



CHAPTER

1

Profit and Loss

INTRODUCTION

Profit is an additional amount which a customer pays in return for buying an item that is owned by someone else.

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

Where SP is the selling price, that is, the price at which the item is sold, and CP is the cost price, that is, the price at which it was originally manufactured or purchased by the seller.

When profit is expressed as a percentage of the CP, it is known as profit %. Therefore,

$$\text{Profit \%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100$$

$$\text{Profit\%} = \left(\frac{\text{SP}}{\text{CP}} - 1 \right) \times 100$$

Sometimes, the product is sold at a price lower than the CP. This is called as loss.

Loss can be written either (CP-SP) in which case it has a positive sign or (SP-CP) in which case it will have a negative. So, less = SP-CP

$$\text{Loss \%} = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100$$

$$\text{Loss \%} = \left(1 - \frac{\text{SP}}{\text{CP}} \right) \times 100$$

Key: Profit or loss % is always expressed as a percentage of the CP.

When the absolute is expressed as a percentage of the SP, it is known as margin %. Therefore,

$$\text{Margin \%} = \frac{SP - CP}{SP} \times 100$$

$$\text{Margin \%} = \left(1 - \frac{CP}{SP}\right) \times 100$$

Usually margin is not used in our calculations. Margin is used to present a lower value of profit because margin % as a value is being calculated on a higher base, that is, SP, and therefore the value of margin % is always lower than profit %.

Let us try to understand through an example.

EXAMPLE 1

If the CP is Rs. 200 while the SP is Rs. 250, find the value of profit % and margin %.

Solution: It is given that the CP is Rs. 200 while the SP is Rs. 250. Therefore,

$$\text{Profit \%} = \frac{250 - 200}{200} \times 100 = 25\%$$

$$\text{Margin \%} = \frac{250 - 200}{250} \times 100 = 20\%$$

Let us try to understand the different components in a selling process, which is the essence of the entire concept of profit and loss.

First of all, we have the CP. This price is increased by a particular percentage to arrive at the Market Price (MP).

The MP is also called the list price or the maximum retail price (MRP). One can also say that MP is the price at which the seller intends to sell the product.

The percentage by which the CP is increased to arrive at the MP is called the Mark-up%. Therefore, mathematically,

$$MP = \frac{CP(100 + \text{markup}\%)}{100}$$

Key: Mark-up% is always applicable on the CP.

Now the customer comes and a negotiation happens between the buyer and the seller. The seller may decide to offer certain reduction in the MP. This reduction is called discount. Discount is a value that is reduced from the MP to arrive at the SP. Therefore, mathematically,

$$SP = \frac{MP(100 - \text{discount}\%)}{100}$$

Key: Discount is always calculated as a percentage of the MP.

The relation between cost, marked and selling price is represented graphically in Figure 1.1.

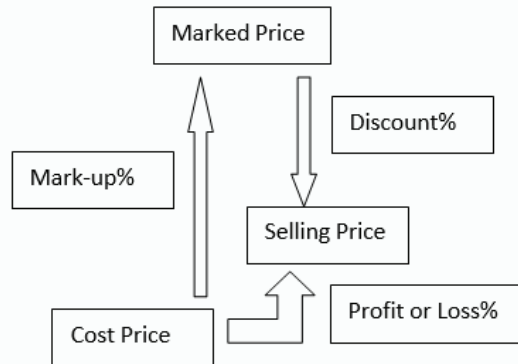


Figure 1.1 Overall process of sale.

Let us look at some examples involving the basic concept of profit, loss and discount (PLD).

EXAMPLE 2

If the CP is Rs. 150 and the SP is Rs. 160, find the profit %.

Solution: It is given that the CP and SP are Rs. 150 and Rs. 160, respectively. Therefore,

$$\text{Profit \%} = \frac{160 - 150}{150} \times 100 = \frac{1}{15} \times 100 = \frac{20}{3} = 6.66\%$$

EXAMPLE 3

If the SP is Rs. 200 and profit is Rs. 50, find the profit %.

Solution: It is given that the SP is Rs. 200 while the profit is Rs. 50. Therefore, SP = Rs. 200, Profit

= Rs. 50, therefore, CP = Rs. 150.

$$\text{Profit\%} = \frac{50}{150} \times 100 = \frac{100}{3} = 33.33\%$$

EXAMPLE 4

If the SP is Rs. 240 and profit is 20%, find the absolute value of profit.

Solution: Now as per the concept,

$$CP \times \frac{100 + 20}{100} = 240$$

Or

$$CP \times \frac{120}{100} = Rs.240 \Rightarrow CP = Rs.200$$

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COMMON UNIVERSITY ENTRANCE TEST- EXAM CONDUCTED BY NTA

A shop displays a sign of 'Buy 3, get 1 free'. Find the discount % offered in the sale.

Solution: Many students make the mistake of calculating the above as a discount of 1 on purchase of 3 items and therefore a discount of 33.33%.

WHY IS THIS INCORRECT?

When we say that the discount is 1 on 3, we are calculating the discount on the SP whereas discount is to be always calculated on the MP.

In this problem, the discount is 1 but on a price of 4 items, and therefore the applicable discount will be $\frac{1}{4}$, that is, 25%.

IMPORTANT POINT'S AND FORMULAE

1. Profit or Loss % = $\left(\frac{SP - CP}{CP}\right) \times 100$ or $\left(\frac{CP - SP}{CP}\right) \times 100$

2. Profit or loss % is always calculated as a % of cost price (CP).

3. If profit % is expressed as a % of the selling price (SP), it is called as margin %.

4. While the mark-up is always calculated as a % of the cost price, discount % is always calculated as a % of the marked price.

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

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

7. The profit % or the loss % in any case is the successive effect of the mark-up % and the discount %.

8. If the CP of x items = SP of y items, then

$$\text{Percentage profit or loss} = \left(\frac{x - y}{y}\right) \times 100$$

9. If two items are sold for Rs. X each, the first one at a profit of P% and the other at a loss of P%, then the overall

loss will be = $\left(\frac{P^2}{100}\right)$

10. The percentage profit is equal to the percentage of impurity added if the items is sold at cost price and the impurity added is free of cost.

11. When the CP and SP are either both increased or both decreased by the same %, there is no change in the existing % profit or loss.