

Profit and Loss

Exercise 11A

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 prices**, 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. 950

Gain = 6%

$$\begin{aligned} \text{SP} &= \left\{ \frac{(100 + \text{Gain \%})}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{(100 + 6)}{100} \times 950 \right\} \\ &= \frac{106}{100} \times 950 \\ &= \frac{100700}{100} \\ &= \text{Rs. 1007} \end{aligned}$$

(ii) CP = Rs. 9600

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

$$\begin{aligned} \text{SP} &= \left\{ \frac{(100 + \text{Gain \%})}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{\left(100 + \frac{50}{3}\right)}{100} \times 9600 \right\} \\ &= \frac{350}{300} \times 9600 \\ &= \frac{3360}{3} \\ &= \text{Rs. 11200} \end{aligned}$$

(iii) CP = Rs. 1540

Loss = 4%

$$\begin{aligned} \text{SP} &= \left\{ \frac{(100 - \text{Loss \%})}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{(100 - 4)}{100} \times 1540 \right\} \\ &= \frac{96}{100} \times 1540 \\ &= \frac{147840}{100} \\ &= \text{Rs. 1478.40} \end{aligned}$$

(iv) CP = Rs. 8640

Loss = $12\frac{1}{2}\%$ = $\frac{25}{2}\%$

$$\begin{aligned} \text{SP} &= \left\{ \frac{(100 - \text{Loss \%})}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{\left(100 - \frac{25}{2}\right)}{100} \times 8640 \right\} \\ &= \frac{175}{200} \times 8640 \\ &= \frac{1512000}{200} \\ &= \text{Rs. 7560} \end{aligned}$$

Q2

Answer :

(i) CP = Rs. 2400

SP = Rs. 2592

Gain = SP - CP = Rs. (2592 - 2400) = Rs. 192

$$\text{Gain\%} = \left(\frac{\text{Gain}}{\text{CP}} \times 100 \right) = \left(\frac{192}{2400} \times 100 \right) = 8$$

(ii) CP = Rs. 1650

SP = Rs. 1452

Loss = CP - SP = (1650 - 1452) = Rs. 198

$$\text{Loss\%} = \left(\frac{\text{Loss}}{\text{CP}} \times 100 \right) = \left(\frac{198}{1650} \times 100 \right) = 12$$

(iii) CP = Rs. 12000 and SP = Rs. 12800

Gain = SP - CP = (12800 - 12000) = Rs. 800

$$\text{Gain\%} = \left(\frac{\text{Gain}}{\text{CP}} \times 100 \right) = \left(\frac{800}{12000} \times 100 \right) = 6.66$$

(iv) CP = Rs. 1800

SP = Rs. 1611

Loss = CP - SP = (1800 - 1611) = Rs. 189

$$\text{Loss\%} = \left(\frac{\text{Loss}}{\text{CP}} \times 100 \right) = \left(\frac{189}{1800} \times 100 \right) = 10.5$$

Q3

Answer :

(i) SP = Rs. 924

Gain = 10%

$$\begin{aligned} \text{CP} &= \left\{ \frac{100}{(100 + \text{Gain \%})} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{(100 + 10)} \times 924 \right\} \\ &= \frac{92400}{110} \\ &= \text{Rs. 840} \end{aligned}$$

(ii) SP = Rs. 1755

Gain = $12\frac{1}{2}\%$ = $\frac{25}{2}\%$

$$\begin{aligned} \text{CP} &= \left\{ \frac{100}{(100 + \text{Gain \%})} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{\left(100 + \frac{25}{2}\right)} \times 1755 \right\} \\ &= \left\{ \frac{200}{225} \times 1755 \right\} \\ &= \frac{351000}{225} \\ &= \text{Rs. 1560} \end{aligned}$$

(iii) SP = Rs. 8510

Loss = 8%

$$\begin{aligned} \text{CP} &= \left\{ \frac{100}{(100 - \text{Loss \%})} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{(100 - 8)} \times 8510 \right\} \\ &= \frac{851000}{92} \\ &= \text{Rs. 9250} \end{aligned}$$

(iv) SP = Rs. 5600

Loss = $6\frac{2}{3}\%$ = $\frac{20}{3}\%$

$$\begin{aligned} \text{CP} &= \left\{ \frac{100}{(100 - \text{Loss \%})} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{\left(100 - \frac{20}{3}\right)} \times 5600 \right\} \\ &= \left\{ \frac{300}{280} \times 5600 \right\} \\ &= \frac{168000}{28} \\ &= \text{Rs. 6000} \end{aligned}$$

Q4

Answer :

Cost price of an almirah = Rs. 13600

Transportation cost = Rs. 400

Total cost price = Rs. (13600 + 400) = Rs. 14000

Selling price = Rs. 16800

Now, SP > CP

Gain = SP - CP = (16800 - 14000) = Rs. 2800

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

$$= \left(\frac{2800}{14000} \times 100 \right) \%$$

$$= \frac{2800}{140} \%$$

$$= 20\%$$

Q5

Answer :

Cost price of the house = Rs. 765000

Cost of repairing the house = Rs. 115000

Total Cost price = (765000 + 115000) = Rs. 880000

Ravi sold it at a gain of 5%.

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

$$= \left\{ \frac{(100 + 5)}{100} \times 880000 \right\}$$

$$= \frac{105}{100} \times 880000$$

$$= \text{Rs. 924000}$$

He gets Rs. 924000.

Q6

Answer :

CP of 12 lemons (dozen) = Rs. 25

CP of one lemon = Rs. $\frac{25}{12}$

CP of five lemons = $5 \times \frac{25}{12} = \frac{125}{12} = \text{Rs. } 10.42$

SP of five lemons = Rs. 12 (given)

Gain = SP - CP = (12 - 10.42) = Rs 1.58

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

= $\left(\frac{1.58}{10.42} \times 100 \right)\%$

= 15.2%

Q7

Answer :

Let the cost price of the pen be Re 1.

Cost price of 12 pens = Rs 12

SP of 12 pens = CP of 15 pens = Rs 15

Gain = SP - CP = Rs (15 - 12) = Rs 3

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

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

= 25%

Gain% = 25%

Q8

Answer :

Let the cost price of one spoon be Re 1.

CP of 16 spoons = Rs 16

SP of 16 spoons = CP of 15 spoons = Rs 15

Loss = CP - SP = (16 - 15) = Re 1

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

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

= 6.25%

Loss% = 6.25%

Q9

Answer :

Cost price of a video = Rs. 12000

$$\text{SP of a video at a gain of 10\%} = \left\{ \frac{(100 + \text{Gain \%})}{100} \times \text{CP} \right\}$$

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

$$= \left\{ \frac{110}{100} \times 12000 \right\}$$

$$= \text{Rs. 13200}$$

So, Rahul purchased at a cost price of Rs. 13200.

Rahul sells it at a loss of 5%.

$$\text{SP of a video at loss of 5\%} = \left\{ \frac{(100 - \text{Loss \%})}{100} \times \text{CP} \right\}$$

$$= \left\{ \frac{(100 - 5)}{100} \times 13200 \right\}$$

$$= \frac{95}{100} \times 13200$$

$$= \text{Rs. 12540}$$

∴ Rakesh pays = Rs. 12540

Q10

Answer :

SP of the sofa set = Rs. 21600

Gain% = 8

$$\text{CP of the sofa set} = \left\{ \frac{100}{(100 + \text{Gain\%})} \times \text{SP} \right\}$$

$$= \left\{ \frac{100}{(100 + 8)} \times 21600 \right\}$$

$$= \frac{2160000}{108}$$

$$= \text{Rs. 20000}$$

He purchased it at the cost of Rs. 20000.

Q11

Answer :

SP of the watch = Rs 11400

Loss% = 5

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

$$= \left\{ \frac{100}{(100 - 5)} \times 11400 \right\}$$

$$= \frac{11400}{95}$$

$$= \text{Rs. 12000}$$

He purchased it at the cost of Rs. 12000.

Q12

Answer :

SP of the calculator = Rs. 1325

Gain % = 6

$$\begin{aligned}\text{CP of the calculator} &= \left\{ \frac{100}{(100 + \text{Gain \%})} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{(100 + 6)} \times 1325 \right\} \\ &= \frac{132500}{106} \\ &= \text{Rs. 1250}\end{aligned}$$

$$\begin{aligned}\text{SP of the calculator} &= \left\{ \frac{(100 + \text{Gain \%})}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{(100 + 12)}{100} \times 1250 \right\} \\ &= \frac{140000}{100} \\ &= \text{Rs. 1400}\end{aligned}$$

Q13

Answer :

SP of a computer = Rs. 24480

Loss% = 4

$$\begin{aligned}\text{CP of the computer} &= \left\{ \frac{100}{(100 - \text{Loss \%})} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{(100 - 4)} \times 24480 \right\} \\ &= \frac{2448000}{96} \\ &= \text{Rs. 25500}\end{aligned}$$

In order to gain 4%:

$$\begin{aligned}\text{SP of the computer} &= \left\{ \frac{(100 + \text{Gain \%})}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{(100 + 4)}{100} \times 25500 \right\} \\ &= \left\{ \frac{104}{100} \times 25500 \right\} \\ &= \frac{2652000}{100} \\ &= \text{Rs. 26520}\end{aligned}$$

Q14

Answer :

Let the CP of the tricycle be Rs. x

$$\begin{aligned}\text{SP at 15\% gain} &= \left\{ \frac{(100 + \text{Gain \%})}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{(100 + 15)}{100} \times x \right\} \\ &= \frac{115}{100} x \\ &= \text{Rs. } \frac{23}{20} x\end{aligned}$$

$$\text{SP at 20\% gain} = x \times \frac{120}{100} = \text{Rs. } \frac{6}{5} x$$

$$\begin{aligned}\frac{6}{5} x - \frac{23}{20} x &= 108 \\ \Rightarrow \frac{24x - 23x}{20} &= 108 \\ \Rightarrow \frac{x}{20} &= 108 \\ \Rightarrow x &= 2160\end{aligned}$$

Hence, the cost price of the tricycle is Rs. 2160

Q15

Answer :

Let CP of a television be Rs x .

$$\text{SP at 8\% loss} = \frac{(100 - 8)}{100} \times x = \text{Rs. } \frac{92}{100} x$$

$$\text{SP at 6\% gain} = \left(\frac{100 + 6}{100} \right) \times x = \text{Rs. } \frac{106}{100} x$$

$$\begin{aligned}\frac{106}{100} x - \frac{92}{100} x &= 3360 \\ \Rightarrow \frac{14}{100} x &= 3360 \\ \Rightarrow x &= \frac{336000}{14} = 24000\end{aligned}$$

\therefore CP = Rs. 24000

Sandeep bought it at the cost of Rs. 24000.

Q16

Answer :

SP of each cycle = Rs. 2376

He gains 10% in one cycle.

$$\begin{aligned}\text{CP} &= \left\{ \frac{100}{(100 + \text{Gain \%})} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{(100 + 10)} \times 2376 \right\} \\ &= \frac{100}{110} \times 2376 \\ &= \text{Rs. } 2160\end{aligned}$$

He loses 10% in the second cycle.

$$\begin{aligned}\text{CP} &= \frac{100}{(100 - \text{Loss \%})} \times \text{SP} \\ &= \frac{100}{(100 - 10)} \times 2376 \\ &= \frac{100}{90} \times 2376 \\ &= \frac{23760}{9} \\ &= \text{Rs. } 2640\end{aligned}$$

$$\text{Total CP} = \text{Rs. } (2160 + 2640) = \text{Rs. } 4800$$

$$\text{Total SP} = \text{Rs. } (2376 + 2376) = \text{Rs. } 4752$$

$$\text{Loss} = \text{CP} - \text{SP} = \text{Rs. } (4800 - 4752) = \text{Rs. } 48$$

$$\begin{aligned} \text{Loss}\% &= \left(\frac{\text{Loss}}{\text{CP}} \times 100 \right)\% \\ &= \left(\frac{48}{4800} \times 100 \right)\% \\ &= 1\% \end{aligned}$$

Q17

Answer :

Let the CP of the exhaust fan be Rs. x .

$$\text{Gain} = \text{Rs. } \frac{x}{6}$$

$$\text{SP} = \text{Rs. } \left(x + \frac{x}{6} \right)$$

$$\text{SP} = \text{Rs. } 7350$$

$$\begin{aligned} \therefore x + \frac{x}{6} &= 7350 \\ \Rightarrow \frac{7}{6}x &= 7350 \\ \Rightarrow x &= \frac{7350 \times 6}{7} = \frac{44100}{7} = 6300 \end{aligned}$$

$$\text{CP of the fan} = \text{Rs. } 6300$$

Q18

Answer :

Mohit sold a watch to Karim at Rs. x .

Mohit sold it at a gain of 10%.

$$\begin{aligned} \text{SP of the watch} &= 110\% \text{ of } x \\ &= \left(x + \frac{10}{100}x \right) = \text{Rs. } \frac{11}{10}x \end{aligned}$$

Karim sold it to Rahim at a gain of 4%.

$$\text{SP of the watch} = 104\% \text{ of } \frac{11}{10}x = \left(\frac{104}{100} \times \frac{11}{10}x \right) = \text{Rs. } \left(\frac{26}{25} \times \frac{11}{10}x \right)$$

But, Rahim pays Rs. 14300.

$$\therefore \frac{26}{25} \times \frac{11}{10}x = 14300$$

$$\Rightarrow x = \frac{14300 \times 25 \times 10}{26 \times 11} = \frac{3575000}{286} = 12500$$

Mohit purchased it at Rs. 25000.

Q19

Answer :

Let the production cost of a washing machine be Rs. x .

Profit of the manufacturer = 10%

$$\begin{aligned} \text{SP of the manufacturer} &= 110\% \text{ of } x \\ &= \left(x + \frac{10}{100}x \right) = \frac{110}{100}x = \text{Rs. } \frac{11}{10}x \end{aligned}$$

Profit of the wholesale dealer = 15%

$$\begin{aligned} \text{SP of the wholesale dealer} &= 115\% \text{ of Rs. } \frac{11}{10}x \\ &= \text{Rs. } \left(\frac{11}{10}x \times \frac{115}{100} \right) = \text{Rs. } \left(\frac{11}{10}x \times \frac{23}{20} \right) \end{aligned}$$

Profit of the retailer = 25%

$$\begin{aligned} \text{SP of the retailer} &= 125\% \text{ of Rs. } \left(\frac{11}{10}x \times \frac{23}{20} \right) \\ &= \text{Rs. } \left(\frac{11}{10}x \times \frac{23}{20} \times \frac{125}{100} \right) = \text{Rs. } \left(\frac{11}{10}x \times \frac{23}{20} \times \frac{5}{4} \right) \end{aligned}$$

Given:

Retail price = Rs. 37950

$$\therefore \left(\frac{11}{10} x \times \frac{23}{20} \times \frac{5}{4} \right) = 37950$$

$$\Rightarrow x = \frac{37950 \times 10 \times 20 \times 4}{11 \times 23 \times 5}$$
$$\Rightarrow x = \frac{30360000}{1265} = 24000$$

\(\therefore\) Production cost of a washing machine = Rs. 24000

Q20

Answer :

Mr. Mehta purchased a video at the cost of Rs. 20000.

Mr. Mehta purchased a television at the cost of Rs. 30000.

Total cost = Rs. (20000 + 30000) = Rs. 50000

He lost 5% on the video.

$$SP = \frac{(100 - \text{Loss \%})}{100} \times CP$$
$$= \frac{100 - 5}{100} \times 20000$$
$$= \frac{95}{100} \times 20000$$
$$= \text{Rs. } 19000$$

He gained 8% on the television.

$$SP = \frac{(100 + \text{Gain \%})}{100} \times CP$$
$$= \frac{100 + 8}{100} \times 30000$$
$$= \frac{108}{100} \times 30000$$
$$= \text{Rs. } 32400$$

Total SP = Rs. (19000 + 32400) = Rs. 51400

Total CP = Rs. 50000

Total Gain = SP - CP = Rs. (51400 - 50000) = Rs. 1400

$$\text{Gain \%} = \left(\frac{\text{Gain}}{\text{CP}} \times 100 \right) \%$$
$$= \left(\frac{1400}{50000} \times 100 \right) \%$$
$$= 2.8\%$$

Q21

Answer :

Let the CP of 1 orange be Rs. x .

\(\therefore\) CP of 36 oranges = Rs. $36x$

Let SP of orange be Rs. y .

\(\therefore\) SP of 36 oranges = Rs. $36y$

Loss = SP of 4 oranges = $4y$ (given)

We know:

Loss = CP - SP

$$\Rightarrow 4y = 36x - 36y$$
$$\Rightarrow 4y + 36y = 36x$$
$$\Rightarrow 40y = 36x$$
$$\Rightarrow 10y = 9x$$
$$\Rightarrow y = \frac{9}{10}x$$

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

$$= \left(\frac{4y}{36x} \times 100 \right) \%$$

$$= \left(\frac{4 \times 9x}{36x \times 10} \times 100 \right) \%$$
$$= 10\%$$

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

Q22

Answer :

Let the CP of one pencil be Rs. x .

Therefore, the CP of 96 pencils will be Rs. $96x$.

Let SP of one pencil be Rs. y .

\therefore SP of 96 pencils = Rs. $96y$

Gain = SP of one dozen pencil = Rs. $12y$ (given)

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

$$\Rightarrow 12y = 96y - 96x \Rightarrow 96x = 96y - 12y \Rightarrow 96x = 84y \Rightarrow x = \frac{84y}{96}$$

$$\text{Gain \%} = \frac{\text{Gain}}{\text{CP}} \times 100 \% = \frac{12y}{96x} \times 100 \% = \frac{12y \times 96}{96 \times \frac{84y}{96}} \times 100 \% = 14.28\%$$

Profit and Loss

Exercise 11B

Q1

Answer :

(b) 25%

CP of the book = Rs. 80

SP of the book = Rs. 100

Gain = SP - CP = Rs. (100 - 80) = Rs. 20

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

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

$$= 25\%$$

Q2

Answer :

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

CP of a football = Rs. 120

SP of a football = Rs. 105

CP > SP

∴ Loss = CP - SP = Rs. (120 - 105) = Rs. 15

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

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

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

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

Q3

Answer :

(b) 25%

SP of the bat = Rs. 100

Gain = Rs. 20

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

$$\Rightarrow 20 = 100 - \text{CP}$$

$$\Rightarrow \text{CP} = 100 - 20 = \text{Rs. } 80$$

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

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

$$= 25\%$$

Q4

Answer :

(a) Rs. 180

SP of the racket = Rs. 198

Gain% = 10

$$\text{CP of the racket} = \left\{ \frac{100}{(100 + \text{Gain\%})} \times 100 \right\}$$

$$= \left\{ \frac{100}{(100 + 10)} \times 198 \right\}$$

$$= \frac{100}{110} \times 198$$

$$= \text{Rs. } 180$$

Q5

Answer :

Let the cost price be Rs. x .

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

$$\therefore \text{SP} = \left(x - \frac{x}{7} \right) = \text{Rs. } \frac{6}{7}x$$

Given:

$$\text{SP} = \text{Rs. } 144$$

$$\therefore \frac{6}{7}x = 144$$

$$\Rightarrow x = \frac{144 \times 7}{6} = \text{Rs. } 168$$

$$\therefore \text{CP} = \text{Rs. } 168$$

$$\text{SP} = \text{Rs. } 144$$

New SP = Rs. 189

$$\text{Gain} = \text{SP} - \text{CP} = \text{Rs. } (189 - 168) = \text{Rs. } 21$$

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

$$= \left(\frac{21}{168} \times 100 \right)\%$$

$$= 12.5\%$$

The correct answer is 12.5%.

All the given options are wrong.

Q6

Answer :

(d) Rs. 72

SP of the pen = Rs. 48

Loses = 20%

$$\begin{aligned}\text{Then, CP} &= \left\{ \frac{100}{(100 - \text{Loss \%})} \times \text{SP} \right\} \\ &= \left\{ \frac{100}{(100 - 20)} \times 48 \right\} \\ &= \text{Rs. 60}\end{aligned}$$

In order to gain 20%:

$$\begin{aligned}\text{SP} &= \left\{ \frac{(100 + \text{Gain \%})}{100} \times \text{CP} \right\} \\ &= \left\{ \frac{(100 + 20)}{100} \times 60 \right\} \\ &= \frac{120}{100} \times 60 \\ &= \text{Rs. 72}\end{aligned}$$

Q7

Answer :

(a) 20%

Let the cost price of each pencil be Rs. 1

Cost of 15 pencils = Rs 15

SP of 15 pencil = CP of 12 pencil = Rs 12

∴ CP = Rs 15

SP = Rs 12

$$\text{Loss} = \text{CP} - \text{SP} = \text{Rs } (15 - 12) = \text{Rs } 3$$

$$\begin{aligned}\text{Loss\%} &= \left(\frac{\text{Loss}}{\text{CP}} \times 100 \right)\% \\ &= \left(\frac{3}{15} \times 100 \right)\% \\ &= \frac{300}{15}\% \\ &= 20\%\end{aligned}$$

Q8

Answer :

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

Let the cost price of each toffee be Rs. 1

Cost price of three toffees = Rs 3

SP of three toffees = CP of four toffees = Rs 4

CP = Rs 3

SP = Rs 4

$$\text{Gain} = \text{SP} - \text{CP} = \text{Rs } (4 - 3) = \text{Rs } 1$$

$$\begin{aligned}\text{Gain\%} &= \left(\frac{\text{Gain}}{\text{CP}} \times 100 \right)\% \\ &= \left(\frac{1}{3} \times 100 \right)\% \\ &= \frac{100}{3}\% \\ &= 33\frac{1}{3}\%\end{aligned}$$

Q9

Answer :

(c) Rs. 176

SP of an article = Rs. 144

Loss% = 10

$$\begin{aligned} CP &= \left\{ \frac{100}{(100 - \text{Loss \%})} \times SP \right\} \\ &= \left\{ \frac{100}{(100 - 10)} \times 144 \right\} \\ &= \frac{100}{90} \times 144 \\ &= \frac{1440}{9} \\ &= \text{Rs. 160} \end{aligned}$$

In order to gain 10%:

$$\begin{aligned} S.P. &= \frac{(100 + \text{Gain \%})}{100} \times CP \\ &= \frac{(100 + 10)}{100} \times 160 \\ &= \frac{110}{100} \times 160 \\ &= \text{Rs. 176} \end{aligned}$$

Q10

Answer :

(a) 50%

CP of six lemons = Re 1

CP of one lemon = Rs $\frac{1}{6}$

CP of four lemon = Rs $\frac{4}{6}$

SP of four lemon = Re 1

$$\text{Gain} = 1 - \frac{4}{6} = \frac{2}{6} = \text{Rs } \frac{1}{3}$$

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

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

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

$$= 50$$

Q11

Answer :

(d)Rs. 600

SP of the chair = Rs 720

Gain% = 20

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

$$= \left\{ \frac{100}{120} \times 720 \right\}$$

$$= \frac{7200}{12}$$

$$= \text{Rs. 600}$$

Q12

Answer :

(c) Rs. 700

SP of a stool = Rs 630

Loss% = 10

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

$$= \left\{ \frac{100}{(100 - 10)} \times 630 \right\}$$

$$= \frac{100}{90} \times 630$$

$$\therefore \text{Rs. 700}$$