



TOPIC- Profit and Loss

Sub: Mathematics

Class: 9

STUDY MATERIAL -6

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DEFINITIONS :

1. The price at which an article is bought is called **Cost Price (CP)**.
2. The price at which an article is sold is called **Selling Price (SP)**.
3. When the selling price is greater than the cost price, the difference is termed as **Profit or Gain**.
PROFIT = SP - CP
OR SP = CP + PROFIT and CP = SP - PROFIT.
4. When the selling price is less than the cost price, the difference is termed as **LOSS**.
LOSS = CP - SP
Or SP = CP - LOSS and CP = SP + LOSS.
5. The amount of profit on cost price of Rs 100 is called **profit percent**.
6. The amount of loss on cost price of Rs 100 is called **loss percent**.
7. Price indicated for selling of goods is called **marked price**

Determination of selling price :

- (i) The selling price at x% profit = $CP \times (100 + \text{profit}\%) / 100$.
- (ii) The selling price at x% loss = $CP \times (100 - \text{loss}\%) / 100$

Determination of cost price :

- (i) The cost price at x% profit = $SP \times 100 / (100 + \text{profit}\%)$.
- (ii) The cost price at x% loss = $SP \times 100 / (100 - \text{loss}\%)$.

Determination of profit percent :

- (i) Profit % = $(\text{total profit}) \times 100 / CP$.

Determination of loss percent :

- (i) Loss % = $(\text{total loss}) \times 100 / CP$.

Determination of selling price :

- (i) $SP = \text{Marked price} \mp \text{Commission or Discount.}$
- (ii) $SP = \text{Marked price} - (\text{marked price}) \cdot (x/100)$ [when a discount of $x\%$ is allowed on marked price].

SOLVED SUMS :

1. If the ratio of CP and SP is 25:26 then what is the percentage of profit ?

Ans : Let CP = $25x$ and SP = $26x$.

Therefore profit = $26x - 25x = x$.

Therefore profit% = $(x) \cdot 100 / 25x$
= 4

Hence profit % is 4%.

2. A man gets the cost price of 120 mangoes by selling 110 mangoes What is his profit percent ?

Ans : Let the CP of one mango be x .

Therefore CP of 120 mangoes = $120x$.

B.T.P. the SP of 110 mangoes is $120x$.

Therefore SP of 1 mango is $120x/110 = 12x/11$.

Since $12x/11 > x$ ie $SP > CP$.

Therefore by selling 1 mango the profit is $(12x/11 - x) = x/11$.

Hence the profit % = $(x \cdot 100) / (11x) = 100/11 \%$

3. If at the cost price of 4 oranges, 5 oranges are sold then what will be the profit or loss of the seller ?

Ans : L.C.M. of 4 and 5 is 20.

Let the CP of 4 oranges be $20x$.

Therefore CP of 1 orange is $20x/4 = 5x$.

Again SP of 5 oranges is $20x$.

Therefore SP of 1 orange is $20x/5 = 4x$.

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

Now $loss = 5x - 4x = x$.

Hence $loss \% = \frac{x \cdot 100}{5x} = 20\%$.

4. There is a discount of 15% if the electric bill is paid in time. Tom paid bill in time and got a discount of Rs 54. What is the amount of his electric bill?

Ans : If the amount of electric bill is Rs 100, then the discount is Rs 15.

Therefore discount is Rs 15 if electric bill is Rs 100.

So if discount is Rs 54, the electric bill will be $(100 \times 54) / 15 = \text{Rs } 360$.

5. A fruit seller purchased banana at Rs 30 per dozen and sold each pair at Rs 7. What is his profit percentage ?

Ans : Cost price of 12 banana is Rs 30.

Sell price of 2 bananas is Rs 7

Therefore selling price of 12 bananas = $(7 \times 12) / 2 = \text{Rs } 42$

Hence profit = $\text{Rs}(42 - 30) = \text{Rs } 12$.

Therefore profit % = $(12 \times 100) / 30 = 40\%$.

6. In what ratio should the Darjeeling tea at Rs 320 per Kg be mixed with Assam tea at Rs 250 per Kg so that there is an overall profit of 20% after selling the mixed tea at Rs 324 per Kg ?

Ans : Let with x Kg Darjeeling tea, 1Kg of Assam tea is mixed.

Therefore total quantity of mixed tea is $(x+1)$ Kg.

CP of mixed tea = $\text{Rs } (320x + 250)$.

SP of mixed tea = $\text{Rs } (x+1) \times 324$.

Since there is a 20% profit,

Therefore SP of mixed tea = $\text{Rs } (320x + 250) \times 120 / 100$.

$$\text{B.T.P. } (320x + 250) \times 120 / 100 = (x+1) \times 324$$

$$\text{Or } 6(320x + 250) = 5 \times 324 (x+1)$$

$$\text{Or } 1920x - 1500 = 1620x + 1620$$

$$\text{Or } 1920x - 1620x = 1620 + 1500$$

$$\text{Or } 300x = 3120$$

$$\text{Or } x = 3120/300 = 10.4$$

Therefore the required ratio $x:1 = 10.4:1 = 104:10 = 26:2.5$.

7. An egg seller bought 100 eggs at the rate Rs10 per pair. But at the time of selling he found that 6 eggs were broken and 4 eggs were rotten. What will be the percentage of profit or loss of the egg if he sells the remaining eggs at Rs 12 per pair ?

Ans : The cost of 100 eggs at the rate of 10 per pair = Rs $(10 \times 100)/2 =$ Rs 500.

Since , 6 eggs were broken and 4 eggs were rotten,
Therefore the number of eggs the seller sold $= (100 - 6 - 4) = 90$ eggs.

Now selling price of 90 eggs at the rate Rs12 per pair = Rs $(90 \times 12)/2 =$ Rs 540.

Since cost price =Rs500 and selling price = Rs540,
Therefore profit =Rs $(540 - 500) =$ Rs 40.

Hence profit percentage $= (40 \times 100)/500 = 8\%$.
Therefore the profit of egg seller is 8%.

8. A book seller allowing 12% discount on the marked price of a book made a profit of 10%. What will be his percentage of profit if he sells the book at the marked price ?

Ans : Let the marked price of the book =Rs 100.

At 12% discount the selling price of the book =Rs $(100 - 12) =$ Rs 88.

Now selling at Rs 88 there is a profit of 10%.

If selling price is Rs 110 then the cost price is Rs 100.

If selling price is Rs 88 then cost price is Rs $(100 \times 88)/110 =$ Rs 80.

Therefore selling at marked price ie Rs 100 the profit of the book seller is Rs $(100 - 80) =$ Rs20.

Hence the seller's profit percentage $(20 \times 100)/80 = 25\%$.

Therefore selling at marked price the seller will make a profit of 25%.

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