

# Percentage

## EXERCISE - 7.1

### Solution-1

$$(i) \quad 356\% \\ \Rightarrow \frac{356}{100} = \frac{89}{25}$$

$$(ii) \quad 2\frac{1}{2}\% \\ \Rightarrow \frac{5}{2}\% \\ \Rightarrow \frac{5}{2 \times 100} = \frac{1}{40}$$

$$(iii) \quad 16\frac{2}{3}\% \\ \Rightarrow \frac{50}{3}\% \\ \Rightarrow \frac{50}{3 \times 100} = \frac{1}{6}$$

### Solution-2 :

$$(i) \quad \frac{3}{2} \\ \Rightarrow \frac{3}{2} \times \frac{50}{100}\% = 150\%$$

$$(ii) \quad \frac{9}{20} \\ \Rightarrow \left(\frac{9}{20} \times 100\right)\% = 45\%$$

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

$$\rightarrow \left( \frac{5}{4} \times 100 \right) \% = 125\%$$

### Solution - 3

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

$$\rightarrow 0.75 \rightarrow \text{Decimal.}$$

When we convert decimals into percentages

$$\text{then } \rightarrow 0.75 \times 100$$

$$\rightarrow 75\%$$

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

$$\rightarrow 0.625$$

$$\rightarrow 0.625 \times 100$$

$$\rightarrow 62.5\%$$

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

$$\rightarrow 0.1875$$

$$\rightarrow 0.1875 \times 100$$

$$\rightarrow 18.75\%$$

Solution-4:

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

$\Rightarrow 0.6666 \rightarrow$  Decimal.

$\rightarrow$  while converting decimals into percentages, we have to multiply with 100

$\Rightarrow 0.6666 \times 100$

$\Rightarrow 66.66\%$

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

$\Rightarrow 0.83333$

$\Rightarrow 0.8333 \times 100$

$\Rightarrow 83.33\%$

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

$\Rightarrow 0.5714$

$\Rightarrow 0.5714 \times 100$

$\Rightarrow 57.14\%$

Solution- 5

(i)  $17 : 20$

$$\Rightarrow \frac{17}{20}$$

$$\Rightarrow \frac{17}{20} \times 100^5$$

$$\Rightarrow 17 \times 5$$

$$\Rightarrow 85\%$$

(ii)  $\frac{13}{18} : 18$

$$\Rightarrow \frac{13}{18}$$

$$\Rightarrow \frac{13}{18} \times 100$$

$$\Rightarrow 72.22\%$$

(iii)  $93 : 80$

$$\Rightarrow \frac{93}{80} \times 100^5$$

$$\Rightarrow 116.25\%$$

### Solution-6

i) 20%

$$\Rightarrow \frac{20}{100}$$

$$\Rightarrow \frac{1}{5}$$

$$\Rightarrow 0.2$$

(ii) 2%

$$\Rightarrow \frac{2}{100}$$

$$\Rightarrow \frac{1}{50}$$

$$\Rightarrow 0.02$$

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

$$\Rightarrow \frac{7}{4}$$

$$\Rightarrow \frac{7}{4 \times 100}$$

$$\Rightarrow 0.0175$$

### Solution-7

(i) 27% of 250

$$\rightarrow \frac{27}{100} \times 250$$

$$\rightarrow \frac{27}{2}$$

$$\rightarrow ₹ 13.5$$

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

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

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

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

$$\rightarrow \frac{25}{16} \text{ (or)} 1\frac{9}{16} \text{ kg}$$

$$\rightarrow 1.56 \text{ kg}$$

### Solution-8

(i) 300g of 2 kg.

$$2 \text{ kg} = (2 \times 1000) \text{ g} = 2000 \text{ g}$$

$$\text{Required percentage} = \left( \frac{300}{2000} \times 100 \right) \%$$

$$= 15\%$$

(i) ₹ 7.50 of ₹ 6

$$\rightarrow ₹ 6 = (6 \times 100) \text{ Paise}$$

$$\begin{aligned} \text{Required percentage} &= \frac{750}{600} \times 100 \\ &= 125\% \end{aligned}$$

Solution-9

(i) 50 kg is 65 kg.

$$\begin{aligned} \text{Required percentage} &= \frac{65}{50} \times 100 \\ &= 130\% \end{aligned}$$

(ii) ₹ 9 is ₹ 4

$$\begin{aligned} \text{Required percentage} &= \frac{4}{9} \times 100 \\ &= \frac{400}{9} \\ &= 44\frac{4}{9}\% \end{aligned}$$

Solution-10

(i).  $16\frac{2}{3}\%$  of number is 25.

Let the required number be 'x'.

According to given condition,  $16\frac{2}{3}\%$  of x is 25

$$\therefore \frac{16\frac{2}{3}}{100} \times x = 25$$

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

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

$$x = 150$$

(ii) let the number be 'x'

Given condition is 13.25% of x is 159

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

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

$$x = 1200$$

Solution - II

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

$$\left[ \because \left(1 + \frac{x}{100}\right) \text{ of original number} \right]$$

$$= \left(\frac{100 + 30}{100}\right) \times 60$$

$$= \frac{130}{100} \times 60$$

$$= 78$$

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

$$= \left(1 - \frac{10}{100}\right) \times 750$$

$$= \left(\frac{100-10}{100}\right) \times 750$$

$$= \frac{90}{100} \times 750$$

$$= 675$$

Solution-12 :

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

$$\left(1 + \frac{15}{100}\right) \times x = 299$$

$$\left(\frac{100+15}{100}\right) \times x = 299$$

$$\frac{115}{100} \times x = 299$$

$$x = \frac{299 \times 100}{115}$$

$$x = 260$$

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

let number be 'x'

$$\therefore \left(\frac{100-18}{100}\right) \times x = 697$$

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

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

$$x = 850$$

### Solution-13

(i). let the monthly salary is 'x'

Mr. Khanna spent 83% and saved 1870

$$\begin{aligned} \text{Savings} &= 100 - 83 \\ &= 17\% \end{aligned}$$

$$\therefore 17\% \text{ of } x = 1870$$

$$\frac{17}{100} \times x = 1870$$

$$x = \frac{1870 \times 100}{17}$$

$$= 11000$$

$$x = ₹ 11,000$$

$\therefore$  Monthly salary is ₹ 11,000/-

Solution-14:

Let the total strength of school is 'x'

Given, 38% of the students are girls.

$$\text{So } \rightarrow 100 - 38$$

$\rightarrow 62\%$  is boys.

$$\therefore \text{Number of boys} = 1023$$

$$\text{i.e., } 62\% \text{ of } x = 1023$$

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

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

$$= 1650$$

Solution-15:

The price of article increased from ₹960 to ₹1080

$$\text{Original price} = 960$$

$$\text{Increase in price} = 1080 - 960$$

$$= 120$$

$$\text{Percentage increase} = \frac{\text{Increase in price}}{\text{original value}} \times 100$$

$$= \frac{120}{960} \times 100$$

$$= 12.5\%$$

Solution-16 :

(i) Given, the total no of eligible voters = 1 lakh  
= 1,00,000

∴ loser polled = 42%

∴ winner polled = 100 - 42  
= 58%

Loser lost by 14,400 votes.

∴ winner - loser = 14,400

58% - 42% = 14,400

16% = 14,400

∴ ~~16~~

let the total no of voter polled = x

∴ 16% of x = 14,400

$$\frac{16}{100} \times x = 14,400$$

$$x = \frac{14,400 \times 100}{16}$$

$$x = 90,000$$

The percentage of voters did not vote

$$\Rightarrow 1,00,000 - 90,000$$

$$\Rightarrow 10,000$$

∴ 10% //

Solution - 17 :

Given Total Candidates = 8000

60% were boys

$$\text{i.e., } \frac{60}{100} \times 8000 = 4800$$

$$\text{Girls} = 8000 - 4800$$

$$= 3200$$

∴ Passed candidates was

$$80\% \text{ of boys} = \frac{80}{100} \times 4800$$

$$= 3840$$

$$90\% \text{ of girls} = \frac{90}{100} \times 3200$$

$$= 2880$$

∴ Total no. of candidates passed in exam

$$\text{i.e., } 3840 + 2880 = 6720$$

∴ Number of candidates who failed

$$\text{i.e., } 8000 - 6720$$

$$= 1280$$

Solution - 18 :-

(i) Given,  $\frac{1}{4}$  of students failed in both in English and maths i.e., 25%.

35% students failed in maths

30% students failed in English.

$\therefore$  percentage of students who failed in

$$\text{only maths} = 35\% - 25\%$$

$$= 10\%$$

percentage of students who failed in

$$\text{only English} = 30\% - 25\%$$

$$= 5\%$$

$\therefore$  percentage of students who failed in any of the subjects = 25 + 10 + 5

$$= 40\%$$

(ii) percentage of students who passed in

$$\text{both the subjects} = 100 - 40$$

$$= 60\%$$

(iii) Given no. of students who failed only in

$$\text{English} = 25 \Rightarrow 5\% = 25$$

$$\therefore \text{Total no. of students} = 100\% = \frac{100}{5} \times 25 = 500 //$$

Solution-19:

let the price of the article be " $x$ ".

The price of article increased by 16%.

$$\text{So } \left(1 + \frac{16}{100}\right) \times x = 1479$$

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

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

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

$$x = 1275$$

$\therefore$  Original price of article is ₹1275/-

Solution-20:

let the prathiba weight is " $x$ " kg.

Prathiba weight reduced by 15%.

$$\text{So } \left(1 - \frac{15}{100}\right) \times x = 59.5$$

$$\left(\frac{100-15}{100}\right) \times x = 59.5$$

$$\frac{85}{100} \times x = 59.5$$

$$x = \frac{59.5 \times 100}{85}$$

$$x = 70$$

Solution- 21

(i) As per given condition,  
shop reduces all its prices by 15%

Let, the original price is ₹40

∴ Let the cost of an article is ₹  $x$

$$\begin{aligned}\therefore x &= 40 - 15\% \text{ of } 40 \\ &= 40 - \frac{15}{100} \times 40 \\ &= 40 - 6 \\ &= 34.\end{aligned}$$

(ii) Let the original price be 'x'.

The article sold at ₹ 20.40.

$$\therefore x - 15\% \text{ of } x = 20.40$$

$$x - \frac{15}{100} \times x = 20.40$$

$$\frac{100x - 15x}{100} = 20.40$$

$$\frac{85x}{100} = 20.40$$

$$x = \frac{20.40 \times 100}{85}$$

$$x = 24.$$

∴ Original price of article is ₹ 24.

Solution-22:

The original price is ₹ 200

Increases by 10%

$$\Rightarrow 200 + 10\% \text{ of } 200$$

$$\Rightarrow 200 + \frac{10}{100} \times 200$$

$$\Rightarrow 200 + 20$$

$$\Rightarrow 220.$$

∴ Decreases by 10%

$$\Rightarrow 220 - 10\% \text{ of } 220$$

$$\Rightarrow 220 - \frac{10}{100} \times 220$$

$$\Rightarrow 220 - 22$$

$$\Rightarrow 198$$

∴ Original price is 200

Final price is 198.

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

(23)

Let 'x' be the number of parrots initially Chandini had.  
20% of the parrots flew away and 5% of them died

$$\begin{aligned} \text{No. of parrots remaining now} &= \left[ 1 - \left( \frac{20}{100} + \frac{5}{100} \right) \right] \times (x) \\ &= 0.75x \end{aligned}$$

Now,

45% of the remaining parrots were sold  
 $\Rightarrow$  55% of remaining parrots were with Chandini

Therefore,

$$\text{No. of parrots Chandini is having finally} = \left( \frac{55}{100} \right) \times 0.75x \quad \text{--- (1)}$$

$$\text{But given No. of parrots Chandini is having} = 33 \quad \text{--- (2)}$$

From (1) & (2),

$$\boxed{33x = \text{equal to } \left( \frac{55}{100} \right) 0.75x}$$

$$\Rightarrow 33 = \left( \frac{55}{100} \right) \times (0.75) \times x$$

$$\Rightarrow \boxed{x = 80}$$

$\therefore$  Chandini had purchased 80 parrots.

(24)

Let 'x' be the maximum marks

'y' be the minimum pass marks

A candidate gets 36% in examination and fails by 24 marks

$$\Rightarrow \boxed{(0.36)x = y - 24} \quad \text{--- (1)}$$

Another candidate gets 43% in an examination and gets 18 marks more than that of pass marks

$$\Rightarrow \boxed{(0.43)x = y + 18} \quad \text{--- (2)}$$

Solving equation (1) and (2), we get

$$0.36x + 24 = 0.43x - 18$$

$$\Rightarrow \frac{0.7x}{10} = 42$$

$$\Rightarrow \boxed{x = 600} \quad \text{Maximum marks}$$

Substituting  $x = 600$  in equation (1)

$$\Rightarrow (0.36) \times 600 = y - 24$$

$$\Rightarrow \boxed{y = 240}$$

$$\text{Percentage of pass marks} = \frac{y}{x} \times 100\%$$

$$= \frac{240}{600} \times 100$$

$$\boxed{\% \text{ of pass marks} = 40\%}$$

Solution-23:

let the total no of parrots be 'x'.

Out of them 20% flew away and 5% died.

$$\Rightarrow \text{ie.} \left(1 - \frac{20}{100} - \frac{5}{100}\right) \times x$$

$$\Rightarrow 0.75 \times x$$

## EXERCISE : 7.2

i) C.P = 400    S.P = 468

$$\begin{aligned} \text{As } S.P > C.P, \text{ profit} &= S.P - C.P \\ &= 468 - 400 \\ &= 68 \end{aligned}$$

$$\begin{aligned} \text{Profit percentage} &= \left( \frac{\text{Profit}}{C.P} \times 100 \right) \% \\ &= \left( \frac{68}{400} \times 100 \right) \% \\ &= 17\% \end{aligned}$$

ii) C.P = 13,600    ,    S.P = 12,104

$$\begin{aligned} \text{As } C.P > S.P, \text{ loss} &= C.P - S.P \\ &= 13,600 - 12,104 \\ &= 1496 \end{aligned}$$

$$\begin{aligned} \text{Loss percentage} &= \left( \frac{\text{Loss}}{C.P} \times 100 \right) \% \\ &= \left( \frac{1496}{13600} \times 100 \right) \% \\ &= 11\% \end{aligned}$$

2. Given S.P = 1636.25 , gain = 96.25

$$\text{As Gain} = S.P - C.P$$

$$\begin{aligned} C.P &= S.P - \text{Gain} = 1636.25 - 96.25 \\ &= 1540 \end{aligned}$$

$$\begin{aligned}\text{Gain percentage} &= \left( \frac{\text{Gain}}{\text{C.P}} \times 100 \right) \% \\ &= \left( \frac{96.25}{1540} \times 100 \right) \% \\ &= 6.25 \%\end{aligned}$$

3. Given

$$\text{S.P} = 770 \quad \text{Loss} = 110$$

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

$$\begin{aligned}\text{C.P} &= \text{Loss} + \text{S.P} \\ &= 110 + 770 \\ &= 880\end{aligned}$$

$$\begin{aligned}\text{Loss percentage} &= \left( \frac{\text{Loss}}{\text{C.P}} \times 100 \right) \% \\ &= \left( \frac{110}{880} \times 100 \right) \% \\ &= 12.5 \%\end{aligned}$$

4. C.P of 1 dozen eggs = 9.60

$$\text{C.P of 25 dozen eggs} = (25 \times 9.6) = 240$$

$$\text{Total no. of eggs} = 25 \times 12 = 300 \text{ eggs}$$

Out of 300 eggs, 30 eggs were broken

So the remaining no. of eggs were  $300 - 30 = 270$  eggs

Given S.P of each egg = 21

$$S.p \text{ of } 270 \text{ eggs} = 270 \times 1 = 270.$$

As  $S.p > C.p$ , he always gets profit (or) gain

$$\text{So the gain percentage} = \left( \frac{\text{gain}}{C.p} \times 100 \right) \%$$

$$\begin{aligned} \text{Gain} &= S.p - C.p \\ &= 270 - 240 = 30. \end{aligned}$$

$$\begin{aligned} \text{Gain percentage} &= \left( \frac{30}{240} \times 100 \right) \% \\ &= 12.5 \% \end{aligned}$$

5.

$$\begin{aligned} C.p \text{ of an article} &= 20,000 + 1400 \text{ (repairs)} \\ &= 21,400 \end{aligned}$$

$$\text{profit percentage} = 20\%$$

$$\frac{\text{profit}}{C.p} \times 100 = 20.$$

$$\text{profit} \times 100 = 20 \times 21,400$$

$$(S.p - C.p) = 20 \times 214$$

$$S.p - 21,400 = 4280.$$

$$S.p = 21,400 + 4280$$

$$S.p = 25680$$

Selling price of an article = 25,680/-

6.

C.P of bicycles includes

i) 200 bicycles at 1200/- per bicycle =  $(200 \times 1200) = 240000$

ii) 30/- per bicycle on transportation =  $200 \times 30 = 6000$

iii) 4000/- on advertising = 4000

$$\begin{aligned} \text{Total cost price of bicycles} &= 240000 + 6000 + 4000 \\ &= 2,50,000 \end{aligned}$$

$$\begin{aligned} \text{S.P of 200 bicycles} &= 200 \times 1350 \\ &= 2,70,000 \end{aligned}$$

As. S.P > C.P, there is always a gain

$$\begin{aligned} \text{So gain} &= \text{S.P} - \text{C.P} \\ &= 2,70,000 - 2,50,000 \\ &= 20,000 \end{aligned}$$

$$\begin{aligned} \text{Gain percentage} &= \frac{\text{Gain}}{\text{C.P}} \times 100 \\ &= \frac{20,000}{2,50,000} \times 100 \\ &= 8\% \end{aligned}$$

7.

Let S.P be ₹  $x$ ,

Then C.P = 90% of  $x$

$$= \frac{9}{10} x$$

$$\begin{aligned}
 \text{Profit} &= \text{S.P} - \text{C.P} \\
 &= x - \frac{9x}{10} \\
 &= \frac{x}{10}
 \end{aligned}$$

$$\begin{aligned}
 \text{Profit Percentage} &= \left( \frac{\text{Profit}}{\text{C.P}} \times 100 \right) \% \\
 &= \left( \frac{(x/10)}{(9x/10)} \times 100 \right) \% \\
 &= \frac{100}{9} \% \\
 &= 11.11\%
 \end{aligned}$$

8. i) C.P of 4 notebooks = ₹ 35

$$\text{Then C.P. of 1 notebook} = \frac{35}{4} = 8.75/-$$

$$\text{S.P of 5 notebooks} = ₹ 58$$

$$\text{Then S.P of 1 notebook} = \frac{58}{5} = 11.6/-$$

As S.P > C.P, there is always a gain

$$\begin{aligned}
 \text{Gain} &= \text{S.P} - \text{C.P} = 11.6 - 8.75 \\
 &= 2.85
 \end{aligned}$$

$$\begin{aligned}
 \text{Gain Percentage} &= \frac{\text{Gain}}{\text{C.P}} \times 100 \\
 &= \frac{2.85}{8.75} \times 100 \\
 &= 32.57\%
 \end{aligned}$$

$$\begin{aligned}
 \text{ii. Number of notebooks to be sold} &= \frac{\text{Total Profit}}{\text{Profit on one notebook}} \\
 &= \frac{171}{2.85} \\
 &= 60.
 \end{aligned}$$

9.

$$\text{Cost price of 3 bananas} = ₹ 1$$

$$\text{The C.P of 1 banana} = ₹ \frac{1}{3} = 0.33$$

$$\text{S.P of 4 bananas} = ₹ 1$$

$$\text{Then S.P of 1 banana} = ₹ \frac{1}{4} = 0.25$$

As C.P > S.P, There is always a loss.

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

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

$$= \frac{1}{12}$$

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

$$= \frac{(1/12)}{(1/3)} \times 100 \%$$

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

$$= 25\%$$

10. Given S.p of 5 pens = C.P of 7 pens.

Let Cost price of one pen be  $x$  then

$$\text{C.P of 7 pens} = ₹ 7x$$

It is given

$$\text{S.p of 5 pens} = \text{C.P of 7 pens.}$$

$$\text{S.p of 5 pens} = ₹ 7x$$

$$\text{S.p of one (1) pen} = \frac{7x}{5}$$

As.  $\text{S.p} > \text{C.p}$  there is a profit

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

$$= \frac{7x}{5} - x = \frac{2x}{5}$$

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

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

$$= \frac{200}{5} \%$$

$$= 40\%$$

11. i) C.P = 2360 , Profit = 8%

$$\text{As. Profit percentage} = \frac{\text{Profit}}{\text{C.P}} \times 100$$

$$\text{profit} \times 100 = 8 \times 2360$$

$$\text{profit} = \frac{8 \times 2360}{100}$$

$$\text{S.P.} - \text{C.P.} = 188.8$$

$$\text{S.P.} = 2360 + 188.8$$

$$\text{S.P.} = 2548.8$$

ii.  $\text{C.P.} = 380$  ;  $\text{loss} = 7.5\%$ .

$$\text{loss percentage} = \frac{\text{loss}}{\text{C.P.}} \times 100$$

$$\text{loss} = \frac{7.5 \times 380}{100}$$

$$\text{C.P.} - \text{S.P.} = 28.5$$

$$\text{S.P.} = 380 - 28.5$$

$$\text{S.P.} = 351.5$$

12.  $\text{C.P.}$  of dozen eggs = ₹ 18

Then  $\text{C.P.}$  of 1 egg =  $\frac{18}{12} = ₹ 1.5$

$\text{profit} = 50\%$

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

$$(\text{S.P.} - \text{C.P.}) = \frac{50 \times 18}{100}$$

$$S.P. - C.P. = 9$$

$$S.P. = 18 + 9$$

$$S.P. = 27$$

$$S.P. \text{ of } 1 \text{ egg} = \frac{27}{12} = \text{₹ } 2.25$$

13.

Let the no of wrist watches are  $x$

Cost of  $x$  wrist watches = ₹ 60,000  
Price

Cp of one third of wrist watches will worth 20,000.

i) As we know  $\frac{1}{3}$ rd are sold at a 30% profit

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

$$= \left[ 1 + \frac{30}{100} \right] \times 20,000$$

$$= \frac{130}{100} \times 20,000$$

$$= 26,000$$

(ii)  $S.P. = \left[ 1 + \frac{P}{100} \right] \text{ of } C.P. \quad [\because \text{As } \frac{1}{3} \text{rd are sold at } 20\% \text{ gain}]$

$$= \left[ 1 + \frac{20}{100} \right] \times 20,000$$

$$= \frac{120}{100} \times 20,000$$

$$= 24,000$$

$$\begin{aligned}
 \text{iii) } S.P &= \left(1 - \frac{5}{100}\right) \text{ of C.P. } \quad [\text{Remaining are sold at a 5\% loss}] \\
 &= \left[1 - \frac{5}{100}\right] \times 20,000 \\
 &= \frac{95}{100} \times 20,000 \\
 &= 19,000
 \end{aligned}$$

$$\text{Total Cost price} = \text{£ } 60,000$$

$$\begin{aligned}
 \text{Selling price} &= \text{£ } [26,000 + 24,000 + 19,000] \\
 &= \text{£ } 69,000
 \end{aligned}$$

As  $S.P > C.P$  there is always a profit

$$\begin{aligned}
 \text{Gain} &= S.P - C.P = 69,000 - 60,000 \\
 &= 9,000/-
 \end{aligned}$$

$$\begin{aligned}
 \text{Gain Percentage} &= \frac{\text{Gain}}{\text{C.P}} \times 100 \% \\
 &= \frac{9,000}{60,000} \times 100 \% \\
 &= 15 \%
 \end{aligned}$$

14.

$$\text{S.P of a Laptop} = \text{£ } 40,000$$

$$\text{C.P of a mobile phone} = \text{£ } 24,000.$$

$$\begin{aligned}
 \text{Total C.P of whole Transaction} &= 40,000 + 24,000 \\
 &= 64,000
 \end{aligned}$$

As shopkeeper made a profit of 8% on laptop

$$\begin{aligned}\text{So, S.P} &= \left(1 + \frac{P}{100}\right) \text{ of C.P} \\ &= \left[1 + \frac{8}{100}\right] \times 40,000 \\ &= \frac{108}{100} \times 40,000 \\ &= 43,200\end{aligned}$$

Also, he made a loss of 12% on mobile phone

$$\begin{aligned}\text{S.P} &= \left[1 - \frac{L}{100}\right] \text{ of C.P} \\ &= \left[1 - \frac{12}{100}\right] \times 24,000 \\ &= \frac{88}{100} \times 24,000 \\ &= 21,120\end{aligned}$$

$$\begin{aligned}\text{Total S.P on Whole Transaction} &= 43,200 + 21,120 \\ &= 64,320.\end{aligned}$$

As,  $\text{S.P} > \text{C.P}$  there is always a gain

$$\begin{aligned}\text{Gain} &= \text{S.P} - \text{C.P} = 64,320 - 64,000 \\ &= 320\end{aligned}$$

$$\text{Gain Percentage} = \frac{\text{Gain}}{\text{C.P}} \times 100$$

$$= \frac{320}{64,000} \times 100$$

$$= 0.5 \%$$

16.

$$\text{C.p of 40 chairs} = (40 \times 175) = 7,000$$

Desired gain on whole deal = 10%.

$$\text{S.p of all chairs} = \left[ 1 + \frac{10}{100} \right] \times 7,000$$

$$= \frac{110}{100} \times 7,000$$

$$= 7,700$$

$$\text{One-fourth of all articles} = \frac{1}{4} \times 40 = 10.$$

$$\text{C.p of 10 articles} = 10 \times 175 = 1,750$$

As these articles are sold at a loss of 8%.

$$\text{S.p of these articles} = \left[ 1 - \frac{8}{100} \right] \text{ of } 1,750$$

$$= \frac{92}{100} \times 1,750$$

$$= 1,610$$

$$\text{Selling price of remaining i.e 30 chairs} = 7,700 -$$

$$1,610$$

$$= 6,090/-$$

$$\therefore \text{S.P. of each of the remaining chairs} = \frac{6090}{30}$$

$$= \text{£}203$$

16.

$$\text{S.P. of two electronic gadgets} = \text{£}44,000 \text{ (each)}$$

For first gadget:

$$\text{S.P.} = \text{£}44,000, \text{ profit} = 10\%, \text{ C.P.} = ?$$

$$44,000 = \left(1 + \frac{10}{100}\right) \text{ of C.P.}$$

$$\text{C.P.} = \text{£} \left(44,000 \times \frac{100}{110}\right) = \text{£}40,000$$

For second gadget:

$$\text{S.P.} = 44,000, \text{ loss} = 12\%, \text{ C.P.} = ?$$

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

$$44,000 = \left[1 - \frac{12}{100}\right] \text{ of C.P.}$$

$$\text{C.P.} = \text{£} \left[44,000 \times \frac{100}{88}\right] = \text{£}50,000.$$

$$\text{Then, total cost price} = 40,000 + 50,000 = 90,000.$$

$$\text{Total selling price} = 44,000 + 44,000 = 88,000$$

$$\text{Loss} = \text{C.P.} - \text{S.P.} = 90,000 - 88,000 = 2,000.$$

$$\begin{aligned}
 \text{Loss percentage} &= \frac{\text{Loss}}{\text{C.P.}} \times 100 \\
 &= \frac{2,000}{99,000} \times 100 \\
 &= \frac{20}{9} \\
 &= 2.22\%
 \end{aligned}$$

17.

Manufacturing price of a T.V set = ₹ 12,000

Shopkeeper sold to a dealer at a profit of 20%.

Now S.P of the T.V set =  $\left[1 + \frac{20}{100}\right]$  of C.P

$$\begin{aligned}
 \text{S.P} &= \frac{120}{100} \times 12,000 \\
 &= ₹ 14,000
 \end{aligned}$$

Dealer sold to a customer at 12.5% profit

Now Dealer's S.P will become cost price

So, New selling price to customer

$$= \left[1 + \frac{12.5}{100}\right] \text{ of C.P}$$

$$= \frac{112.5}{100} \times 14,000$$

$$= 16,200.$$

So the customer has to pay ₹16,200 for T.V set

18. i) S.P = 450, loss = 10%.

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

$$10 = \left[ 1 - \frac{\text{S.P}}{\text{C.P}} \right] \times 100$$

$$1 - \frac{\text{S.P}}{\text{C.P}} = \frac{1}{10}$$

$$\frac{\text{S.P}}{\text{C.P}} = 1 - \frac{1}{10} = \frac{9}{10}$$

$$\text{C.P} = \frac{450 \times 10}{9}$$

$$\text{C.P} = ₹500.$$

ii) S.P = ₹690, profit = 15%.

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

$$690 = \left[ 1 + \frac{15}{100} \right] \times \text{C.P}$$

$$\text{C.P} = \frac{690 \times 100}{115}$$

$$\text{C.P} = ₹600.$$

19. If S.P = 3920 , gain = 12%.

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

$$3920 = \left[ 1 + \frac{12}{100} \right] \times C.P$$

$$C.P = \frac{3920 \times 100}{112}$$

$$C.P = 3,500.$$

Now S.P = 4,375

$$\begin{aligned} \text{As } S.P > C.P, \text{ Gain} &= S.P - C.P \\ &= 4,375 - 3,500 \\ &= 875 \end{aligned}$$

$$\begin{aligned} \text{Gain percentage} &= \left[ \frac{\text{Gain}}{C.P} \times 100 \right] \% \\ &= \left[ \frac{875}{3,500} \times 100 \right] \% \\ &= 25 \% \end{aligned}$$

20. S.P = ₹ 1334 , Loss = 8%.

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

$$1334 = \left[ 1 - \frac{8}{100} \right] \times C.P$$

$$C.P = \frac{1334 \times 100}{92}$$

$$C.P = 1450$$

$$\text{Given profit} = 12\frac{1}{2}\% = 12.5\%$$

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

$$= \left[1 + \frac{12.5}{100}\right] \times 1450$$

$$S.P = \frac{112.5 \times 1450}{100}$$

$$S.P = 21631.25$$

21.  $S.P = 252$  - Gain = 5%

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

$$C.P = \frac{S.P \times 100}{100 + P}$$

$$= \frac{252 \times 100}{100 + 5}$$

$$C.P = \frac{25200}{105} = 240$$

$$S.P = ? \quad \text{if gain} = 35\%$$

$$S.P = \left[ 1 + \frac{P}{100} \right] \text{ of C.P}$$
$$= \left[ 1 + \frac{35}{100} \right] \times 240$$

$$S.P = \frac{135 \times 240}{100}$$

$$S.P = 2324$$

22.

Let the selling price of a bag be ₹  $x$ .

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

$$x = \left( 1 + \frac{12}{100} \right) \text{ of C.P}$$

$$x = \frac{112}{100} \text{ of C.P}$$

$$C.P = \frac{100x}{112}$$

To make 18% profit

$$S.P = \left[ 1 + \frac{18}{100} \right] \text{ of C.P}$$

$$= \frac{118}{100} \times \frac{100x}{112} = \frac{59x}{56}$$

According to given information,  $\frac{59x}{56} = x + 39$

$$\frac{59x}{56} - x = 39$$

$$\frac{3x}{56} = 3913$$

$$x = 56 \times 13$$

$$x = 728 = \text{S.P.}$$

$$\begin{aligned} \text{Cost price of bag} &= \frac{100 \times x}{112} \\ &= \frac{100 \times 728}{112} \end{aligned}$$

$$\text{Cost price of bag} = ₹ 650.$$

23. Let the S.P. of sweater be  $x$ , loss = 5%.

$$x = \left[ 1 - \frac{5}{100} \right] \text{ of C.P.}$$

$$\text{C.P.} = \frac{100x}{95}$$

To make 15% profit

$$\begin{aligned} \text{S.P.} &= \left[ 1 + \frac{15}{100} \right] \text{ of C.P.} = \left[ 1 + \frac{15}{100} \right] \times \frac{100x}{95} \\ &= \frac{115}{100} \times \frac{100x}{95} = \frac{23x}{19}. \end{aligned}$$

According to given information,  $\frac{23x}{19} = x + 260$

$$\frac{4x}{19} = 260$$

$$x = 65 \times 19$$

$$x = 1235$$

$\therefore$  Selling price of sweater = 1,235

24.

Let the selling price be "x". Loss = 8%.

$$x = \left[1 - \frac{8}{100}\right] \text{ of C.P.}$$

$$\text{C.P.} = \frac{100x}{92}$$

To make a profit of 12%.

$$\begin{aligned} \text{S.P.} &= \left[1 + \frac{12}{100}\right] \text{ of C.P.} = \left[\frac{112}{100} \times \frac{100x}{92}\right] \\ &= \frac{28x}{23} \end{aligned}$$

According to given information,  $\frac{28x}{23} = x + 150$

$$\frac{5x}{23} = 150$$

Selling price,  $x = 23 \times 30 = 690$

### EXERCISE : 7.3

1.

i) Marked price = £ 575, discount = 12%.

$$\text{Discount percentage} = \left( \frac{\text{Discount}}{\text{Marked price}} \times 100 \right) \%$$

$$12 = \frac{\text{Discount}}{575} \times 100$$

$$\text{Discount} = \frac{12 \times 575}{100}$$

$$\text{Discount} = 269$$

$$\text{Selling price} = \text{Marked price} - \text{Discount}$$

$$= 575 - 69$$

$$= 2506$$

ii) Printed price = £ 12,750; discount =  $8\frac{1}{3}\%$ .

$$\text{Discount percentage} = \left( \frac{\text{Discount}}{\text{Marked price}} \times 100 \right) \%$$

$$\frac{25}{3} = \frac{\text{Discount}}{12,750} \times 100$$

$$\text{Discount} = \frac{25}{3} \times \frac{12,750}{100} = 1062.5$$

$$\begin{aligned}
 \text{Selling price} &= \text{Marked price (or) printed price} - \text{Discount} \\
 &= 12,750 - 1062.5 \\
 &= 11,687.5
 \end{aligned}$$

2

i) Marked price = ₹ 780 , selling price = ₹ 721.5

$$\text{Selling price} = \text{Marked price} - \text{Discount}$$

$$\begin{aligned}
 \text{Discount} &= \text{Marked price} - \text{Selling price} \\
 &= 780 - 721.5 \\
 &= ₹ 58.5
 \end{aligned}$$

$$\begin{aligned}
 \text{Discount percentage} &= \frac{\text{Discount}}{\text{Marked price}} \times 100 \% \\
 &= \frac{58.5}{780} \times 100 \% \\
 &= 7.5 \%
 \end{aligned}$$

ii. Advertisised price (or)  
Marked price = ₹ 28,500      selling price = ₹ 24,510

$$\text{Selling price} = \text{Marked price} - \text{Discount}$$

$$\begin{aligned}
 \text{Discount} &= \text{Marked price} - \text{Selling price} \\
 &= 28,500 - 24,510 \\
 &= 3990
 \end{aligned}$$

$$\text{Discount percentage} = \frac{\text{Discount}}{\text{marked price}} \times 100$$

$$= \frac{3990}{28500} \times 100\%$$

$$= 14\%$$

3.

Marked price = £ 30 (each)

$$\text{Discount \%} = \frac{\text{Discount}}{\text{Marked price}} \times 100$$

$$\text{Discount} = \frac{15 \times 30}{100} = 4.5$$

Discount on one note book = 4.5

Discount on dozen note books =  $12 \times 4.5 = 54$ .

Marked price on dozen note books =  $12 \times 30 = 360$ .

Selling price = Marked price - Discount

$$= 360 - 54$$

$$= \text{£} 306$$

4.

Selling price = £ 728      Discount = 9%

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

$$728 = \left(1 - \frac{9}{100}\right) \times \text{M.P}$$

$$\text{M.P} = \frac{728 \times 100}{91} = \text{£} 800$$

5. Marked price = ₹ 800      Discount = 20%.

i) Selling price = ?

$$\text{Discount \%} = \frac{\text{Discount}}{\text{M.P.}} \times 100.$$

(OR)

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

$$= \left[ 1 - \frac{20}{100} \right] \times 800$$

$$= \frac{80}{100} \times 800$$

$$\text{S.P.} = ₹ 640.$$

ii) Profit = 25%.

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

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

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

$$\text{C.P.} = ₹ 512$$

6. Marked price = ₹ 2,250      Discount = 12%      Profit = 10%.

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

$$= \left[ 1 - \frac{12}{100} \right] \times 2250$$

$$= \frac{88}{100} \times 2250$$

$$= \text{£ } 1980$$

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

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

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

$$= \text{£ } 1800$$

7. Cost price = £ 650. Discount = 20%. Profit = 20%.

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

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

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

$$S.P = \text{£ } 780$$

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

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

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

$$M.P = \text{£ } 975$$



9. Cost price of an article = ₹ 1600.

i) Since the cost price is 20% below the marked price.

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

$$1600 = M.P - \frac{20}{100} \times M.P$$

$$1600 = \left[1 - \frac{20}{100}\right] \times M.P$$

$$M.P = \frac{1600 \times 100}{80}$$

$$M.P = ₹ 2000$$

ii) Discount = 16%.

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

$$= \left[1 - \frac{16}{100}\right] \times 2000$$

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

$$S.P = ₹ 1680$$

iii) Profit percentage =  $\left[\frac{S.P - C.P}{C.P} \times 100\right] \%$

$$= \left[\frac{1680 - 1600}{1600} \times 100\right] \%$$

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

$$= 5\%$$

10. Discount = 20%      profit = 20%      selling price = ₹ 360.

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

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

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

$$\text{M.P} = ₹ 450$$

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

$$360 = \left[ 1 + \frac{20}{100} \right] \times \text{C.P}$$

$$\text{C.P} = \frac{360 \times 100}{120}$$

$$\text{C.P} = ₹ 300$$

11. Marked price of a refrigerator = ₹ 28,600.

The selling price of a refrigerator is

$$= \left[ 1 - \frac{10}{100} \right] \left[ 1 - \frac{5}{100} \right] \text{ of M.P} \quad \left[ \because S.P = \left( 1 - \frac{d_1}{100} \right) \left( 1 - \frac{d_2}{100} \right) \text{ of M.P} \right]$$

$$= \frac{90}{100} \times \frac{95}{100} \times 28600$$

$$= ₹ 24,453$$

12. Let the marked price be 'x'

First dealer:

$$\begin{aligned} \text{S.P.} &= \left[1 - \frac{15}{100}\right] \left[1 - \frac{5}{100}\right] \text{ of M.P.} \\ &= \frac{85}{100} \times \frac{95}{100} \times x \\ &= \frac{17 \times 19 \times x}{20 \times 20} = 0.8075x \end{aligned}$$

Second dealer:

$$\begin{aligned} \text{S.P.} &= \left[1 - \frac{20}{100}\right] \text{ of M.P.} \\ &= \frac{80}{100} \times x \\ &= \frac{4x}{5} = 0.8x \end{aligned}$$

As the second dealer offers price is less compared to first dealer.

So, The second dealer is best offer.

13. Let the marked price of an article be 'x'.  
and a single discount of d% be equivalent to  
two given successive discounts of 30% and 10%, then

$$\left(1 - \frac{d}{100}\right) \text{ of } x = \left(1 - \frac{30}{100}\right) \left(1 - \frac{10}{100}\right) \text{ of } x$$

$$1 - \frac{d}{100} = \frac{70}{100} \times \frac{90}{100}$$

$$1 - \frac{d}{100} = \frac{63}{100}$$

$$\frac{d}{100} = \frac{37}{100}$$

$$d = 37$$

Hence a discount of 37% is equivalent to two gives successive discounts.

### EXERCISE : 14

1.

i) Cost price of a towel = £50.

$$\begin{aligned} \text{Sales Tax} &= 5\% \text{ of } 50 = \pounds \frac{5}{100} \times 50 \\ &= \pounds 2.5 \end{aligned}$$

$$\begin{aligned} \therefore \text{Buying Price} &= \text{Cost price} + \text{Sales Tax} \\ &= 50 + 2.5 = \pounds 52.5 \end{aligned}$$

ii) Cost price of flour = £15 per kg

Then Cost price of 5 kg flour =  $(5 \times 15) = \pounds 75$

$$\begin{aligned} \text{Sales Tax} &= 5\% \text{ of } 75 = \frac{5}{100} \times 75 \\ &= \pounds 3.75 \end{aligned}$$

$$\begin{aligned} \therefore \text{Buying price} &= \text{Cost price} + \text{Sales Tax} \\ &= 75 + 3.75 = \pounds 78.75 \end{aligned}$$

2.

i) Let the original price of T.V be  $x$ .

$$\therefore \text{VAT} = 8\% \text{ of } x = \pounds \left( \frac{8}{100} \times x \right) = \pounds \frac{2x}{25}$$

$$\text{Price including VAT} = \pounds \left( x + \frac{2x}{25} \right) = \pounds \frac{27x}{25}$$

$$\therefore \frac{27x}{25} = 13,500$$

$$\begin{aligned}x &= \frac{13,500 \times 25}{27} \\ &= \text{£ } 12,500.\end{aligned}$$

ii)

$$\text{Now } \frac{27x}{25} = 180$$

$$x = \frac{180 \times 25}{27}$$

$$x = \text{£ } 166.67$$

3. Let the original price of Ac be 'x'

$$\therefore \text{VAT} = 8\% \text{ of } x = \frac{2x}{25}$$

$$\text{Price including VAT} = \text{£} \left( x + \frac{2x}{25} \right) = \text{£} \frac{27x}{25}$$

$$\therefore \frac{27x}{25} = 34,992$$

$$x = \frac{34,992 \times 25}{27}$$

$$x = \text{£ } 32,400.$$

4. Price including VAT = £ 1296.

Original price of shirt = £ 1200

Let VAT be 'x'

price including VAT =  $x\%$  of original price + original price

$$1296 = \left(\frac{x}{100} \times 1200 + 1200\right)$$

$$12x = 1296 - 1200$$

$$12x = 96$$

$$x = 8\%$$

$$\therefore \text{VAT} = 8\%$$

5.

Price of purse including 8% VAT = 523.8

Let the original price be  $\text{£} x$

$\therefore$  price including VAT = original price + 8% of original price

$$523.8 = x + 8\% \text{ of } x$$

$$523.8 = x + \frac{8x}{100} = x + \frac{2x}{25}$$

$$\frac{27x}{25} = 523.8$$

$$x = \text{£}485$$

Now VAT increased by 10%.

$$\text{New selling price} = 485 + 10\% \text{ of } 485$$

$$= 485 + \frac{10}{100} \times 485$$

$$= 485 + 48.5$$

$$= \text{£ } 533.5$$

$$\therefore \text{New selling price of Purse} = \text{£ } 533.5$$

6. Marked price =  $\text{£ } 4800$

$$\text{Rate of discount} = 10\%$$

$$\text{Discount} = \frac{10}{100} \times 4,800 = \text{£ } 480$$

$$\text{S.P of wall hanging} = \text{M.P} - \text{Discount}$$

$$= 4,800 - 480$$

$$= \text{£ } 4,320.$$

$$\text{Now VAT } 8\% \text{ of } 4320 = \text{£ } \frac{8}{100} \times 4320 = 345.6$$

$$\text{Bill amount} = \text{£ } 4,320 + 345.6 = \text{£ } 4665.6$$

Hence, the customer has to pay  $\text{£ } 4665.6$  in Cash to purchase

7. Let the reduced price of washing machine be  $\text{£ } x$

$$\text{VAT} = 9\% \text{ of } x = \text{£ } \left( \frac{9}{100} \times x \right) = \text{£ } \frac{9x}{100}$$

$$\text{Amount paid by Amit} = x + \frac{9x}{100} = \text{£ } \frac{109x}{100}$$

As Amit has 10,900 to purchase it,

$$\therefore \frac{109x}{100} = 10,900 \Rightarrow x = \frac{10,900 \times 100}{109} = 10,000$$

∴ The reduced price of washing machine = ₹ 10,000.

$$\begin{aligned}\text{So, amount reduced} &= 10,900 - 10,000 \\ &= ₹ 900.\end{aligned}$$

Hence, the amount reduced by shopkeeper is ₹ 900