

11. PROFIT AND LOSS

IMPORTANT FACTS

COST PRICE: THE PRICE AT WHICH ARTICLE IS PURCHASED.ABBREVIATED AS C.P.

SELLING PRICE: THE PRICE AT WHICH ARTICLE IS SOLD.

PROFIT OR GAIN:IF SP IS GREATER THAN CP,THE SELLING PRICE IS SAID TO HAVE PROFIT OR GAIN.

LOSS: IF SP IS LESS THAN CP,THE SELLER IS SAID TO INCURED A LOSS.

FORMULA

1.GAIN=(SP)-(CP). 2.LOSS=(CP)-(SP).

3.LOSS OR GAIN IS ALWAYS RECKONED ON CP

4. GAIN % = {GAIN*100}/CP.

5.LOSS% = {LOSS*100}/CP.

6.SP = {(100+GAIN%) /100} *CP.

7.SP = {(100-LOSS%)/100} *CP.

8. { 100/(100+GAIN%) } *SP

9.CP = 100/(100-LOSS%)} *SP

10.IF THE ARTICLE IS SOLD AT A GAIN OF SAY 35%, THEN SP =135% OF CP

11.IF A ARTICLE IS SOLD AT A LOSS OF SAY 35%. THEN SP=65% OF CP.

12.WHEN A PERSON SELLS TWO ITEMS,ONE AT A GAIN OF X% AND OTHER AT A LOSS OF X%.THEN THE SELLER ALWAYS INCURES A LOSS GIVEN:

$$\{\text{LOSS}\% = (\text{COMMON LOSS AND GAIN})^2 / 10. = (X/10)^2$$

13.IF THE TRADER PROFESSES TO SELL HIS GOODS AT CP BUT USES FALSE WEIGHTS,THEN

$$\text{GAIN} = [\text{ERROR}/(\text{TRUE VALUE}) - (\text{ERROR}) * 100]\%$$

SOLVED PROBLEMS

ex.1 A man buys an article for rs.27.50 and sells it for rs.28.50. find his gain %.

$$\begin{aligned}\text{sol. cp} &= \text{rs} 27.50, \text{ sp} = \text{rs} 28.50 \\ \text{gain} &= \text{rs} (28.50 - 27.50) = \text{rs} 1.10 \\ \text{so gain\%} &= \{(1.10/27.50) * 100\} = 4\%\end{aligned}$$

Ex.2. If the a radio is sold for rs 490 and sold for rs 465.50.find loss%.

$$\begin{aligned}\text{sol. cp} &= \text{rs} 490, \text{ sp} = 465.50. \\ \text{loss} &= \text{rs} (490 - 465.50) = \text{rs} 24.50. \\ \text{loss\%} &= [(24.50/490) * 100]\% = 5\%\end{aligned}$$

Ex.3.find S.P when

$$\begin{aligned}\text{(i) CP} &= 56.25, \text{ gain} = 20\%. \\ \text{sol.} \\ \text{(i) SP} &= 20\% \text{ of rs } 56.25, = \text{rs} \{(120/100) * 56.25\} = \text{rs} 67.50. \\ \\ \text{(ii) CP} &= \text{rs } 80.40, \text{ loss} = 5\% \\ \text{sol: sp} &= 85\% \text{ of rs } 80.40 \\ &= \text{rs} \{(85/100) * 80.40\} = \text{rs } 68.34.\end{aligned}$$

ex.4 find cp when:

$$\begin{aligned}\text{(i)} \quad \text{sp} &= \text{rs } 40.60 : \text{ gain} = 16\% \\ \text{(ii)} \quad \text{sp} &= \text{rs } 51.70 : \text{ loss} = 12\% \\ \\ \text{(i)} \quad \text{cp} &= \text{rs} \{(100/116) * 40.60\} = \text{rs } 35. \\ \text{(ii)} \quad \text{cp} &= \text{rs} \{(100/88) * 51.87\} = \text{rs } 58.75.\end{aligned}$$

ex.5 A person incures loss for by selling a watch for rs1140.at what price should the watch be sold to earn a 5% profit ?

sol. let the new sp be rsx.then

$$\begin{aligned}(100 - \text{loss\%}) : (1^{\text{st}} \text{ sp}) &= (100 + \text{gain\%}) \frac{(2^{\text{nd}} \text{ sp})}{95} \\ \Rightarrow \{(100 - 5)/1140\} &= \{(100 + 5)/x\} \Rightarrow x = \{(105 * 1140)/95\} = 1260. \\ \Rightarrow\end{aligned}$$

ex.6 A book was sold for rs 27.50 with a profit of 10%. if it were sold for rs25.75, then what would be % of profit or loss?

$$\begin{aligned}\text{sol. SP} &= \text{rs } 27.50: \text{ profit} = 10\%. \\ \text{sol. CP} &= \text{rs} \{(100/110) * 27.50\} = \text{rs } 25. \\ \text{When sp} &= \text{Rs } 25.75, \text{ profit} = \text{Rs} (25.75 - 25) = \text{Rs } 0.75\end{aligned}$$

$$\text{Profit\%} = \{(0.75/25) * 100\}\% = 3\%$$

Ex7 .If the cost price is 96% of sp then whqt is the profit %

Sol. $sp=Rs100$: then $cp=Rs\ 96$:profit $=Rs\ 4$.

Profit $=\{(4/96)*100\}\%=4.17\%$

Ex.8. The cp of 21 articles is equal to sp of 18 articles.find gain or loss %

CP of each article be Rs 1

CP of 18 articles $=Rs18$,sp of 18 articles $=Rs\ 21$.

Gain $\%=[(3/18)*100]\%=50/3\%$

Ex.9 By selling 33 metres of cloth , one gains the selling price of 11 metres . Find the gain percent .

Sol:

$(SP\ of\ 33m)-(CP\ of\ 33m)=Gain=SP\ of\ 11\ m$

$SP\ of\ 22m = CP\ of\ 33m$

Let CP of each metre be Re.1 , Then, CP of 22m= Rs.22,SP of 22m=Rs.33.

Gain $\%=[(11/22)*100]\%=50\%$

Ex10 A vendor bought bananas at 6 for Rs.10 and sold them at Rs.4 for Rs.6 .Find his gain or loss percent .

Sol:

Suppose , number of bananas bought = LCM of 6 and 4=12

CP=Rs. $[(10/6)*12]=Rs.20$; SP= Rs $[(6/4)*12]=Rs.18$

Loss $\%=[(2/20)*100]\%=10\%$

Ex.11. A man brought toffees at for a rupee. How many for a rupee must he sell to gain 50%?

Sol. C.P of 3 toffees=Re 1; S.P of 3 toffees $=150\%$ of Re.1 $=3/2$.

For Rs. $3/2$, toffees sold $=3$, for Re.1, toffees sold $= [3*(2/3)] = 2$.

Ex. 12.A grocer purchased 80 kg of sugar at Rs.13.50 per kg and mixed it with 120kg sugar at Rs.16per kg. At what rate should he sell the mixer to gain 16%?

Sol .C.P of 200 kg of mixture = Rs. $(80 * 13.50+120*16) = Rs.3000$.

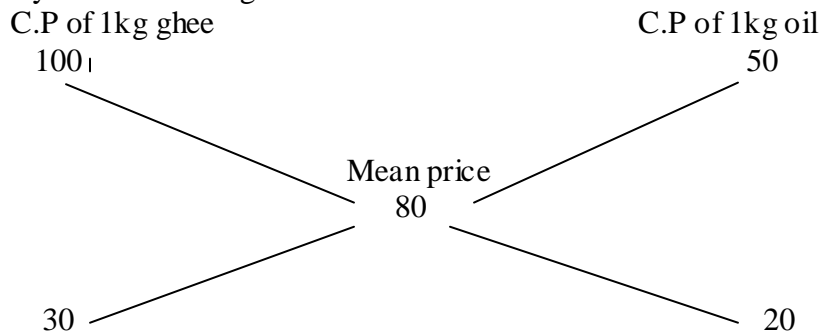
S.P $=116\%$ Of Rs.3000 $=Rs. [(116/100) *3000]=Rs.3480$.

\therefore Rate of S.P of the mixture $=Rs. [3480/200]$ per kg $=Rs.17.40$ per kg.

Ex.13. Pure ghee cost Rs.100 per kg. After adulterating it with vegetable oil costing Rs.50 per kg, A shopkeeper sells the mixture at the rate of Rs.96 per kg, thereby making a profit of 20%.In What ratio does he mix the two?

Sol. Mean cost price $=Rs. [(100/120)*96] =Rs.80$ per kg.

By the rate of allegation :



\therefore Required ratio = 30:20 = 3:2.

Ex. 14. A dishonest dealer professes to sell his goods at cost price but uses a weight of 960 gms for a kg weight . Find his gain percent.

Sol . Gain% = $\left[\frac{\text{Error}}{(\text{error value}) - (\text{error})} \times 100 \right] \% = \left[\frac{(40/960) \times 100}{6} \right] \% = 4 \frac{1}{6} \%$

Ex 15. If the manufacturer gains 10%,the wholesale dealer 15% and the retailer 25% ,then find the cost of production of a ,the retail price of which is Rs.1265?

Sol:

Let the cost of production of the table be Rs x

The ,125% of 115% of 110% of x=1265

$$\Rightarrow 125/100 \times 115/100 \times 110/100 \times x = 1265 \Rightarrow 253/160 \times x = 1265 \Rightarrow x = (1265 \times 160/253) = \text{Rs.}800$$

Ex16 . Monika purchased a pressure cooker at 9/10th of its selling price and sold it at 8% more than its S.P .find her gain percent.

Sol:

Let the s.p be Rs. X .then C.P = Rs.9x/10, Receipt=108% of rs.x=Rs 27x/25

Gain=Rs (27x/25*9x/10)=Rs(108x-90x/100)=Rs18x/100

Gain%=(18x/100*10/9x*100)%=20%

Ex .17 An article is sold at certain price. By selling it at 2/3 of its price one losses 10%,find the gain at original price ?

sol:

let the original s.p be Rs x. then now S.P=Rs2x/3, loss=10%

now C.P=Rs20x/27*27/20x*100)%=35%

Ex .18. A tradesman sold an article at a loss of 20%.if the selling price has been increased by Rs100,ther would have been a gain of 5%.what was the cost price of the article?

Sol:

Let C.P be Rs x. then $(105\% \text{ of } x) - (80\% \text{ of } x) = 100$ or $25\% \text{ of } x = 100$

$$\Rightarrow x/4 = 100 \text{ or } x = 400$$

$$\Rightarrow \text{so, C.P} = \text{Rs } 400$$

Ex 19. A man sells an article at a profit of 25% if he had bought it 20% less and sold it for Rs 10.50 less, he would have gained 30% find the cost price of the article.

Sol:

Let the C.P be Rs x

$$1^{\text{st}} \text{ S.P} = 125\% \text{ of } x = 125x/100 = 5x/4; 2^{\text{nd}} \text{ S.P} = 80\% \text{ of } x = 80x/100 = 4x/5$$

$$2^{\text{nd}} \text{ S.P} = 130\% \text{ of } 4x/5 = (130/100 * 4x/5) = 26x/25$$

$$\Rightarrow 5x/4 - 26x/25 = 10.50 \Leftrightarrow x = (10.50 * 100) / 21 = 50$$

hence C.P = Rs.50

Ex 20. The price of the jewel, passing through three hands, rises on the whole by 65%. if the first and the second sellers 20% and 25% profit respectively find the percentage profit earned by the third seller.

Sol:

Let the original price of the jewel be Rs p and let the profit earned by the third seller be x%

Then, $(100+x)\%$ of 125% OF 120% OF $P = 165\%$ OF P

$$\Rightarrow ((100+X)/100 * 125/100 * 120/100 * P) = (165/100 * P)$$

$$\Rightarrow (100+X) = (165 * 100 * 100) / (125 * 120) = 110 \Rightarrow X = 10\%$$

Ex21 . A man 2 flats for Rs 675958 each. on one he gains 16% while on the other he losses 16%. How much does he gain/loss in the whole transaction?

Sol:

In this case there will be always loss. The selling price is immaterial

$$\text{Hence, loss \%} = (\text{common loss and gain \%})^2 / 10 = (16/10)\% = (64/25)\% = 2.56\%$$

Ex.22. A dealer sold three-fourth of his article at a gain of 20% and remaining at a cost price. Find the gain earned by him at the two transaction.

Sol:

Let the C.P of the whole be Rs x

C.P of $\frac{3}{4}^{\text{th}}$ =Rs $\frac{3x}{4}$, C.P of $\frac{1}{4}^{\text{th}}$ =Rs $\frac{x}{4}$

$$\Rightarrow \text{total S.P} = \text{Rs} [(120\% \text{ of } \frac{3x}{4}) + \frac{x}{4}] = \text{Rs} (\frac{9x}{10} + \frac{x}{4}) = \text{Rs} \frac{23x}{20}$$

$$\Rightarrow \text{gain} = \text{Rs} (\frac{23x}{20} - x) = \text{Rs} \frac{3x}{20}$$

$$\Rightarrow \text{gain}\% = \frac{3x}{20} \times \frac{1}{x} \times 100 = 15\%$$

Ex 23 ..A man bought a horse and a carriage for Rs 3000.he sold the horse at a gain of 20% and the carriage at a loss of 10%,thereby gaining 2% on the whole.find the cost of the horse.

Sol:

Let the C.p of the horse be Rs.x, then C.P of the carriage =Rs(3000-x)

$$20\% \text{ of } x - 10\% \text{ of } (3000 - x) = 2\% \text{ of } 3000$$

$$\Rightarrow \frac{x}{5} - \frac{(3000 - x)}{10} = 60 \Rightarrow 2x - 3000 + x = 600 \Rightarrow 3x + 3600 \Rightarrow x = 1200$$

$$\Rightarrow \text{hence, C.P of the horse} = \text{Rs } 1200$$

Ex 24 find the single discount equivalent to a series discount of 20% ,10% and 5%'

sol:

let the marked price be Rs 100

then ,net S.P=95% of 90% of 80% of Rs 100

$$= \text{Rs} (\frac{95}{100} \times \frac{90}{100} \times \frac{80}{100} \times 100) = \text{Rs } 68.40$$

Ex .25 After getting 2 successive discounts, a shirt with a list price of Rs 150 is available at Rs 105. If the second discount is 12.55,find the first discount.

Sol:

Let the first discount be x%

Then, 87.5% of (100-x)% of 150 = 105

$$\Rightarrow 87.5/100 * (100-x)/100 * 150 = 105 \Rightarrow 105 \Rightarrow 100-x = (105 * 100 * 100) / (150 * 87.5) = 80$$

$$\Rightarrow x = (100 - 80) = 20$$

$$\Rightarrow \text{first discount} = 20\%$$

Ex .26 An uneducated retailer marks all its goods at 50% above the cost price and thinking that he will still make 25% profit, offers a discount of 25% on the marked price. what is the actual profit on the sales?

Sol:

Let C.P = Rs 100. then, marked price = Rs 150

S.P = 75% of Rs 150 = Rs 112.50

Hence, gain% = 12.50%

Ex27 .A retailer buys 40 pens at the market price of 36 pens from a wholesaler ,if he sells these pens giving a discount of 1% ,what is the profit % ?

sol:

let the market price of each pen be Rs 1

then, C.P of 40 pens = Rs 36 S.P of 40 pens = 99% of Rs 40 = Rs 39.60

$$\text{profit \%} = ((39.60 * 100) / 36) \% = 110\%$$

Ex 28 . At what % above C.P must an article be marked so as to gain 33% after allowing a customer a discount of 5%?

Sol

Let C.P be Rs 100.then S.P be Rs 133

Let the market price be Rs x

Then 90% of x=133=> $95x/100=133$ => $x=(133*100/95)=140$

Market price = 40% above C.P

Ex .29 . When a producer allows 36% commission on retail price of his product, he earns a profit of 8.8%. what would be his profit % if the commision is reduced by 24%?

Sol:

Let the retail price =Rs 100.then, commission=Rs 36

S.P=Rs(100-36)=Rs 64

But, profit=8.8%

C.P=Rs($100/108.8*64$)=Rs 1000/17

New commission =Rs12. New S.P=Rs(100-12)Rs 88

Gain=Rs($88-1000/17$)=Rs 496/17

Gain%=($496/17*17/1000*100$)%=49.6%

