



Content

S. No.	Concept
1	Profit and Loss
2	Percentage of Profit and Loss
3	Markup, Marked Price and Discount Price
4	Simple and Compound Interest
5	Quiz Questions

- **Price:**

- Price is the **fixed amount** assigned for a product



Different types of prices are:

(i) Cost Price

(ii) Selling Price

Cost Price and Selling Price:



Ram, the fruit stall owner buys fruits from the wholesale market and sells it in his shop.

On a particular day, he buys apples, mangoes, oranges and bananas. Each fruit has two prices, one at each shop, as shown in the price list.

The price at which Ram buys the fruit at the market is called the **Cost Price(C.P.)**.

The price at which he sells the fruit in his stall is called the **Selling Price (S.P.)**.

Cost Price and Selling Price:

Cost Price (C.P.):

The price, at which a product is purchased, is called its cost price.

Cost price (C.P) includes **2 types** of cost.
They are ***production cost and additional cost***.

Production cost :

The cost incurred by the manufacturer while producing a product is known as production cost

Examples : Electricity charges in the factory, machinery cost (machine used for producing the product), wages paid to the daily labor, etc.

Additional cost :

Examples : transportation, packaging, salary to staff and sales man, advertisement expenditure, etc.,

Therefore,

Cost price(C.P) = Production cost + additional cost.

Selling Price (S.P.):

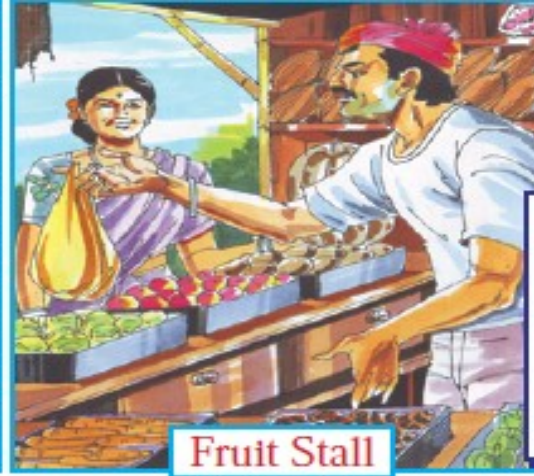
The price, at which a product is sold, is called its selling price.

Profit and Loss:

PRICE LIST	
Mango	₹10 each
Apple	₹6 each
Banana	₹3 each
Orange	₹5 each



Wholesale Market



Fruit Stall

PRICE LIST	
Mango	₹15 each
Apple	₹8 each
Banana	₹2 each
Orange	₹5 each

From the price list, we can say that the selling price of the apples and the mangoes in the shop are greater than their respective cost price in the whole sale market.

(i.e.) the shopkeeper gets some amount in addition to the cost price. This additional amount is called the **profit**.

Selling Price of mango = Cost Price of mango + Profit

Thus, Profit = Selling Price – Cost Price

As we know, bananas get rotten fast, the shop keeper wanted to sell them without wasting them. So, he sells the bananas at a lower price (less than the cost price). The amount by which the cost is reduced from the cost price is called **Loss**.

S.P. of the banana = C.P. of the banana – Reduced amount

Thus, Loss = Cost Price – Selling Price

Profit / Gain:

If *Selling price is greater than cost price*, then the product is sold at a profit.

Therefore, **Selling price(S.P) – Cost price(C.P) = Profit**

Loss:

If *Cost price is greater than the selling price*, then the product is sold at a loss.

Therefore, **Cost price(C.P) – Selling price(S.P) = Loss.**

Thus giving any two values in the above equations, we can find the value of the other.

Example: A dealer bought a Air cooler set for Rs.8,000 and sold it for 9,500. Find the profit / loss made by him for 1 Air cooler set. If he had sold 5 Air cooler sets, find the total profit/loss.

Selling Price of the Air cooler set = Rs.8,000

Cost Price of the Air cooler set = Rs.9,500

S.P. > C.P, there is a profit

Profit = S.P. – C. P.

= 9,500 – 8000

Profit = Rs.1,500

Profit on 1 Air Cooler set = Rs.1,500

Profit on 5 Air Cooler sets = 1500 × 5

Profit on 5 Air Cooler sets = 7,500

Example :If the product has production cost is \$ 1200, advertising expenditure is \$ 400, Packaging \$ 250, Salary to salesman \$ 700.

Find the profit or loss of that product, when

(i)Selling price is \$ 2800 and

(ii)Selling is \$ 2150.

Given: Production cost and Additional cost of the product.

To Find: The profit or loss of that product in certain condition

Solution: First let us find the cost price of the product.

Cost price = Production cost + additional cost

Production cost = \$ 1200

Additional cost = advertising expenditure + Packaging + Salary to salesman

$$= 400 + 250 + 700$$

$$= \$ 1350$$

Therefore,

$$\text{Cost price} = 1200 + 1350 = \$ 2550$$

Case (i)

Selling price(S.P) = \$ 2800

Cost price (C.P)= \$ 2550

Selling price is greater than cost price, therefore

$S.P - C.P = \text{Profit}$

$$\rightarrow \text{Profit} = 2800 - 2550 = \$ 250$$

Case (ii)

Selling price(S.P) = \$ 2150

Cost price (C.P)= \$ 2550

Cost price is greater than Selling price, therefore

Percentage of Profit and Loss:

Profit percentage is always calculated with respect to cost price.

$$\text{Profit percentage} = \left[\frac{\text{Profit}}{\text{Cost price}} \right] \times 100$$

Where, profit = Selling price – Cost price.

Therefore,

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

Similarly we can calculate the **loss percentage** with respect to cost price.

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

Note:

$$1. \text{S.P} = \left[\frac{(100 + \text{Profit \%})}{100} \right] \times \text{C.P}$$

$$2. \text{S.P} = \left[\frac{(100 - \text{Loss \%})}{100} \right] \times \text{C.P}$$

$$3. \text{C.P} = \left[\frac{100}{(100 + \text{Profit \%})} \right] \times \text{S.P}$$

$$4. \text{C.P} = \left[\frac{100}{(100 - \text{Loss \%})} \right] \times \text{S.P}$$

Example: A dealer buys 20 balls at a cost of \$ 500. He sells a ball for \$ 20. Find profit or loss of a ball as a percentage of cost.

Given : Cost price of 20 balls = \$500 and Selling price of 1 ball = \$20

To Find : Percentage of profit or loss

Solution : Cost price of 1 ball = $\$500/20 = \25

Here, **Cost price > Selling price**

Therefore, Percentage of loss = $[(C.P - S.P) / C.P] \times 100$
 $= [(25 - 20) / 25] \times 100 = \mathbf{20\%}$.

Example: A shopkeeper expects a gain of 18.5% on his cost price. If in a week, his sale was of Rs. 760, what was his profit?

Given: Selling Price of the product = 760 Profit percentage = 18.5

To Find: The Profit amount

Solution: We can directly use the formula to find the cost price,

$$C.P = [100/(100 + \text{Profit \%})] \times S.P$$

$$C.P = [100/(100+18.5\%)] \times 760 = 0.844 \times 760 = 641.44$$

$$\text{Profit amount} = \text{Selling Price} - \text{Cost Price} = 760 - 641.44 =$$

Example: Find the loss as a percentage of cost, if the cost of the product is \$25 and the selling price is \$10?

Given: Cost of the product = \$25 and Selling price = \$10

$$\text{Loss} = 25 - 10 = \$15$$

$$\text{Loss percentage} = [\text{loss} / \text{cost price}] \times 100$$

$$= [15/25] \times 100 = 60\%$$

$$\text{Loss percentage} = 60\%$$

Example: A school bookshop sells outdated text book for \$49.35, making a 6% loss. What was the cost price of the book, and what was the cash value of the loss?

Given : Selling price = \$49.35 and Loss percentage = 6%

To Find : Cost price and Loss in \$ value

Solution: Loss Percentage = $[(C.P - S.P) / C.P] \times 100$

$$C.P = (49.35) / (0.94)$$

$$\text{Cost Price} = \$52.50$$

Loss in \$ value

$$\text{Loss} = \text{Cost price} - \text{Selling price} = \$52.50 - \$49.35 = \$3.15$$

Example: A man sells two mobile phones at \$594 each. On one he gains 10% and on the other he loses 10%. Find his gain or loss percent on the whole.

Given : S.P. of the first mobile phone = \$594, Gain% = 10%
and S.P. of the second mobile phone = \$594. Loss% = 10.

To find: Net Loss or gain percent on the whole.

Solution:

Profit of the first mobile phone = 10% (C.P of the first mobile phone)

Percentage of profit = $[(S.P - C.P) / C.P] \times 100$

$$10 = (594 - C.P) / C.P \times 100$$

$$C.P = 540$$

Loss of the second mobile phone = 10% (C.P of the second mobile phone)

Percentage of loss = $[(C.P - S.P) / C.P] \times 100$

$$10 = (C.P - 594) / C.P \times 100$$

$$C.P = 660$$

To say whether there was an overall Profit or Loss, we need to find the combined C.P. and S.P.

$$\text{Total C.P. of the two watches} = 540 + 660 = \$1,200.$$

$$\text{Total S.P. of the two watches} = 594 + 594 = \$1,188.$$

$$\text{Net Loss} = 1,200 - 1,188 = \$12.$$

$$\text{Loss\%} = [\text{Loss} / \text{C.P.}] \times 100$$

$$\text{Loss\%} = 12 / 1200 \times 100 = 1\%$$

Mark up, Marked Price and Discount:

Mark up:

A markup is added on to the total cost incurred by the producer of a good or service in order to create a profit.

When profits are based on cost, profit is commonly referred to as **mark up** over selling price, and the percent profit on cost is called **percent markup** to distinguish it from *percent profit* (i.e., on selling price). Hence, markup can be expressed as a fixed amount or as a percentage.

There are two types of markup's.

- (i) Initial markup
- (ii) Additional markup.

Initial Markup: Initial markup, is nothing but the profit.

Its an addition made to the cost for fixing the selling price.
It is the difference between the cost price and the selling price.
If it is the initial markup, **selling price can be called as markup price(Marked Price).**

Additional Markup : It is the markup on the original selling price.
This happens with respect to the retailer.

Example: An item with a cost of \$10 might normally be priced at \$15.
This means, initial markup is $\$15 - \$10 = \$5$
If there is a shortage of this item and if high demand exist, the retailer sets a selling price of \$17.
Therefore the additional markup is \$2.

Marked Price and Discount:

Nancy went to shop to purchase a frock. She entered the shop and purchased frock. The price labelled on the frock was Rs.550. This Price is called Marked Price.

She gave the shopkeeper Rs.550. But the shopkeeper returned the balance amount and informed her that there is a discount of 20%.

Here, 20% discount means, 20% discount on the Marked Price.

$$\text{Discount} = 20\% \times 550 = 110$$



Marked price:

The price which is marked on or attached to an article for sale is called marked price.

Discount:

Discount is the reduction on the Marked Price. Discount is a selling strategy adopted by the seller for attracting the customer. Usually discount will be represented in the form of percentage.

Note :

- 1) Discount Amount = Marked Price \times Discount Percentage
- 2) Marked Price = Selling Price + Discount Amount
- 3) Selling Price = Marked Price – Discount Amount
= Marked Price – Marked Price \times Discount Percentage
= Marked Price (1 – Discount Percentage)
- 4) Markup = Marked Price (Markup price) – Cost price.
- 5) Markup ratio = Markup / Cost Price
- 6) If there is no discount (that is discount = 0 (zero)),
then Marked Price = Selling Price.
In that case, Markup = Selling Price – Cost Price

Example : A computer software retailer used a markup rate of 40%. Find the selling price of a computer game that cost the retailer \$25.

Given: Markup rate = 40%, Cost Price = \$25.

To Find: Selling Price of the product.

Solution: The markup is 40% of the \$25 cost, so the markup is

Markup = Markup rate x cost price.

$$(0.40)(25) = \mathbf{\$10}$$

Then the selling price, Selling price = Mark up + Cost Price = 25 + 10 = 35

Hence, The item sold for **\$35**.

Example: A shopkeeper allows a discount of 10% to his customers and still gains 20%. Find the marked price of an article which costs Rs.450 to the shopkeeper.

Given: C.P is 450, discount is 10% and the profit is 20%

To find: Marked Price of an article

Solution:

Profit = 20% of C.P

Profit = $20/100 \times 450 = 90$

S.P = C.P + Profit

S.P = $450 + 90 = 540$

Discount = 10% of Marked Price(M.P)

Selling Price = Marked Price – Discount

S.P = M.P – 10%MP = 90% x M.P

M.P = $540/90\% = \text{Rs.}600$

Hence the marked price of an article is Rs.600

Example: A Laptop set was sold for Rs.44,400 after giving successive discounts of 10% and 20% respectively. What was the approximate value of marked price?

Given: Selling Price of Laptop = 44,400

First Discount = 10%

Second Discount = 20%

To Find: The Marked price of the Laptop

Solution:

Let the Marked Price of the Laptop = X

After the first Discount, the price will be = $X - 10\%X = 90\%X$

After the second Discount, the price will be = $90\%X - 20\%(90\%X)$

$$= 90/100 \times X - 20/100 \times 90/100 \times X$$

$$= 90/100 \times X - 18/100 \times X$$

$$= 72/100 \times X$$

The price of the Laptop after the second Discount is nothing but the marked price of the Laptop.

$$44,400 = 72/100 X$$

$$X = 61,666.666667$$

Example: A dealer buys an article for Rs.1,600 and marks it 30% above the Cost Price. He then sells it after allowing a discount of 20%. Find the Selling Price and profit percent.

Given: C.P = 1,200, Markup = 30%C.P and Discount = 20%

To Find: S.P and profit percent of the article.

Solution:

Markup = 30% of C.P = $30/100 \times 1,600 = 480$

Marked Price = Cost price + Markup = $1,600 + 480 = 2080$

Discount = 20% x Marked Price = $20/100 \times 2080 = 416$

Selling Price = Marked Price – Discount

= $1560 - 312$

= 1664

Simple and Compound Interest:

Interest:

When we borrow (or lend) money we pay (or receive) some additional amount in addition to the original amount. This additional amount that we receive is termed as **Interest (I)**.

There are two types of Interest:

(i) Simple Interest

(ii) Compound Interest

Simple Interest:

Simple interest is calculated on the **original principal only**. Accumulated interest from prior periods is not used in calculations for the following periods.

Simple Interest (S.I) = $\frac{PNR}{100}$

Total value (A) = Principal amount + Interest

$$A = P + \frac{PNR}{100} = P(1 + \frac{NR}{100})$$

where,

A- Value of the investment (total amount needed to be paid by the borrower)

P- Principal (original amount borrowed or loaned)

R- Interest rate for one period

N- Number of periods(in years)

Example: Sonu barrowed Rs.6000 on 10th June 2011 and returned it on 22nd August 2011. Find the amount he paid, if the interest is calculated at 5% per annum.

Given: Principal amount =6000, Rate of Interest = 5%

To find: Total amount needed to be paid by Sonu.

Solution:

Number of days, June = $20(30-10)$, [Since the number of days in June=10]

July = 31 [Since the number of days in July=31]

August=22

Total number days = $20+31+22 = 73$ days

No. of years (N)= $73/365 = 1/5$ years

Simple interest (SI) = $PNR/100 = 6000 \times 1/5 \times 5/100 = 60$

Required Amount = $6000 + 60 = \text{Rs. } 6060$

Example: A certain sum of money amounts to Rs.7,335 in 7 years and Rs.6,525 in 5 years respectively. Find the principal and rate percent.

Given: Value of investment after 7 years is 7335 and value of investment after 5 years is 6525.

To Find: Principal amount and rate of interest of the investment.

Solution:

Amount at the end of 7 years = Principal + interest for 7 years

Amount at the end of 5 years = Principal + Interest for 5 years
 $= P + I_5 = 6525$

Interest amount for two years = $I_2 = 7335 - 6525 = 810$

Interest for 1 year = $810/2 = 405$

Hence, Interest at the end of 7 years = $405 \times 7 = 2835$

Amount at the end of 7 years = Principal amount + Interest for 7 years

$A = P + I_7$

$7335 = P + 2835$

Principal Amount = 4500

Rate of Interest (R) = $S.I \times 100/PN = 405 \times 100/4500 \times 1 = 9\%$

Rate of Interest R = 9%

Compound Interest:

Compound interest is calculated each period on the **original principal and all interest accumulated during past periods**. This addition of interest to the principal is called **compounding**.

Although the interest may be stated as a yearly rate, the compounding periods can be yearly, semiannually, quarterly, or even continuously.

Compound Interest Formula:

$$\text{Compound Interest (CI)} = A - P$$

Where,

$$A = P \left(1 + \frac{r}{100n} \right)^{nt}$$

P = principal amount (initial investment)

r = annual interest rate (percentage)

n = number of times the interest is compounded per year

t = number of years the amount is deposited or borrowed for

A = amount after time t, including interest.

Example: Find the compound interest on Rs.3000 at the rate of 10% per annum for 18 months when interest is compounded half-yearly.

Given: Principal amount = 3000, Rate of interest = 10%.
Amount is compounded for 18 months, when interest is compounded half-yearly.

To Find: We have to find the compound interest.

Solution:

$$A = P \left(1 + \frac{r}{100n} \right)^{nt}$$

$n = 2, t = 18 \text{ months} = 18/12 \text{ years} = 3/2 \text{ years}$

$$A = 3000 \left(1 + \frac{10}{2 \times 100} \right)^{2 \times 3/2}$$

$$A = 3000 \left(\frac{21}{20} \right)^3$$

$$A = 3000 \left(\frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} \right)$$

$$A = 3472.875$$

$$CI = A - P = 3472.875 - 3000 = 472.875$$

Example: In how much time will a sum of Rs.1600 amount to Rs.1852.20 at 5% per annum compound interest.

Given: Principal amount (P) = 1600, Total value of the investment (A) = 1852.20 and Rate of Interest (R)= 5%.

To Find: Time period (t).

Solution:

$$\begin{aligned}A &= P (1 + r/n)^{nt} \\1852.20 &= 1600 (1+5/100)^n \\1852.20/1600 &= (105/100)^n \\(185220/160000) &= (21/20)^n \\(9261/8000) &= (21/20)^n \\(21/20)^3 &= (21/20)^n \quad \backslash\end{aligned}$$

n= 3 years

Hence, it will take 3 years time to get a amount of Rs.1852.20

Example: If the simple interest on a sum of money for 2 years at 7% per annum is Rs. 210, what is the compound interest on the same at the same rate and for the same time?

Given: Simple Interest (SI)=210 for years at 7% rate of interest.

To Find: The compound interest on the same at the same rate(7%) and for the same time(2 years).

Solution:

$$SI = PRT/100$$

$$P = SI \times 100/RT$$

$$P = 210 \times 100/7 \times 2$$

$$P = 1500$$

We have to find the compound interest.

$$\text{Compound Interest (CI)} = A - P$$

$$\text{Where, } A = P (1 + r/n)^{nt}$$

$$A = 1500(1+7/100)^2$$

$$A = 1500 (107/100 \times 107/100) = 1717.35$$

$$CI = A - P = 1717.35 - 1500 = 217.35$$

Example: There is 50% increase in an amount in 5 years at simple interest. What will be the compound interest of Rs. 16,000 after 4 years at the same rate?

Given: The value of simple interest for 5 years is 50% of its principal amount.
Principal value of compound interest = 16,000, Number of years = 4
Rate of Interest is same for both the investment.

To Find: The rate of Interest. Using the rate of interest, we have to find the value of compound interest.

Solution:

Let P be the Principal amount. Then 50% of P is the amount of Simple Interest

Simple Interest (SI) = $\frac{PTR}{100}$

$$50\% P = P \times 5 \times R / 100$$

$$50/100 \times P = P \times 5 \times R / 100$$

$$R = 10\%$$

$$\begin{aligned}\text{Compound Interest (CI)} &= A - P = P \left(1 + \frac{r}{100n} \right)^{nt} - P \\ &= 16,000 \left(1 + \frac{10}{100} \right)^4 - 16,000 \\ &= 16,000 \times 1.4641 - 16,000\end{aligned}$$

Quiz Questions:

- 1) Cost price = \$4500 , Selling price = \$5200, find the profit percentage?
- 2) A person bought an article for \$250. For how much should he sell it so that, his profit percentage is 10%?
- 3) If by selling an article for \$390 a shopkeeper gains 20%, find his cost price?
- 4) A retailer buys 40 dolls for 10cents each. 5 are damaged and unsalable but he sells the rest for 15cents each. What is the profit or loss percentage?

- 6) The list price of a watch is Rs.950. A discount of 15% on sales is announced.
- What is the amount of discount on it and its selling price?
- 7) A shoe store uses a 40% markup on cost. Find the cost of the shoe that sells for \$63.
- 8) A bracelet that regularly sells for \$44 is on sale for 25% off. Find the sale price of the bracelet.
- 9) If original price is \$400 and discount is \$80, find the selling price and the discount percentage.
- 10) An amount of \$3,750.00 is deposited in a bank pa