percentage of qualifying marks = $(240/600 \times 100) \%$

By further calculation

= $240/6 \%$

= 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 % = (Profit × 100)/ C.P.

Substituting the values

= (68 × 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 % = [Loss/C.P. × 100] %

Substituting the values

= [1496/ 13600 × 100] %

So we get

= 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 % = [Gain/ C.P. × 100] %

Substituting the values

= [96.25/1540 × 100] %

By further calculation
 $= 9625/1540 \%$
 $= 1925/308 \%$
So we get
 $= 25/4 \%$
 $= 6 \frac{1}{4} \%$

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 % = $[\text{Loss} / \text{C.P.} \times 100] \%$
Substituting the values
 $= [110 / 880 \times 100] \%$
By further calculation
 $= 100/8 \%$
So we get
 $= 25/2 \%$
 $= 12.5 \%$

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 = $25 \times 9.60 = ₹ 240$
No. of eggs = 25 dozen = $25 \times 12 = 300$
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 = $1 \times 270 = ₹ 270$
So the profit = S.P. - C.P.
Substituting the values
 $= 270 - 240$
 $= ₹ 30$

Here

$$\begin{aligned}\text{Profit \%} &= [\text{Profit}/ \text{C.P.} \times 100] \% \\ \text{Substituting the values} \\ &= [30/240 \times 100] \% \\ \text{So we get} \\ &= 100/8 \% \\ &= 25/2 \% \\ &= 12.5 \%\end{aligned}$$

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

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

Substituting the values

$$= [21400 \times (100 + 20)] / 100$$

By further calculation

$$= (21400 \times 120) / 100$$
$$= ₹ 25680$$

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

$$\begin{aligned}\text{Net C.P. of the bicycle} &= 240000 + 6000 + 4000 \\ &= ₹ 250000\end{aligned}$$
$$\begin{aligned}\text{S.P. of 200 bicycle at ₹ 1350 per bicycle} &= 200 \times 1350 \\ &= ₹ 270000\end{aligned}$$

So profit = S.P – C.P.

Substituting the values

$$\begin{aligned}&= 270000 - 250000 \\ &= ₹ 20000\end{aligned}$$

Here
Profit % = [Profit/ C.P. × 100] %

Substituting the values
= $[20000/250000 \times 100] \%$
So we get
= $200/25 \%$
= 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
= $90/100 \times ₹ x$
= ₹ $9x/10$

We know that
Profit = S.P. – C.P.
Substituting the values
= $x - 9x/10$
Taking LCM
= $(10x - 9x)/10$
= ₹ $x/10$

Here
Profit % = $[\text{Profit}/\text{C.P.} \times 100] \%$
Substituting the values
= $[x/10/9x/10 \times 100] \%$
It can be written as
= $[x/10 \times 10/9x \times 100] \%$
So we get
= $100/9 \%$
= $11 \frac{1}{9} \%$

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 = $35/4 \times 20$
= 35×5
= ₹ 175
S.P. of the note books = $58/5 \times 20$
= 58×4
= ₹ 232

(i) We know that
Gain = S.P. – C.P.
Substituting the values

$$= 232 - 175$$
$$= ₹ 57$$

Here

$$\text{Gain \%} = [\text{Gain} / \text{C.P.} \times 100] \%$$

Substituting the values

$$= [57 / 175 \times 100] \%$$

By further calculation

$$= [57/7 \times 4] \%$$

So we get

$$= 228/7 \%$$

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

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

When the profit is ₹ 1, the number of note books sold = $20/57$

$$\begin{aligned} \text{When the profit is ₹ 171, the number of note books sold} &= 20/57 \times 171 \\ &= 20 \times 3 \\ &= 60 \end{aligned}$$

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 of 3 and 4 is 12

We know that

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

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

Here

$$\text{Loss} = \text{C.P.} - \text{S.P.}$$

Substituting the values

$$= 4 - 3$$

$$= ₹ 1$$

$$\text{Loss \%} = [\text{Loss} / \text{C.P.} \times 100] \%$$

Substituting the values

$$= [1/4 \times 100] \%$$

So we get

$$= 100/4 \%$$

$$= 25 \%$$

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

$$\text{C.P. of 1 pen} = ₹ x/7$$

Based on the question

$$\begin{aligned}\text{S.P. of 5 pens} &= ₹ x \\ \text{S.P. of 1 pen} &= ₹ x/5\end{aligned}$$

$$\begin{aligned}\text{Profit} &= \text{S.P.} - \text{C.P.} \\ \text{Substituting the values} \\ &= x/7 - x/5 \\ \text{Taking LCM} \\ &= (7x - 5x)/35 \\ &= ₹ 2x/35\end{aligned}$$

We know that

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

Substituting the values

$$= 2x/35 / x/7 \times 100 \%$$

It can be written as

$$= 2x/35 \times 7/x \times 100 \%$$

By further calculation

$$= 2/5 \times 100 \%$$

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

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

Substituting the values

$$= (100 + 8) / 100 \times 2360$$

By further calculation

$$= 108 / 100 \times 2360$$

So we get

$$= 108 / 10 \times 236$$
$$= ₹ 2548.80$$

(ii) It is given that

Cost price = ₹ 380, Loss = 7.5 %

We know that

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

Substituting the values

$$= (100 - 7.5) / 100 \times 380$$

By further calculation

$$= 92.5 / 100 \times 380$$

So we get

$$= 9.25 \times 38$$
$$= ₹ 351.50$$

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 = 50%

We know that

S.P. of 12 eggs = $[1 + 50/100]$ of ₹ 18

It can be written as

= $(150/100 \times 18)$

By further calculation

= $(3/2 \times 18)$

So we get

= 3×9

= ₹ 27

S.P. of 1 egg = ₹ $27/12$

So we get

= ₹ $9/4$

= ₹ 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

$$= (12/100 \times 575)$$

By further calculation

$$= (12/4 \times 23)$$

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

$$= [25/ (3 \times 100) \times 12750]$$

By further calculation

$$= (25/30 \times 1275)$$

So we get

$$= (5/6 \times 1275)$$

$$= ₹ 1062.50$$

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

$$\text{Discount \%} = [\text{Discount}/\text{M.P.} \times 100] \%$$

Substituting the values

$$= [58.50/780 \times 100] \%$$

By further calculation

$$= 5850/780 \%$$

So we get

$$= 585/78 \%$$

$$= 7.5 \%$$

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

We know that

$$\text{Discount} = \text{Advertised price} - \text{Selling Price}$$

Substituting the values

$$= 28500 - 24510$$

$$= ₹ 3990$$

Here

$$\text{Discount \%} = [\text{Discount}/ \text{advertised price} \times 100] \%$$

Substituting the values

$$= [3990/ 28500 \times 100] \%$$

So we get

$$= 3990/ 285 \%$$

$$= 14 \%$$

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

$$\text{M.P. of one notebook} = ₹ 30$$

$$\text{M.P. of one dozen notebooks} = 30 \times 12 = ₹ 360$$

$$\text{Discount} = 15\%$$

We know that

$$\text{Amount of discount} = 15\% \text{ of M.P.}$$

It can be written as

$$= 15\% \text{ of ₹ 360}$$

By further calculation

$$= (15/100 \times 360)$$

So we get

$$= (15/10 \times 36)$$

$$= (3/2 \times 36)$$

On further simplification

$$= 3 \times 18$$

$$= ₹ 54$$

$$\text{Price a student pays for a dozen notebooks} = 360 - 54 = ₹ 306$$

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. = $[1 - \frac{d}{100}]$ of M.P.
Substituting the values
S.P. = $[1 - \frac{20}{100}]$ 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

$$\text{S.P.} = [1 + P/100] \text{ of C.P.}$$

Substituting the values

$$640 = [1 + 25/100] \text{ of C.P.}$$

By further calculation

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

So we get

$$\text{C.P.} = [640 \times 100/125]$$

$$\text{C.P.} = 128 \times 4$$

$$\text{C.P.} = ₹ 512$$

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

$$\text{M.P. of an article} = ₹ 2250$$

$$\text{Discount} = 12 \%$$

We know that

$$\text{S.P.} = [1 - d/100] \text{ of M.P.}$$

Substituting the values

$$\text{S.P.} = [1 - 12/100] \text{ of ₹ 2250}$$

By taking LCM

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

By further calculation

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

So we get

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

$$\text{S.P.} = 22 \times 90$$

$$\text{S.P.} = ₹ 1980$$

(ii) It is given that

$$\text{S.P.} = ₹ 1980$$

$$\text{Profit} = 10\%$$

We know that

$$\text{S.P.} = [1 + P/100] \text{ of C.P.}$$

Substituting the values

$$1980 = [1 + 10/100] \text{ of C.P.}$$

By further calculation

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

So we get

$$\text{C.P.} = 1980 \times 100/110$$

$$\text{C.P.} = 18 \times 100$$

$$\text{C.P.} = ₹ 1800$$

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

$$\text{C.P.} = ₹ 650$$

$$\text{Profit} = 20\%$$

We know that

$$\text{S.P.} = [1 + P/100] \text{ of C.P.}$$

Substituting the values

$$= [1 + 20/100] \times 650$$

By further calculation

$$= 120/100 \times 650$$

So we get

$$= 12 \times 65$$

$$= ₹ 780$$

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

(ii) It is given that

$$\text{S.P.} = ₹ 780$$

$$\text{Discount} = 20\%$$

We know that

$$\text{S.P.} = [1 - d/100] \text{ of M.P.}$$

Substituting the values

$$780 = [1 - 20/100] \text{ of M.P.}$$

By further calculation

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

It can be written as

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

So we get

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

$$\text{M.P.} = 7800/8$$

$$\text{M.P.} = ₹ 975$$

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

$$\text{C.P. of a dinner set} = ₹ 1200$$

We know that

$$\text{M.P.} = 1200 + 80\% \text{ of ₹ } 1200$$

By further calculation

$$= 1200 + 80/100 \times 1200$$

So we get

$$= 1200 + 80 \times 12$$

By multiplication

$$= 1200 + 960$$

$$= ₹ 2160$$

(ii) It is given that

$$\text{M.P.} = ₹ 2160$$

$$\text{Discount} = 15\%$$

We know that

$$\text{S.P.} = (1 - d/100) \text{ of M.P.}$$

Substituting the values

$$= (1 - 15/100) \times 2160$$

By further calculation

$$= 85/100 \times 2160$$

So we get

$$= 17/20 \times 2160$$

$$= 17 \times 108$$

$$= ₹ 1836$$

(iii) We know that

$$\text{Profit} = \text{S.P.} - \text{C.P.}$$

Substituting the values

$$= 1836 - 1200$$

$$= ₹ 636$$

Here

$$\text{Profit \%} = [\text{Profit}/\text{C.P.} \times 100] \%$$

Substituting the values

$$= (636/1200 \times 100) \%$$

By further calculation

$$= 636/12 \%$$

$$= 53 \%$$

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

$$\text{C.P.} = ₹ 1600$$

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

Take ₹ x as the M.P. of an article

We know that

$$\text{C.P.} = \text{M.P.} - 20\% \text{ of M.P.}$$

Substituting the values

$$1600 = x - 20\% \text{ of } x$$

It can be written as

$$1600 = x - 20/100 \times x$$

By further calculation

$$1600 = 80x/100$$

So we get

$$x = 1600 \times 100/80$$

$$x = 20 \times 100$$

$$x = ₹ 2000$$

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

(ii) It is given that

$$\text{M.P.} = ₹ 2000$$

$$\text{Discount} = 16\%$$

We know that

$$\text{S.P.} = [1 - 16/100] \text{ of M.P.}$$

Taking LCM

$$= (100 - 16)/100 \text{ of } ₹ 2000$$

By further calculation

$$= 84/100 \times 2000$$

So we get

$$= 84 \times 20$$

$$= ₹ 1680$$

(iii) It is given that

$$\text{Profit} = \text{S.P.} - \text{C.P.}$$

Substituting the values

$$= 1680 - 1600$$

$$= ₹ 80$$

We know that

$$\text{Profit \%} = [\text{Profit} / \text{C.P.} \times 100] \%$$

Substituting the values

$$= [80/1600 \times 100] \%$$

So we get

$$= 80/16 \%$$

$$= 5 \%$$

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%

$$\text{S.P.} = [1 - d/100] \text{ of M.P.}$$

Substituting the values

$$360 = [1 - 20/100] \text{ of M.P.}$$

By further calculation

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

It can be written as

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

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

So we get

$$\text{M.P.} = 45 \times 10$$

$$\text{M.P.} = ₹ 450$$

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

Profit = 20%

$$\text{S.P.} = ₹ 360$$

We know that

$$\text{S.P.} = [1 + P/100] \text{ of C.P.}$$

Substituting the values

$$360 = [1 + 20/100] \text{ of } x$$

By further calculation

$$360 = [1 + 1/5] \text{ of } x$$

So we get

$$360 = 6x/5$$

By cross multiplication

$$x = 360 \times 5/6$$

$$x = 60 \times 5$$

$$x = ₹ 300$$

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

$$\begin{aligned}\text{Total S.T.} &= (50 \times 5) / 100 \\ &= ₹ 2.50\end{aligned}$$

So the buying price = $50 + 2.50 = ₹ 52.50$

(ii) We know that

$$\begin{aligned}\text{C.P. of 5 kg of flour at the rate of ₹ 15 per kg} &= 15 \times 5 \\ &= ₹ 75\end{aligned}$$

Rate of S.T. = 5%

Here

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

So we get

$$= 375 / 100$$

$$= ₹ 3.75$$

So the total price of the flour = $75 + 3.75 = ₹ 78.75$

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

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

By further calculation

$$= (13500 \times 100) / 108$$

$$= ₹ 12500$$

(ii) It is given that

Total cost of shampoo bottle including VAT = ₹ 180

Rate of VAT = 8%

We know that

Original price of shampoo = $(180 \times 100) / (100 + 8)$

By further calculation

$$= (180 \times 100) / 108$$

So we get

$$= 500/3$$

$$= ₹ 166.67$$

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 = $(34992 \times 100) / (100 + 8)$

By further calculation

$$= (34992 \times 100) / 108$$

$$= ₹ 32400$$

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 = $(\text{VAT} \times 100) / \text{C.P.}$

Substituting the values

$$= (96 \times 100) / 1200$$

$$= 8 \%$$

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 = $(523.80 \times 100) / (100 + 8)$

By further calculation

$$= (523.80 \times 100) / 108$$

$$= ₹ 485$$

Here

New rate of VAT = 10%

Amount of VAT = $485 \times 10/100$

So we get

= $4850/100$

= ₹ 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 = $[4800 \times (100 - 10)/ 100]$

By further calculation

= $(4800 \times 90)/ 100$

= ₹ 4320

Here

Rate of VAT charged = 8%

So the sale price including VAT = $[4320 \times (100 + 8)/ 100]$

By further calculation

= $(4320 \times 108)/ 100$

= $466560/100$

= ₹ 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% = $x \times 9/100 = ₹ 9x/100$

So the amount paid = $x + 9x/100 = 109x/100$

By equating the values

$109x/100 = 10900$

By further calculation

$x = (10900 \times 100)/ 109$

$x = 10000$

$$\begin{aligned}\text{Amount reduced by the shopkeeper} &= 10900 - 10000 \\ &= ₹ 900\end{aligned}$$

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

