

Profit and Loss

Ex 10A

IMPORTANT FACTS

Cost Price:

The price, at which an article is purchased, is called its **cost price**, abbreviated as **C.P.**

Selling Price:

The price, at which an article is sold, is called its **selling price**, abbreviated as **S.P.**

Profit or Gain:

If S.P. is greater than C.P., the seller is said to have a **profit** or **gain**.

Loss:

If S.P. is less than C.P., the seller is said to have incurred a **loss**.

IMPORTANT FORMULAE

1. $\text{Gain} = (\text{S.P.}) - (\text{C.P.})$

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

3. Loss or gain is always reckoned on C.P.

4. Gain Percentage: (Gain %)

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

5. Loss Percentage: (Loss %)

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

6. Selling Price: (S.P.)

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

7. Selling Price: (S.P.)

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

8. Cost Price: (C.P.)

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

9. Cost Price: (C.P.)

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

10. If an article is sold at a gain of say 35%, then S.P. = 135% of C.P.

11. If an article is sold at a loss of say, 35% then S.P. = 65% of C.P.

12. When a person sells two similar items, one at a gain of say $x\%$, and the other at a loss of $x\%$, then the seller always incurs a loss given by:

$$\text{Loss \%} = \left(\frac{\text{Common Loss and Gain \%}}{10} \right)^2 = \left(\frac{x}{10} \right)^2$$

13. If a trader professes to sell his goods at cost price, but uses false weights, then

$$\text{Gain \%} = \left[\frac{\text{Error}}{(\text{True Value}) - (\text{Error})} \times 100 \right] \%$$

Q1.

Answer :

(i)

CP = Rs. 620

SP = Rs. 713

Since $SP > CP$, there is a gain.

Gain = $713 - 620 = \text{Rs. } 93$

$$\begin{aligned}\text{Gain percentage} &= \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \% \\ &= \left(\frac{93}{620} \times 100 \right) \% \\ &= 15\%\end{aligned}$$

(ii)

CP = Rs 675

SP = Rs 630

Since $SP < CP$, there is a loss.

Loss = $675 - 630 = \text{Rs. } 45$

$$\begin{aligned}\text{Loss percentage} &= \left(\frac{\text{Loss}}{\text{CP}} \times 100 \right) \% \\ &= \left(\frac{45}{675} \times 100 \right) \% \\ &= 6 \frac{2}{3} \%\end{aligned}$$

(iii)

CP = Rs. 345

SP = Rs. 372.60

Since $SP > CP$, there is a gain.

Gain = $372.60 - 345 = \text{Rs. } 27.6$

$$\begin{aligned}\text{Gain percentage} &= \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \% \\ &= \left(\frac{27.6}{345} \times 100 \right) \% \\ &= \left(\frac{2760}{345} \right) \% \\ &= 8\%\end{aligned}$$

(iv)

CP = Rs 80

SP = Rs 76.80

Since $SP < CP$, there is a loss.

Loss = $80 - 76.80 = \text{Rs. } 3.2$

$$\begin{aligned}\text{Loss percentage} &= \left(\frac{\text{loss}}{\text{CP}} \times 100 \right) \% \\ &= \left(\frac{3.2}{80} \times 100 \right) \% \\ &= \left(\frac{32}{80} \times 100 \right) \% \\ &= 4\%\end{aligned}$$

(iii)

CP = Rs. 875

Loss percentage = 12%

$$\begin{aligned}\text{SP} &= \frac{(100 - \text{loss \%})}{100} \times \text{CP} \\ &= \frac{(100 - 12)}{100} \times 875 \\ &= \frac{77000}{100} \\ &= \text{Rs. } 770\end{aligned}$$

(iv)

CP = Rs. 645

Loss percentage = $13 \frac{1}{3} \% = \frac{40}{3} \%$

$$\begin{aligned}\text{SP} &= \frac{(100 - \text{loss \%})}{100} \times \text{CP} \\ &= \frac{\left(100 - \frac{40}{3} \right)}{100} \times 645 \\ &= \frac{\left(\frac{300 - 40}{3} \right)}{100} \times 645 \\ &= \left(\frac{260}{3} \right) \times \left(\frac{1}{100} \right) \times 645 \\ &= \text{Rs. } 559\end{aligned}$$

Q3.

Answer :

(i)

$$\text{SP} = \text{Rs. } 1596$$

$$\text{Gain percentage} = 12\%$$

$$\begin{aligned}\text{CP} &= \frac{100}{(100 + \text{gain } \%)} \times \text{SP} \\ &= \frac{100}{(100 + 12)} \times 1596 \\ &= \text{Rs. } 1425\end{aligned}$$

(ii)

$$\text{SP} = \text{Rs. } 2431$$

$$\text{Loss percentage} = 6\frac{1}{2}\% = \frac{13}{2}\%$$

$$\begin{aligned}\text{CP} &= \frac{100}{(100 - \text{loss } \%)} \times \text{SP} \\ &= \frac{100}{\left(100 - \frac{13}{2}\right)} \times 2431 \\ &= \frac{100 \times 2}{187} \times 2431 \\ &= \text{Rs. } 2600\end{aligned}$$

(iii)

$$\text{SP} = \text{Rs. } 657.60$$

$$\text{Loss percentage} = 4\%$$

$$\begin{aligned}\text{CP} &= \frac{100}{(100 - \text{loss } \%)} \times \text{SP} \\ &= \frac{100}{(100 - 4)} \times 657.60 \\ &= \text{Rs. } 685\end{aligned}$$

(iv)

$$\text{SP} = \text{Rs. } 34.40$$

$$\text{Gain percentage} = 7\frac{1}{2}\% = \frac{15}{2}\%$$

$$\begin{aligned}\text{CP} &= \frac{100}{(100 + \text{gain } \%)} \times \text{SP} \\ &= \frac{100}{\left(100 + \frac{15}{2}\right)} \times 34.40 \\ &= \frac{100 \times 2}{215} \times 34.40 \\ &= \text{Rs. } 32\end{aligned}$$

Q4.

Answer :

$$\text{CP of the iron safe} = \text{Rs. } 5580$$

$$\text{Transportation} = \text{Rs. } 170$$

$$\text{Total CP} = \text{Rs } (5580 + 170) = \text{Rs. } 5750$$

$$\text{SP} = \text{Rs. } 6440$$

Since $\text{SP} > \text{CP}$, Manjit makes a profit.

$$\text{Gain} = 6440 - 5750$$

$$= \text{Rs } 690$$

$$\begin{aligned}\text{Gain percentage} &= \left(\frac{\text{gain}}{\text{total CP}} \times 100\right)\% \\ &= \left(\frac{690}{5750} \times 100\right)\% \\ &= 12\%\end{aligned}$$

Q5.

Answer :

CP of the car = Rs. 73500

Repairs = Rs. 10300

Insurance = Rs. 2600

Total CP = 73500 + 10300 + 2600 = Rs. 86400

SP = Rs. 84240

Since $SP < CP$, Robin has a loss.

Loss = 86400 - 84240

= Rs. 2160

Loss percentage = $\left(\frac{\text{loss}}{\text{total CP}} \times 100\right)\%$

$$= \left(\frac{2160}{86400} \times 100\right)\%$$

$$= 2\frac{1}{2}\%$$

Q6.

Answer :

The price of rice is Rs 18 per kg.

According to the question, we have :

Cost for 20 kg of rice = $20 \times 18 = \text{Rs. } 360$

Cost for 25 kg of rice = $25 \times 16 = \text{Rs. } 400$

Total CP = 360 + 400 = Rs. 760

Also, total quantity of rice = 20 + 25 = 45 kg

SP = $45 \times 19 = \text{Rs. } 855$

Since $SP > CP$, there is a gain.

Now, gain = 855 - 760 = Rs. 95

Gain percentage = $\left(\frac{\text{gain}}{\text{total CP}} \times 100\right)\%$

$$= \left(\frac{95}{760} \times 100\right)\%$$

$$= 12\frac{1}{2}\%$$

Q7.

Answer :

Let 5 kg of coffee be mixed with 2 kg of chicory.

CP of the mixture = Rs $(250 \times 5 + 75 \times 2)$

$$= \text{Rs } (1250 + 150)$$

= Rs. 1400

SP of the mixture = Rs $(7 \times 230) = \text{Rs. } 1610$

Since $SP > CP$, there is a gain.

Now, gain = Rs $(1610 - 1400)$

= Rs. 210

Gain percentage = $\left(\frac{\text{gain}}{\text{total CP}} \times 100\right)\%$

$$= \left(\frac{210}{1400} \times 100\right)\%$$

= 15%

Q8.

Answer :

Let Rs x be the SP of each bottle and Rs y be the CP of each bottle.

SP of 16 bottles = CP of 17 bottles

$$\Rightarrow 16x = 17y$$

$$\Rightarrow \frac{x}{y} = \frac{17}{16}$$

Gain per bottle = SP - CP

$$= \text{Rs } (x - y)$$

\therefore Gain percentage = $\left(\frac{\text{gain}}{\text{CP}} \times 100\right)\%$

$$= \left(\frac{x-y}{y} \times 100\right)\%$$

$$= \left\{\left(\frac{x}{y} - 1\right) \times 100\right\}\%$$

$$= \left\{\left(\frac{17}{16} - 1\right) \times 100\right\}\%$$

$$= \left(\frac{1}{16} \times 100\right)\%$$

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

Q9.

Answer :

Let Rs x be the CP of one candle and Rs. y be the SP of one candle.

Now, CP of 12 candles = SP of 15 candles

$$\Rightarrow 12x = 15y$$

$$\Rightarrow \frac{y}{x} = \frac{12}{15}$$

Loss = CP – SP

$$= \text{Rs } (x - y)$$

$$\therefore \text{ Loss percentage} = \left(\frac{\text{loss}}{\text{CP}} \times 100 \right) \%$$

$$= \left\{ \left(\frac{x-y}{x} \right) \times 100 \right\} \%$$

$$= \left\{ \left(1 - \frac{y}{x} \right) \times 100 \right\} \%$$

$$= \left\{ \left(1 - \frac{12}{15} \right) \times 100 \right\} \%$$

$$= \left(\frac{3}{15} \times 100 \right) \%$$

$$= 20\%$$

Q10.

Answer :

Let Rs x be the SP of one cassette.

SP of 5 cassettes = Rs. $5x$

SP of 125 cassettes = Rs. $125x$

Gain = Rs. $5x$, when SP = Rs. $125x$

But gain = SP – CP

$$\Rightarrow \text{CP} = \text{SP} - \text{gain}$$

$$= 125x - 5x$$

$$= \text{Rs. } 120x$$

$$\therefore \text{ Gain percentage} = \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \%$$

$$= \left(\frac{5x}{120x} \times 100 \right) \%$$

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

Q11.

Answer :

Let Rs x be the SP of one lemon.

SP of 45 lemons = Rs. $45x$

Loss = SP of 3 lemons = Rs. $3x$

But loss = CP – SP

$$\text{CP} = \text{loss} + \text{SP}$$

$$= 3x + 45x$$

$$= \text{Rs. } 48x$$

$$\therefore \text{ Loss percentage} = \left(\frac{\text{loss}}{\text{CP}} \times 100 \right) \%$$

$$= \left(\frac{3x}{48x} \times 100 \right) \%$$

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

Q12.

Answer :

CP of 6 oranges = Rs. 10

CP of 1 orange = $\frac{10}{6} = \text{Rs. } \frac{5}{3}$

SP of 4 oranges = Rs. 9

SP of 1 orange = Rs. $\frac{9}{4}$

Since $\text{SP} > \text{CP}$, there is a gain.

Now, gain = $\text{SP} - \text{CP}$

$$= \frac{9}{4} - \frac{5}{3}$$
$$= \text{Rs. } \frac{7}{12}$$

$$\therefore \text{Gain percentage} = \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \%$$

$$= \left(\frac{\frac{7}{12}}{\frac{5}{3}} \times 100 \right) \%$$

$$= \left(\frac{7}{12} \times \frac{3}{5} \times 100 \right) \%$$

$$= \left(\frac{7}{4} \times 20 \right) \%$$

$$= 35\%$$

Q13.

Answer :

SP of 10 bananas = Rs. 18

SP of 1 banana = $\frac{18}{10} = \text{Rs. } \frac{9}{5}$

CP of 12 bananas = Rs. 16

CP of 1 banana = Rs. $\frac{16}{12} = \text{Rs. } \frac{4}{3}$

Since $\text{SP} > \text{CP}$, there is a gain.

Now, gain = $\text{SP} - \text{CP}$

$$= \frac{9}{5} - \frac{4}{3}$$
$$= \text{Rs. } \frac{7}{15}$$

$$\therefore \text{Gain percentage} = \left(\frac{\frac{7}{15}}{\frac{4}{3}} \times 100 \right) \%$$

$$= \left(\frac{7}{15} \times \frac{3}{4} \times 100 \right) \%$$

$$= 35\%$$

Q14.

Answer :

CP of 10 apples = Rs. 25

SP of 12 apples = Rs. 25

SP of 10 apples = Rs. $\frac{25}{12} \times 10 = \text{Rs. } \frac{125}{6}$

Since $\text{SP} < \text{CP}$, there is a loss.

Now, loss = $\text{CP} - \text{SP}$

$$= \text{Rs. } 25 - \frac{125}{6}$$
$$= \text{Rs. } \frac{25}{6}$$

$$\therefore \text{Loss percentage} = \left(\frac{\text{loss}}{\text{CP}} \times 100 \right) \%$$

$$= \left(\frac{\frac{25}{6}}{25} \times 100 \right) \%$$

$$= 16.67\%$$

Q15.

Answer :

Let x be number of eggs he purchased.

CP of 3 eggs = Rs. 5

CP of x eggs = Rs. $\frac{5}{3}x$

SP of 5 eggs = 12

SP of x eggs = $\frac{12}{5}x$

\therefore Gain = SP - CP

$$= \frac{12}{5}x - \frac{5}{3}x$$

$$= \text{Rs. } \frac{11}{15}x$$

Now, $\frac{11}{15}x = 143$

$$\Rightarrow x = 143 \div \frac{11}{15}$$

$$\Rightarrow x = 143 \times \frac{15}{11} \Rightarrow x = 195$$

Q16.

Answer :

SP of the camera = Rs. 1080

Let Rs x be the CP.

Gain = Rs. $\frac{1}{8}x$... (i)

Also, gain = SP - CP

$$= \text{Rs. } (1080 - x) \quad \dots (ii)$$

From (i) and (ii), we have :

$$\frac{1}{8}x = 1080 - x$$

$$\Rightarrow x = 8640 - 8x$$

$$\Rightarrow 9x = 8640$$

$$\Rightarrow x = 960$$

\therefore CP = Rs. 960

Now, gain = $\frac{1}{8}x$

$$= \frac{960}{8}$$

$$= \text{Rs. } 120$$

$$\therefore \text{ Gain percentage} = \left(\frac{120}{960} \times 100 \right) \%$$

$$= 12 \frac{1}{2} \%$$

Q17.

Answer :

SP of the pen = Rs. 54

Let Rs x be the CP of the pen.

Loss = Rs. $\frac{x}{10}$

SP = CP - Loss

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

$$= \text{Rs. } \frac{9x}{10}$$

Now, we have $\frac{9x}{10} = 54$

$$\Rightarrow x = 54 \times \frac{10}{9}$$

$$\Rightarrow x = 60$$

\therefore CP of the pen = Rs. 60

Now, loss = $\frac{x}{10}$

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

$$= \text{Rs. } 6$$

$$\therefore \text{ Loss percentage} = \left(\frac{\text{loss}}{\text{CP}} \times 100 \right) \%$$

$$= \left(\frac{6}{60} \times 100 \right) \%$$

$$= 10\%$$

Q18.

Answer :

Let $Rs\ x$ be the CP of the table.

Case I :

Loss percentage = 10%

$$\Rightarrow \text{Loss \%} = \left(\frac{\text{loss}}{\text{CP}} \times 100 \right) \%$$

$$\Rightarrow 10 = \frac{\text{loss}}{x} \times 100$$

$$\Rightarrow \frac{\text{Loss}}{x} = \frac{1}{10}$$

$$\Rightarrow \text{Loss} = Rs\ \frac{x}{10}$$

Suppose that SP_1 is the selling price when he incurs a loss of 10%.

$$\text{Loss} = Rs\ \frac{x}{10}$$

$$\Rightarrow \text{CP} - \text{SP}_1 = \frac{x}{10}$$

$$\Rightarrow \text{SP}_1 = x - \frac{x}{10}$$

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

Case II :

Gain percentage = 10%

$$\Rightarrow \text{Gain \%} = \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \%$$

$$\Rightarrow 10 = \frac{\text{gain}}{x} \times 100$$

$$\Rightarrow \frac{\text{Gain}}{x} = \frac{1}{10}$$

$$\Rightarrow \text{Gain} = Rs\ \frac{x}{10}$$

Suppose that SP_2 is the selling price when he makes gain of 10%.

Q19.

Answer :

Let $Rs\ x$ be the CP.

$$\text{Gain}_1 \text{ percentage} = \left(\frac{\text{gain}_1}{\text{CP}} \times 100 \right) \%$$

$$\Rightarrow 15 = \frac{\text{gain}_1}{x} \times 100$$

$$\Rightarrow \text{Gain}_1 = Rs\ \frac{15x}{100}$$

$$\text{Again, gain}_2 \text{ percentage} = \left(\frac{\text{gain}_2}{\text{CP}} \times 100 \right) \%$$

$$\Rightarrow 8 = \frac{\text{gain}_2}{x} \times 100$$

$$\Rightarrow \text{Gain}_2 = Rs\ \frac{8x}{100}$$

According to the question, we have :

$$\text{Gain}_1 - \text{gain}_2 = 56$$

$$\Rightarrow \frac{15x}{100} - \frac{8x}{100} = 56$$

$$\Rightarrow \frac{7x}{100} = 56$$

$$\Rightarrow 7x = 5600$$

$$\Rightarrow x = 800$$

Hence, the CP of the chair is Rs 800.

Q20.

Answer :

Let the cost price of the cycle be Rs x .

$$\begin{aligned}\text{SP of the cycle at 10\% gain} &= \text{Rs} \left\{ \frac{100 + \text{gain \%}}{100} \times \text{CP} \right\} \\ &= \text{Rs} \left\{ \frac{100+10}{100} \times x \right\} \\ &= \text{Rs} \left\{ \frac{110x}{100} \right\} \\ &= \text{Rs. } \frac{11x}{10}\end{aligned}$$

$$\begin{aligned}\text{SP of the cycle at 14\% gain} &= \text{Rs} \left\{ \frac{100+14}{100} \times x \right\} \\ &= \text{Rs} \left\{ \frac{114x}{100} \right\} \\ &= \text{Rs} \left\{ \frac{57x}{50} \right\} \\ \therefore \frac{57x}{50} - \frac{11x}{10} &= 65 \\ \Rightarrow \left(\frac{57x}{50} - \frac{55x}{50} \right) &= 65 \\ \Rightarrow \frac{57x-55x}{50} &= 65 \\ \Rightarrow \frac{2x}{50} &= 65 \\ \Rightarrow 2x &= 3250 \\ \Rightarrow x &= 1625\end{aligned}$$

Therefore, the cost price of the cycle is Rs 1625.

Q21.

Answer :

CP of the first variety of wheat = Rs $40 \times 6.25 = \text{Rs. } 250$

CP of second variety of wheat = Rs $30 \times 7 = \text{Rs. } 210$

Total CP = Rs $(250 + 210)$

= Rs 460

Total amount of wheat = $(40 + 30)$ kg

= 70 kg

Now, gain percentage = $\frac{\text{gain}}{\text{CP}} \times 100$

$$\Rightarrow \text{Gain} = \frac{(\text{gain \%}) \times \text{CP}}{100}$$

$$\Rightarrow \text{Gain} = \frac{460 \times 5}{100}$$

$$= \text{Rs } 23$$

$$\therefore \text{SP} = \text{CP} + \text{gain}$$

$$= 460 + 23$$

$$= \text{Rs } 483$$

$$\therefore \text{Rate per kg} = \text{Rs } \frac{483}{70} = \text{Rs } 6.9$$

Q22.

Answer :

CP of the first bat = Rs 560

Gain percentage = 15%

$$\begin{aligned}\text{SP of the first bat} &= \text{Rs} \left\{ \frac{100 + \text{gain \%}}{100} \times \text{CP} \right\} \\ &= \text{Rs} \left\{ \frac{100+15}{100} \times 560 \right\} \\ &= \text{Rs} \left\{ \frac{115}{100} \times 560 \right\} \\ &= \text{Rs } 644\end{aligned}$$

CP of the second bat = Rs 240

Loss percentage = 5%

$$\begin{aligned}\text{SP of the second bat} &= \text{Rs} \left\{ \frac{100 - \text{loss \%}}{100} \times \text{CP} \right\} \\ &= \text{Rs} \left\{ \frac{100-5}{100} \times 240 \right\} \\ &= \text{Rs} \left\{ \frac{95}{100} \times 240 \right\} \\ &= \text{Rs } 228\end{aligned}$$

Total CP of the two bats = Rs $(560 + 240) = \text{Rs } 800$

Total SP of the two bats = Rs $(644 + 228) = \text{Rs } 872$

Since $SP > CP$, there is gain in the whole transaction.

Now, gain = Rs $(872 - 800)$ = Rs 72

$$\begin{aligned}\therefore \text{Gain percentage} &= \left\{ \frac{\text{gain}}{\text{total CP}} \times 100 \right\} \% \\ &= \left\{ \frac{72}{800} \times 100 \right\} \% \\ &= 9\%\end{aligned}$$

Wasim gains 9% on the whole transaction.

Q23.

Answer :

CP of one jeans = Rs 725

Gain percentage = 8%

$$\begin{aligned}\text{SP of one jeans} &= \text{Rs} \left\{ \frac{100 + \text{gain \%}}{100} \times \text{CP} \right\} \\ &= \text{Rs} \left\{ \frac{100 + 8}{100} \times 725 \right\} \\ &= \text{Rs} \left\{ \frac{108}{100} \times 725 \right\} \\ &= \text{Rs } 783\end{aligned}$$

CP of the other jeans = Rs 725

Loss percentage = 4%

$$\begin{aligned}\text{SP of the other jeans} &= \left\{ \frac{100 - \text{loss \%}}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{100 - 4}{100} \times 725 \right\} \\ &= \left\{ \frac{96}{100} \times 725 \right\} \\ &= \text{Rs } 696\end{aligned}$$

Total CP of the two pairs of jeans = Rs (725×2) = Rs 1450

Total SP of the two pairs of jeans = Rs $(696 + 783)$ = Rs 1479

Since $SP > CP$, there is a gain in the whole transaction.

Now, gain = Rs $(1479 - 1450)$ = Rs 29

$$\begin{aligned}\therefore \text{Gain percentage} &= \left\{ \frac{\text{gain}}{\text{total CP}} \times 100 \right\} \% \\ &= \left\{ \frac{29}{1450} \times 100 \right\} \% \\ &= 2\%\end{aligned}$$

Hence, Hema gains 2% on the whole transaction.

Q24.

CP of 1 kg of sugar = Rs 25

C.P of 200 kg sugar = **Rs** (200×25) = **Rs** 5000

CP of 80 kg of sugar = **Rs** (25×80) = **Rs** 2000

CP of 40 kg of sugar = **Rs** (25×40) = **Rs** 1000

$$\begin{aligned}\text{SP of 80 kg of sugar} &= \frac{100 + \text{gain \%}}{100} \times \text{CP} \\ &= \text{Rs } \frac{110}{100} \times 2000 \\ &= \text{Rs } 2200\end{aligned}$$

$$\begin{aligned}\text{SP of 40 kg sugar} &= \frac{100 - \text{loss \%}}{100} \times \text{CP} \\ &= \text{Rs } \frac{96}{100} \times 1000 \\ &= \text{Rs } 960\end{aligned}$$

$$\begin{aligned}\text{SP of 200 kg sugar} &= \frac{100 + \text{gain \%}}{100} \times \text{CP} \\ &= \text{Rs } \frac{108}{100} \times 5000 \\ &= \text{Rs } 5400\end{aligned}$$

Remaining quantity of sugar = $(200 - 80 + 40)$ kg = 80 kg

SP of the remaining sugar (80 kg) = Rs $(5400 - 2200 - 960)$
= Rs 2240

Q25.

Answer :

Let Rs x be the CP.

Then, SP = Rs $\frac{4x}{3}$

Since SP > CP, there is a gain.

$$\text{Now, gain} = SP - CP$$

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

$$= \text{Rs } \frac{x}{3}$$

$$\therefore \text{Gain percentage} = \left(\frac{\text{gain}}{CP} \times 100 \right) \%$$

$$= \left(\frac{100 \times x}{3x} \right) \%$$

$$= 33.33\%$$

Q26.

Answer :

Let CP be Rs x .

Then, SP = Rs $\frac{4x}{5}$

Since CP > SP, there is a loss.

$$\text{Loss} = CP - SP$$

$$= x - \frac{4x}{5} = \text{Rs } \frac{x}{5}$$

$$\therefore \text{Loss percentage} = \left(\frac{\text{loss}}{CP} \times 100 \right) \%$$

$$= \left(\frac{\frac{x}{5}}{x} \times 100 \right) \%$$

$$= 20\%$$

Thus, there is a loss of 20%.

Q27.

Answer :

SP of the umbrella = Rs 115.20

Loss = 10%

$$\text{CP of the umbrella} = \frac{100}{100 - \text{loss}} \times SP$$

$$= \text{Rs } \frac{100}{100 - 10} \times 115.20$$

$$= \text{Rs } \frac{100}{90} \times 115.20$$

$$= \text{Rs } 128$$

Now, CP = Rs 128 and desired gain = 5%

$$\therefore \text{Desired SP} = \frac{100 + \text{gain} \%}{100} \times CP$$

$$= \text{Rs } \frac{105}{100} \times 128$$

$$= \text{Rs } 134.4$$

Hence, the desired selling price is Rs 134.4

Q28.

Answer :

SP of the bouquet = Rs 322

Gain percentage = 15%

$$\begin{aligned}\text{CP of the umbrella} &= \left(\frac{100}{100 + \text{gain \%}} \right) \times \text{SP} \\ &= \text{Rs} \left(\frac{100}{100 + 15} \right) \times 322 \\ &= \text{Rs} \frac{100}{115} \times 322 \\ &= \text{Rs } 280\end{aligned}$$

Now, CP = Rs 128 and desired gain percentage = 25%

$$\begin{aligned}\therefore \text{Desired SP} &= \left(\frac{100 + \text{gain \%}}{100} \right) \times \text{CP} \\ &= \text{Rs} \frac{125}{100} \times 280 \\ &= \text{Rs } 350\end{aligned}$$

Hence, the selling price to obtain the desired gain must be Rs 350.

Q29.

Answer :

Let the original price be x .

SP = Rs 3120

Now, SP = CP - loss

$$\begin{aligned}\Rightarrow 3120 &= x - \frac{4}{100}x \\ \Rightarrow 3120 &= x - \frac{x}{25} \\ \Rightarrow 3120 &= \frac{24x}{25} \\ \Rightarrow \frac{3120 \times 25}{24} &= x \\ \Rightarrow x &= 3250\end{aligned}$$

So, the cost price is Rs 3250.

If it is sold for Rs 3445, then it's a gain because SP > CP.

Now, gain = SP - CP

= Rs (3445 - 3250)

= Rs 195

$$\begin{aligned}\therefore \text{Gain percentage} &= \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \% \\ &= \left(\frac{195}{3250} \times 100 \right) \% \\ &= 6\%\end{aligned}$$

Q30.

Answer :

SP of one saree = Rs 2185

Gain percentage = 15%

$$\begin{aligned}\text{CP of one saree} &= \left\{ \frac{100}{100 + \text{gain \%}} \times \text{SP} \right\} \\ &= \text{Rs} \left\{ \frac{100}{100 + 15} \times 2185 \right\} \\ &= \text{Rs} \left\{ \frac{100}{115} \times 2185 \right\} \\ &= \text{Rs } 1900\end{aligned}$$

SP of the other saree = Rs 2185

Loss percentage = 5%

$$\begin{aligned}\text{CP of the other aree} &= \left\{ \frac{100}{100 - \text{loss \%}} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{100 - 5} \times 2185 \right\} \\ &= \left\{ \frac{100}{95} \times 2185 \right\} \\ &= \text{Rs } 2300\end{aligned}$$

Total SP of the two sarees = Rs (2185 × 2) = Rs 4370

Total CP of the two sarees = Rs (1900 + 2300) = Rs 4200

Since SP > CP, there is a gain in the whole transaction.

Now, gain = Rs (4370 – 4200) = Rs 170

$$\begin{aligned}\therefore \text{Gain percentage} &= \left\{ \frac{\text{gain}}{\text{total CP}} \times 100 \right\} \% \\ &= \left\{ \frac{170}{4200} \times 100 \right\} \% \\ &= 4 \frac{200}{4200} \% \\ &= 4 \frac{1}{21} \%\end{aligned}$$

Hence, Luxmi gains $4 \frac{1}{21} \%$ in the whole transaction.

Q31.

Answer :

SP of one fan = Rs 990

Gain percentage = 10%

$$\begin{aligned}\text{CP of one fan} &= \left\{ \frac{100}{100 + \text{gain \%}} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{100 + 10} \times 990 \right\} \\ &= \left\{ \frac{100}{110} \times 990 \right\} \\ &= \text{Rs. 900}\end{aligned}$$

SP of the other fan = Rs 900

Loss percentage = 10%

$$\begin{aligned}\text{Its CP} &= \left\{ \frac{100}{100 - \text{loss \%}} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{100 - 10} \times 990 \right\} \\ &= \left\{ \frac{100}{90} \times 990 \right\} \\ &= \text{Rs 1100}\end{aligned}$$

Total CP of the two fans = Rs (900 + 1100) = Rs 2000

Total SP of the two fans = Rs (990 + 990) = Rs 1980

Since CP > SP, there is a loss in the whole transaction.

Now, loss = Rs (2000 – 1980) = Rs 20

$$\begin{aligned}\therefore \text{Loss percentage} &= \left\{ \frac{\text{loss}}{\text{total CP}} \times 100 \right\} \% \\ &= \left\{ \frac{20}{2000} \times 100 \right\} \% \\ &= 1\%\end{aligned}$$

Hence, the shopkeeper incurs a loss of 1% in the whole transaction.

Q32.

Answer :

CP of sugar = Rs 4500

Profit on one-third of the sugar = 10%

$$\text{CP of one-third of the sugar} = \text{Rs } \frac{4500}{3} = \text{Rs. 1500}$$

$$\begin{aligned}\text{SP of one-third of the sugar} &= \frac{100 + \text{gain \%}}{100} \times \text{CP} \\ &= \text{Rs } \frac{110}{100} \times 1500 \\ &= \text{Rs 1650}\end{aligned}$$

Now, profit = Rs (1650 – 1500) = Rs 150

At a profit of 12%, we have:

$$\begin{aligned}\text{SP of sugar} &= \frac{100 + \text{gain \%}}{100} \times \text{CP} \\ &= \text{Rs } \frac{112}{100} \times 4500 \\ &= \text{Rs 5040}\end{aligned}$$

\therefore Gain = Rs (5040 – 4500) = Rs 5400

Profit on the remaining amount of sugar = Rs (540 – 150) = Rs 390

CP of the remaining sugar = Rs (4500 – 1500) = Rs 3000

$$\begin{aligned}\text{Gain percentage} &= \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \% \\ &= \left(\frac{390}{3000} \times 100 \right) \% \\ &= 13\%\end{aligned}$$

Therefore, the profit on the remaining amount of sugar is 13%.

Q33.

Answer :

CP of the land = Rs 96000

CP of two-fifth of the land = $\frac{96000 \times 2}{5}$ = **Rs. 38400**

$$\begin{aligned}\text{SP of } \frac{2}{5} \text{ of the land} &= \frac{100 - \text{loss \%}}{100} \times \text{CP} \\ &= \frac{94}{100} \times 38400 \\ &= \text{Rs } 36096\end{aligned}$$

Loss = Rs (38400 – 36096) = Rs 2304

At a gain of 10%, we have:

$$\begin{aligned}\text{SP of the land} &= \frac{100 + \text{gain \%}}{100} \times \text{CP} \\ &= \text{Rs } \frac{110}{100} \times 96000 \\ &= \text{Rs } 105600\end{aligned}$$

Gain = Rs (105600 – 96000) = Rs 9600

Profit on the remaining land = Rs (9600 + 2304) = Rs 11904

CP of the remaining land = Rs (96000 – 38400) = Rs 57600

$$\begin{aligned}\therefore \text{Gain percentage} &= \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \% \\ &= \left(\frac{11904}{57600} \times 100 \right) \% \\ &= 20.67\%\end{aligned}$$

Therefore, the profit on the remaining part of land is 20.67%.

Q34.

Answer :

SP of the watch for Alex = Rs 1330

Loss percentage for Alex = 5%

$$\begin{aligned}\text{CP for Alex} &= \frac{\text{SP} \times 100}{100 - \text{loss \%}} \\ &= \frac{1330 \times 100}{100 - 5} \\ &= \frac{133000}{95} \\ &= \text{Rs } 1400\end{aligned}$$

Now, SP for Vinod = CP for Alex = Rs 1400

Gain percentage of the watch for Vinod = 12%

$$\begin{aligned}\text{CP of the watch for Vinod} &= \frac{\text{SP} \times 100}{100 + \text{gain \%}} \\ &= \text{Rs } \frac{1400 \times 100}{100 + 12} \\ &= \text{Rs } \frac{140000}{112} = \text{Rs } 1250\end{aligned}$$

Thus, Vinod paid Rs 1250 for the watch.

Profit and Loss

Ex 10B

IMPORTANT FACTS

Cost Price:

The price, at which an article is purchased, is called its **cost price**, abbreviated as **C.P.**

Selling Price:

The price, at which an article is sold, is called its **selling price**, abbreviated as **S.P.**

Profit or Gain:

If S.P. is greater than C.P., the seller is said to have a **profit** or **gain**.

Loss:

If S.P. is less than C.P., the seller is said to have incurred a **loss**.

IMPORTANT FORMULAE

$$1. \text{ Gain} = (\text{S.P.}) - (\text{C.P.})$$

$$2. \text{ Loss} = (\text{C.P.}) - (\text{S.P.})$$

$$3. \text{ Loss or gain is always reckoned on C.P.}$$

$$4. \text{ Gain Percentage: (Gain \%)}$$

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

$$5. \text{ Loss Percentage: (Loss \%)}$$

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

$$6. \text{ Selling Price: (S.P.)}$$

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

$$7. \text{ Selling Price: (S.P.)}$$

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

$$8. \text{ Cost Price: (C.P.)}$$

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

$$9. \text{ Cost Price: (C.P.)}$$

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

10. If an article is sold at a gain of say 35%, then S.P. = 135% of C.P.

11. If an article is sold at a loss of say, 35% then S.P. = 65% of C.P.

12. When a person sells two similar items, one at a gain of say $x\%$, and the other at a loss of $x\%$, then the seller always incurs a loss given by:

$$\text{Loss \%} = \left(\frac{\text{Common Loss and Gain \%}}{10} \right)^2 = \left(\frac{x}{10} \right)^2$$

13. If a trader professes to sell his goods at cost price, but uses false weights, then

$$\text{Gain \%} = \left[\frac{\text{Error}}{(\text{True Value}) - (\text{Error})} \times 100 \right] \%$$

Q1.

Answer :

Marked price = Rs 4650 and discount = 18%

Discount = 18% of marked price

$$= 18\% \text{ of Rs } 4650$$

$$= \text{Rs } \left(4650 \times \frac{18}{100} \right) = \text{Rs } 837$$

Selling price = marked price – discount

$$= \text{Rs } (4650 - 837) = \text{Rs } 3813$$

Therefore, the selling price of the cooler is Rs 3813.

Q2.

Answer :

Marked Price = Rs 960

Selling Price = Rs 816

Discount = MP – SP

$$= \text{Rs } (960 - 816)$$

$$= \text{Rs } 144$$

$$\text{Rate of discount} = 144 \times \frac{100}{960} = 15\%$$

Therefore, the discount on the sweater is 15%.

Q3.

Answer :

Selling price = **Rs 546**

Discount = **Rs 104**

Marked Price = ?

Marked Price = selling price + discount

$$= \text{Rs } (546 + 104)$$

$$= \text{Rs } 650$$

$$\begin{aligned}\text{Rate of discount} &= 104 \times \frac{100}{650} \\ &= 16\%\end{aligned}$$

Therefore, the rate of discount given on the shirt is 16%.

Q4.

Answer :

Selling Price = Rs 216.20

Rate of discount = 8%

Marked Price = ?

SP = MP – discount

Let the MP be Rs x .

$$\text{Now, } x - \frac{8}{100} \times x = 216.20$$

$$\Rightarrow \frac{92x}{100} = 216.20$$

$$\Rightarrow 92x = 21620$$

$$\Rightarrow x = \frac{21620}{92}$$

$$\Rightarrow x = 235$$

\therefore Marked price = **Rs 235**

Q5.

Answer :

Cost price = Rs 528

Rate of discount = 12%

Marked price = ?

SP = MP – discount

Let the MP be Rs x .

$$\text{Now, } \frac{x - 12}{100 \times x} = 528$$

$$\Rightarrow \frac{88x}{100} = 528$$

$$\Rightarrow 88x = 52800$$

$$\Rightarrow x = \frac{52800}{88}$$

$$\Rightarrow x = \text{Rs } 600$$

Therefore, the marked price of tea set is Rs 600.

Q6.

Answer :

Let Rs 100 be the CP.

Then, marked price = **Rs 135**

Discount = 20% of MP

$$= \frac{20}{100} \times 135$$
$$= 27$$

Selling price = marked price – discount

$$= 135 - 27$$

$$= \text{Rs } 108$$

Now, gain = SP – CP

$$= 108 - 100$$

$$= \text{Rs } 8$$

$$\therefore \text{Gain percentage} = \frac{\text{gain}}{\text{CP}} \times 100$$

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

Q7.

Answer :

Let Rs 100 be the CP.

Then, marked price = **Rs 140**

Discount = 30% of MP

$$= \frac{30}{100} \times 140$$
$$= 42$$

Selling Price = marked price – discount

$$= 140 - 42$$

$$= \text{Rs } 98$$

Now, loss = CP – SP

$$= 100 - 98$$

$$= \text{Rs } 2$$

$$\therefore \text{Loss percentage} = \frac{\text{Loss} \times 100}{\text{CP}}$$

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

$$= 2\%$$

Therefore, the shopkeeper had a loss of 2%.

Q8.

Answer :

Cost price of the fan = **Rs 1080**

Gain percentage = 25%

$$\therefore \text{Selling price} = \left\{ \frac{(100 + \text{gain \%})}{100} \times \text{CP} \right\}$$

$$= \left\{ \frac{100 + 25}{100} \times 1080 \right\}$$

$$= \frac{125}{100} \times 1080$$

$$= \text{Rs } 1350$$

Let the marked price be Rs **x**.

Discount = 25% of **Rs x**

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

SP = MP – discount

$$\Rightarrow 1350 = x - \frac{25x}{100}$$

$$\Rightarrow 1350 = \frac{100x - 25x}{100}$$

$$\Rightarrow 135000 = 75x \Rightarrow x = \frac{13500}{75} \Rightarrow x = 1800$$

Therefore, the marked price of the fan is **Rs 1800**.

Q9.

Answer :

Cost price of the refrigerator = **Rs 11515**

Gain percentage = 20%.

$$\begin{aligned}\therefore \text{Selling price} &= \left\{ \frac{(100 + \text{gain \%})}{100} \times C.P \right\} \\ &= \left\{ \frac{100+20}{100} \times 11515 \right\} \\ &= \frac{120}{100} \times 11515 \\ &= \text{Rs } 13818\end{aligned}$$

Let the marked price be Rs x .

Discount = 16% of **Rs x**

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

S.P = MP - Discount

$$\Rightarrow 13818 = x - \frac{16x}{100}$$

$$\Rightarrow 13818 = \frac{100x - 16x}{100}$$

$$\Rightarrow 1381800 = 84x \Rightarrow x = \frac{1381800}{84} \Rightarrow x = 16450$$

Therefore, the marked price of the refrigerator is **Rs 16450**.

Q10.

Answer :

The cost price of the ring is **Rs 1190**.

Gain percentage = 20%.

$$\begin{aligned}\therefore \text{Selling price} &= \left\{ \frac{(100 + \text{gain \%})}{100} \times C.P \right\} \\ &= \left\{ \frac{100+20}{100} \times 1190 \right\} \\ &= \frac{120}{100} \times 1190 \\ &= \text{Rs } 1428\end{aligned}$$

Let the marked price be x .

Discount = 16% of **Rs x**

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

SP = MP - Discount

$$\Rightarrow 1428 = x - \frac{16x}{100}$$

$$\Rightarrow 1428 = \frac{100x - 16x}{100}$$

$$\Rightarrow 142800 = 84x$$

$$\Rightarrow \frac{142800}{84} = x$$

$$\Rightarrow x = 1700$$

Therefore, the marked price of the ring is **Rs 1700**.

Q11.

Answer :

Let **Rs 100** be the cost price.

Gain required = 17%

\therefore Selling price = **Rs 117**

Let the marked price be **Rs x** .

Then, discount = 10% of x

$$= \frac{10}{100} \times x$$

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

Selling Price = MP - discount

$$\Rightarrow 117 = x - \frac{x}{10}$$

$$\Rightarrow 117 = \frac{9x}{10}$$

$$\Rightarrow 9x = 1170$$

$$\Rightarrow x = \frac{1170}{9}$$

$$\Rightarrow x = 130$$

\therefore Marked price = **Rs 130**

Hence, the marked price is 30% above the cost price.

Q12.

Answer :

Let **Rs 100** be the cost price.

Gain required = 8%

Therefore, the selling price is **Rs 108**.

Let **Rs x** be the marked price.

Then, discount = 10% of x

$$\begin{aligned} &= \frac{10}{100} \times x \\ &= \frac{x}{10} \end{aligned}$$

Selling Price = MP – discount

$$\Rightarrow 117 = x - \frac{x}{10}$$

$$\Rightarrow 117 = \frac{9x}{10}$$

$$\Rightarrow 9x = 1080$$

$$\Rightarrow x = \frac{1080}{9}$$

$$\Rightarrow x = 120$$

\therefore Marked price = **Rs 120**

Hence, the marked price is 20% above the cost price.

Q13.

Answer :

Marked price of the TV = Rs 18500

First discount = 20%

Now, 20% of 18500

$$= \frac{20}{100} \times 18500$$

$$= \text{Rs } 3700$$

Price after the first discount = Rs (18500 – 3700) = Rs 14800

Second discount = 5% of 14800

$$\begin{aligned} &= \frac{5}{100} \times 14800 \\ &= 740 \end{aligned}$$

Price after the second discount = (14800 – 740)

= Rs 14060

The TV is available for **Rs 14060**.

Q14.

Answer :

Let the marked price of the article be Rs 100.

First discount = 20%

Price after the first discount = (100 – 20) = Rs 80

Second discount = 5% of 80

$$\begin{aligned} &= \frac{5}{100} \times 80 \\ &= \text{Rs } 4 \end{aligned}$$

Price after the second discount = (80 – 4) = Rs 76

Net selling price = Rs 76

\therefore Single discount equivalent to the given successive discounts = (100 – 76)% = 24%

Profit and Loss

Ex 10C

Q1.

Answer :

List price of the refrigerator = Rs 14650

Sales tax = 6% of Rs 14650

$$= \text{Rs } \left(14650 \times \frac{6}{100} \right) = \text{Rs } 879$$

Bill amount = Rs (14650 + 879)

$$= \text{Rs } 15529$$

Hence, the cost of the refrigerator is Rs 15,529.

Q2.

(i)

Cost of the tie = Rs. 250

Sales tax = 6% of Rs 250

$$= \text{Rs. } \left(250 \times \frac{6}{100} \right)$$

$$= \text{Rs. 15}$$

Hence, bill amount = Rs (250 + 15)

$$= \text{Rs. 265}$$

(ii) **Cost of the medicines = Rs. 625**

Sales tax = 4% of Rs. 625

$$= \text{Rs. } \left(625 \times \frac{4}{100} \right)$$

$$= \text{Rs. 25}$$

Hence, bill amount = Rs (625 + 25)

$$= \text{Rs 650}$$

(iii) **Cost of the cosmetics = Rs 430**

Sales tax = 10% of Rs 430

$$= \text{Rs } \left(430 \times \frac{10}{100} \right)$$

$$= \text{Rs 43}$$

Hence, bill amount = Rs (430 + 43)

$$= \text{Rs. } 473$$

(iv) Cost of clothes = Rs 1175

Sales tax = 8% of Rs 1175

$$= \text{Rs} \left(1175 \times \frac{8}{100} \right)$$

$$= \text{Rs } 94$$

Hence, bill amount = Rs (1175 + 94)

$$= \text{Rs. } 1269$$

Therefore, total amount to be paid by Reena = bill amount of all the four items

$$= \text{Rs } (265 + 650 + 473 + 1269)$$

$$= \text{Rs } 2657$$

Q3.

Answer :

Let the original price of the watch be Rs x .

VAT = 10% of Rs x

$$= \text{Rs} \left(x \times \frac{10}{100} \right)$$

$$= \text{Rs } \frac{10x}{100}$$

\therefore Price including VAT = Rs $\left(x + \frac{x}{10} \right)$

$$= \text{Rs } \frac{11x}{10}$$

$$\text{Now, } \frac{11x}{10} = 1980$$

$$\Rightarrow x = \left(1980 \times \frac{10}{11} \right)$$

$$= 1800$$

Hence, the original price of the watch is Rs 1,800.

Q4.

Answer :

Let the original price of the shirt be Rs x .

VAT = 7% of Rs x

$$= \text{Rs.} \left(x \times \frac{7}{100} \right)$$

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

\therefore Price including VAT = Rs. $\left(x + \frac{7x}{100} \right)$

$$= \text{Rs.} \frac{107x}{100}$$

$$\text{Now, } \frac{107x}{100} = 1337.50$$

$$\Rightarrow x = \text{Rs} \left(1337.50 \times \frac{100}{107} \right)$$

$$= \text{Rs } 1250$$

Hence, the original price of the shirt is Rs 1,250.

Q5.

Answer :

Let the price of 10 g of gold be Rs x .

VAT = 1% of Rs x

$$= \text{Rs} \left(x \times \frac{1}{100} \right)$$

$$= \text{Rs } \frac{x}{100}$$

\therefore Price including VAT = Rs. $\left(x + \frac{x}{100} \right)$

$$= \text{Rs } \frac{101x}{100}$$

$$\text{Now, } \frac{101x}{100} = 15756$$

$$\Rightarrow x = \text{Rs} \left(15756 \times \frac{100}{101} \right)$$

$$= \text{Rs } 15600$$

Hence, the price of 10 g of gold is Rs 15,600.

Q6.

Answer :

Let the original price of the computer be Rs x .

VAT = 4% of Rs. x

$$= \text{Rs.} \left(x \times \frac{4}{100} \right)$$

$$= \text{Rs.} \frac{4x}{100}$$

$$\begin{aligned} \therefore \text{Price including VAT} &= \text{Rs.} \left(x + \frac{4x}{100} \right) \\ &= \text{Rs.} \frac{104x}{100} \end{aligned}$$

$$\text{Now, } \frac{104x}{100} = 37960$$

$$\begin{aligned} \Rightarrow x &= \left(37960 \times \frac{100}{104} \right) \\ &= 36500 \end{aligned}$$

\therefore The original price of the computer is Rs 36,500

Q7.

Answer :

Let the original cost of the spare parts be Rs x .

$$\text{VAT} = 12\% \text{ of Rs. } x = \text{Rs.} \left(x \times \frac{12}{100} \right) = \text{Rs.} \frac{12x}{100}$$

$$\begin{aligned} \therefore \text{Price including VAT} &= \text{Rs.} \left(x + \frac{12x}{100} \right) \\ &= \text{Rs.} \frac{112x}{100} \end{aligned}$$

$$\text{Now, } \frac{112x}{100} = 20776 \Rightarrow x = \left(20776 \times \frac{100}{112} \right) = 18550$$

Hence, the original cost of the spare parts is Rs 18,550.

Q8.

Answer :

Let the list price of the TV set be Rs x .

VAT = 8% of Rs. x

$$= \text{Rs.} \left(x \times \frac{8}{100} \right)$$

$$= \text{Rs.} \frac{8x}{100}$$

$$\begin{aligned} \therefore \text{Price including VAT} &= \text{Rs.} \left(x + \frac{8x}{100} \right) \\ &= \text{Rs.} \frac{108x}{100} \end{aligned}$$

$$\text{Now, } \frac{108x}{100} = 27000$$

$$\begin{aligned} \Rightarrow x &= \left(27000 \times \frac{100}{108} \right) \\ &= 25000 \end{aligned}$$

Hence, the list price of the TV set is Rs 25,000.

Q9.

Answer :

Let the rate of VAT be $x\%$. Then, we have:

$$840 + x\% \text{ of } 840 = 882$$

$$\Rightarrow \left(\frac{x}{100} \times 840 \right) = 882 - 840$$

$$\Rightarrow \frac{84x}{100} = 42$$

$$\begin{aligned} \Rightarrow x &= \left(42 \times \frac{100}{84} \right) \\ &= 5 \end{aligned}$$

\therefore The rate of VAT is 5%.

Q10.

Answer :

Let the rate of VAT be $x\%$. Then, we have:

$$\begin{aligned}18500 + x\% \text{ of } 18500 &= 19980 \\ \Rightarrow \left(\frac{x}{100} \times 18500\right) &= 19980 - 18500 \\ \Rightarrow 185x &= 1480 \\ \Rightarrow x &= \frac{1480}{185} \\ &= 8\end{aligned}$$

\therefore The rate of VAT is 8%.

Q11.

Answer :

Let the rate of VAT be $x\%$. Then, we have:

$$\begin{aligned}34000 + x\% \text{ of } 34000 &= 382500 \\ \Rightarrow \left(\frac{x}{100} \times 340000\right) &= 382500 - 340000 \\ \Rightarrow 3400x &= 42500 \\ \Rightarrow x &= \frac{42500}{3400} \\ &= 12.5\end{aligned}$$

\therefore The rate of VAT is 12.5%.

Profit and Loss RS Ex 10D

Q1.

Answer :

$$(c) 33\frac{1}{3}\%$$

$$SP = \text{Rs } 100$$

$$\text{Gain} = \text{Rs } (100 - 75)$$

$$= \text{Rs } 25$$

$$\therefore \text{Gain percentage} = \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \%$$

$$= \left(\frac{25}{75} \times 100 \right) \%$$

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

Q2.

Answer :

$$(b) 12\frac{1}{2}\%$$

$$CP = \text{Rs } 120$$

$$SP = \text{Rs } 105$$

$$\text{Loss} = \text{Rs } (120 - 105)$$

$$= \text{Rs } 15$$

$$\therefore \text{Loss percentage} = \left(\frac{\text{loss}}{\text{CP}} \times 100 \right)$$

$$= \left(\frac{15}{120} \times 100 \right)$$

$$= 12\frac{1}{2}\%$$

Q3.

Answer :

$$(b) 25\%$$

$$CP = SP - \text{Gain}$$

$$= \text{Rs } (100 - 20)$$

$$= \text{Rs } 80$$

$$\therefore \text{Gain percentage} = \left(\frac{\text{gain}}{\text{CP}} \times 100 \right) \%$$

$$= \left(\frac{20}{80} \times 100 \right) \%$$

$$= 25\%$$

Q4.

Answer :

$$(d) \text{ Rs } 72$$

$$\text{SP} = \text{Rs } 48$$

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

$$\text{Now, CP} = \frac{100}{100 - \text{loss \%}} \times \text{SP}$$

$$= \text{Rs } \left(\frac{100}{(100 - \text{loss \%})} \times \text{SP} \right)$$

$$= \text{Rs } \left(\frac{100}{(100 - 20)} \times 48 \right)$$

$$= \text{Rs } \left(\frac{100}{80} \times 48 \right)$$

$$= \text{Rs } 60$$

$$\therefore \text{Desired SP} = \left\{ \frac{(100 + \text{gain \%})}{100} \times \text{CP} \right\}$$

$$= \left\{ \frac{(100 + 20)}{100} \times 60 \right\}$$

$$= \text{Rs } \left(\frac{12}{10} \times 60 \right)$$

$$= \text{Rs } 72$$

Q5.

Answer :

$$(c) 120\%$$

Let the SP and CP of the article be Rs x and y , respectively.

Gain percentage = 10%

$$\Rightarrow 10 = \frac{x - y}{y} \times 100$$

$$\Rightarrow y = \frac{10x}{11}$$

According to the question, we have:

$$\text{SP} = \text{Rs } 2x$$

$$\therefore \text{Gain percentage} = \frac{\text{gain}}{\text{CP}} \times 100$$

$$= \frac{2x - \frac{10x}{11}}{\frac{10x}{11}} \times 100$$

$$= \frac{12}{10} \times 100$$

$$= 120\%$$

Q6.

Answer :

$$(d) 125\%$$

$$\text{Cost price of a banana} = \text{Rs } \frac{2}{3}$$

$$\text{Selling price of a banana} = \text{Rs } \frac{3}{2}$$

$$\text{Now, profit} = \text{Rs } \left(\frac{3}{2} - \frac{2}{3} \right) = \text{Rs } \frac{9-4}{6} = \text{Rs } \frac{5}{6}$$

$$\therefore \text{Gain percentage} = \frac{\text{gain}}{\text{CP}} \times 100$$

$$= \frac{\left(\frac{5}{6} \right)}{\left(\frac{2}{3} \right)} \times 100$$

$$= \frac{5}{6} \times \frac{3}{2} \times 100$$

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

$$= 5 \times 25$$

$$= 125\%$$

Q7.

Answer :

(c) 20%

Let Rs x be the SP of each pen.

SP of 10 pens = CP of 12 pens = Rs $12x$

CP of 10 pens = Rs $10x$

Now, gain = Rs $(12x - 10x)$

= Rs $2x$

\therefore Gain percentage = $\left(\frac{\text{gain}}{\text{CP}} \times 100\right)\%$

$$= \left(\frac{2x}{10x} \times 100\right)\%$$

$$= 20\%$$

Q8.

Answer :

(b) 25%

Let the SP of 100 pens be Rs x .

SP of 1 pen = Rs $\frac{x}{100}$

Profit = Rs $\frac{20x}{100}$

$$= \text{Rs } \frac{x}{5}$$

Now, CP = $x - \frac{x}{5}$

$$= \frac{4x}{5}$$

\therefore Gain percentage = $\frac{\frac{x}{5}}{\frac{4x}{5}} \times 100$

$$= 25\%$$

Q9.

Answer :

(d) 150%

L.C.M of 5 and 2 = $(5 \times 1 \times 2) = 10$

Let 10 be the number of toffees bought.

CP of 5 toffees = Rs 1

CP of 1 toffee = Rs $\left(\frac{1}{5}\right)$

\therefore CP of 10 toffees = Rs $\left(\frac{1}{5} \times 10\right)$

$$= \text{Rs } 2$$

SP of 2 toffees = Rs 1

SP of 1 toffee = Rs $\left(\frac{1}{2}\right)$

\therefore SP of 10 toffees = Rs $\left(\frac{1}{2} \times 10\right)$

$$= \text{Rs. } 5$$

Gain = Rs $(5 - 2)$

$$= \text{Rs } 3$$

Gain percentage = $\left(\frac{\text{gain}}{\text{CP}} \times 100\right)\%$

$$= \left(\frac{3}{2} \times 100\right)\%$$

$$= 150\%$$

Q10.

Answer :

(d) 25%

L. C. M of 5 and 6 = $(5 \times 1 \times 6) = 30$

Let 30 be the number of oranges bought.

CP of 5 oranges = Rs 10

$$\begin{aligned}\text{CP of 1 oranges} &= \text{Rs } \left(\frac{10}{5}\right) \\ &= \text{Rs } 2\end{aligned}$$

$$\begin{aligned}\therefore \text{CP of 30 oranges} &= \text{Rs } (2 \times 30) \\ &= \text{Rs } 60\end{aligned}$$

SP of 6 oranges = Rs 15

$$\text{SP of 1 oranges} = \text{Rs } \left(\frac{15}{6}\right)$$

$$\begin{aligned}\therefore \text{SP of 30 oranges} &= \text{Rs } \left(\frac{15}{6} \times 30\right) \\ &= \text{Rs } 75\end{aligned}$$

$$\begin{aligned}\text{Now, gain} &= \text{Rs } (75 - 60) \\ &= \text{Rs } 15\end{aligned}$$

$$\begin{aligned}\therefore \text{Gain percentage} &= \left(\frac{\text{gain}}{\text{CP}} \times 100\right)\% \\ &= \left(\frac{15}{60} \times 100\right)\% \\ &= 25\%\end{aligned}$$

Q11.

Answer :

(a) 4%

SP of the radio = Rs 950

Loss = 5%

$$\begin{aligned}\text{CP} &= \left\{ \frac{100}{(100 - \text{loss})} \times \text{SP} \right\} \\ &= \text{Rs } \left\{ \frac{100}{(100 - 5)} \times 950 \right\} \\ &= \text{Rs } \left(\frac{100}{95} \times 950 \right) \\ &= \text{Rs } 1000\end{aligned}$$

$$\begin{aligned}\text{Now, gain} &= \text{Rs } (1040 - 1000) \\ &= \text{Rs } 40\end{aligned}$$

$$\begin{aligned}\therefore \text{Gain percentage} &= \left(\frac{\text{gain}}{\text{CP}} \times 100\right)\% \\ &= \left(\frac{40}{1000} \times 100\right)\% \\ &= 4\%\end{aligned}$$

Q12.

Answer :

(a) 20%

Let Rs x be the CP of each article.

$$\text{SP of an article} = \text{Rs } \frac{6}{5}x$$

Now, gain = (SP - CP)

$$\begin{aligned}&= \text{Rs } \left(\frac{6}{5}x - x\right) \\ &= \text{Rs } \frac{x}{5}\end{aligned}$$

$$\begin{aligned}\therefore \text{Gain percentage} &= \left(\frac{\text{gain}}{\text{CP}} \times 100\right)\% \\ &= \left(\frac{\frac{x}{5}}{x} \times 100\right)\% \\ &= \left(\left(\frac{x}{5} \times \frac{1}{x}\right) \times 100\right)\% \\ &= 20\%\end{aligned}$$

Q13.

Answer :

(b) Rs.1200

SP = Rs 720

Loss percentage = 25%

$$CP = \left\{ \frac{100}{(100 - \text{loss \%})} \times SP \right\}$$

$$= \text{Rs} \left\{ \frac{100}{(100 - 25)} \times SP \right\}$$

$$= \text{Rs} \left(\frac{100}{85} \times 720 \right)$$

$$= \text{Rs} 960$$

$$\therefore \text{Desired SP} = \left\{ \frac{(100 + \text{gain \%})}{100} \times CP \right\}$$

$$= \text{Rs.} \left\{ \frac{(100 + 25)}{100} \times 960 \right\}$$

$$= \text{Rs.} \left(\frac{125}{100} \times 960 \right)$$

$$= \text{Rs. 1200}$$

Q14.

Answer :

(a) 5%

CP = Rs. 20x

SP = Rs. 21x

Gain = Rs. (21 - 20)

= Rs. x

$$\therefore \text{Gain percentage} = \left(\frac{\text{gain}}{CP} \times 100 \right) \%$$

$$= \left(\frac{x}{20x} \times 100 \right) \%$$

$$= 5\%$$

Q15.

Answer :

(a) 1.5% gain

SP of the first chair = Rs 500

Gain percentage = 20%

$$\therefore \text{CP of the first chair} = \left\{ \frac{100}{(100 + \text{gain \%})} \times SP \right\}$$

$$= \text{Rs.} \left\{ \frac{100}{(100 + 20)} \times 500 \right\}$$

$$= \text{Rs.} \left(\frac{100}{120} \times 500 \right)$$

$$= \text{Rs. 416.67}$$

SP of the second chair = Rs. 500

Loss percentage = 12%

$$\therefore \text{CP of the second chair} = \left\{ \frac{100}{(100 - \text{loss \%})} \times SP \right\}$$

$$= \text{Rs.} \left\{ \frac{100}{(100 - 12)} \times 500 \right\}$$

$$= \text{Rs.} \left(\frac{100}{88} \times 500 \right)$$

$$= \text{Rs. 568.18}$$

Total CP of the two chairs = Rs. (416.67 + 568.18)

$$= \text{Rs. 984.85}$$

Total SP of the two chairs = Rs. (500 × 2)

$$= \text{Rs. 1000}$$

Since SP > CP, there is a gain in the whole transaction.

Now, gain = Rs. (1000 - 984.85)

$$= \text{Rs. 15.15}$$

$$\therefore \text{Gain percentage} = \left(\frac{\text{gain}}{CP} \times 100 \right) \%$$

$$= \left(\frac{15.15}{984.85} \times 100 \right) \%$$

$$= 1.5\%$$

Q16.

Answer :

(b) Rs 530

Let the CP be Rs x .

Then, we have :

$$625 - x = x - 435$$

$$\Rightarrow x + x = 625 + 435$$

$$\Rightarrow 2x = 1060$$

$$\therefore x = \text{Rs } 530$$

Q17.

Answer :

(c) Rs 198

$$\text{CP} = \text{Rs } 150$$

$$\text{Total CP} = \text{Rs } (150 + 10\% \text{ of } 150)$$

$$= \text{Rs } \left(150 + \left(\frac{10}{100} \times 150 \right) \right)$$

$$= \text{Rs } (150 + 15)$$

$$= \text{Rs } 165$$

$$\therefore \text{Desired SP} = \left\{ \frac{(100 + \text{gain \%})}{100} \times \text{total CP} \right\}$$

$$= \text{Rs. } \left\{ \frac{(100 + 20)}{100} \times 165 \right\}$$

$$= \text{Rs. } \left(\frac{120}{100} \times 165 \right)$$

$$= \text{Rs. } 198$$

Q18.

Answer :

(a) Rs. 50

Let the CP be Rs x . Then, we have :

$$(105\% \text{ of } x) - (95\% \text{ of } x) = 5$$

$$\Rightarrow \left(\frac{105}{100} \times x \right) - \left(\frac{95}{100} \times x \right) = 5$$

$$\Rightarrow \left(\frac{105x}{100} - \frac{95x}{100} \right) = 5$$

$$\Rightarrow \frac{(105x - 95x)}{100} = 5$$

$$\Rightarrow \frac{10x}{100} = 5$$

$$\Rightarrow \frac{x}{10} = 5$$

$$\Rightarrow x = 50$$

$$\therefore \text{CP} = \text{Rs } 50$$

Q19.

Answer :

(b) 8%

Let the CP be Rs 100.

Then, marked price = Rs 120

Discount = 10% of MP

$$= (10\% \text{ of Rs } 120)$$

$$= \text{Rs. } \left(120 \times \frac{10}{100} \right)$$

$$= \text{Rs. } 12$$

$$\text{Now, SP} = (\text{MP}) - (\text{discount})$$

$$= \text{Rs } (120 - 12)$$

$$= \text{Rs } 108$$

$$\text{Gain percentage} = (108 - 100)\%$$

$$= 8\%$$

Q20.

Answer :

(c) 1% loss

Let the CP be Rs 100.

Then, marked price = Rs 110

Discount = 10% of MP

$$= (10\% \text{ of Rs. } 110)$$

$$= \text{Rs. } \left(110 \times \frac{10}{100}\right)$$

$$= \text{Rs. } 11$$

Now, $SP = (MP) - (\text{discount})$

$$= \text{Rs } (110 - 11)$$

$$= \text{Rs } 99$$

$$\therefore \text{Loss percentage} = (100 - 99)\% = 1\%$$

Q21.

Answer :

(c) Rs.750

Let the basic price be x .

VAT = 10% of Rs x

$$= \text{Rs } \left(x \times \frac{10}{100}\right)$$

$$= \text{Rs } \frac{x}{10}$$

$$\therefore \text{Price including VAT} = \text{Rs } \left(x + \frac{x}{10}\right) \\ = \text{Rs. } \frac{11x}{10}$$

Now, $\frac{11x}{10} = 825$

$$\Rightarrow x = \left(825 \times \frac{10}{11}\right)$$

$$\Rightarrow x = 750$$

\therefore The basic price of the watch is Rs 750.