

Lecture 5

14 Jan, 2023

Profit & Loss: To determine price of a commodity.
whether it is profitable/not.

Terminologies: Cost Price (CP), Selling Price (SP), Fixed cost, Variable cost, Loss

Profit: Buy a pen @ 2 Rs
& then
sell it @ 3 Rs.

Soln: CP = 2
SP = 3
Profit/Loss = SP - CP

$$= 3 - 2$$
$$= 1$$

∴ ans. is true, I have a profit of Rs. 1.

C.P: It is amt paid for any product.

Fixed cost

Variable cost

It is constant

eg: NS : 100 emp
= 25 Lakhs

\therefore Yearly outgoing = 25×12 Lakh

It is variable.

eg: NS: I am an
external resource.

\therefore I am a
variable cost to NS.

$$\text{Discount} = \text{Marked Price} - \text{SP}$$

① Bread : Shopkeeper get bread at Rs. 25 (CP)
MRP of bread = Rs. 30
 \therefore Prof = $\text{Rs. } 30 - \text{Rs. } 25 = \text{Rs. } 5$

② He decides to give 1 Rs discount on bread to attract more footfalls to his shop.
 \therefore Disc = $\text{Mkd Price} - \text{SP}$
= $30 - 29$
= Rs. 1

$$\text{Discount Percentage} = (\text{Discount} / \text{mkd price}) \times 100$$

$$= \frac{1}{30} \times 100$$

$$= 3.33\%$$

$$\text{Profit Percentage} = \frac{\text{Profit}}{\text{CP}} \times 100$$

$$\text{Loss Percentage} = \frac{\text{Loss}}{\text{CP}} \times 100$$

Tricks:

1. $P = SP - CP$ if $SP > CP$

2. $L = CP - SP$ if $CP > SP$

3. $P\% = (P/CP) \times 100\%$

4. $L\% = (L/CP) \times 100\%$

5. $SP = \left\{ (100 + P\%) / 100 \right\} \times CP$

6. $SP = \left\{ (100 - L\%) / 100 \right\} \times CP$

$$7. CP = \left\{ \frac{100}{(100+P\%)} \right\} \times SP$$

$$8. CP = \left\{ \frac{100}{(100-L\%)} \right\} \times SP$$

$$9. \text{Discount} = \text{Marked Price} - SP$$

$$10. SP = \text{Marked Price} - \text{Discount}$$

11. When there are two successful profits, say $m\%$ & $n\%$, then the net percentage profit = $\left[m+n + \frac{mn}{100} \right]$

12. When profit = $m\%$ & loss = $n\%$.

then

$$\text{net profit or loss} = \left[m-n - \frac{mn}{100} \right]$$

examples:

1. Suppose a shopkeeper has bought 1kg of apples for Rs. 100. & sold it for Rs. 120 per kg. How much profit is gained by him?

Soln: $SP - CP = 120 - 100 = \text{Rs } 20$

2. Also calculate percentage of profit gained by him.

Soln: $P\% = \frac{P}{CP} \times 100$

$$= \frac{20}{100} \times 100 = 20\%$$

3. A shopkeeper buys a fan for Rs. 1000
& sells it at a loss of 15%.

What will be his SP?

Soln. CP = 1000

L% = 15%.

$$L\% = (L / CP) \times 100$$

$$15 = \frac{L}{1000} \times 100$$

$$L = 15 \times 10$$

$$L = 150$$

$$L = CP - SP$$

$$150 = 1000 - SP$$

$$SP = \text{Rs. } 850/-$$

4. If a pen cost Rs. 50 after 10% discount, then what is the actual price / marked price of the pen?

Soln:

$$SP = MP - D$$

— (1)

whr SP = selling price

MP = marked price

D = Discount

$$\text{Percent discount, } D\% = \frac{D}{MP} \times 100$$

$$\therefore D = \frac{D\% \times MP}{100} \quad \text{--- (2)}$$

Sub. (2) in (1),

$$SP = MP - \left(\frac{D\% \times MP}{100} \right)$$

$$SP = \frac{100MP - (D\% \times MP)}{100}$$

$$100SP = 100MP - 10MP$$

$$\frac{100SP}{MP} = 90MP$$

$$MP = \frac{100 \times SP}{90}$$

$$= \frac{100 \times 50}{90} = \frac{500}{9}$$

$$\therefore MP = \text{Rs } 55.55$$

Q. If the selling is doubled, the profit triples.

Find P%.

Soln:

Let's assume

$$CP = x \quad \&$$

$$SP = y$$

$$CP = x$$

$$SP = 2y$$

$$\textcircled{1} \text{ Prof} = SP - CP \quad P = y - x$$

$$3P = 2y - x$$

$$\frac{P}{3P} = \frac{y - x}{2y - x}$$

$$\frac{1}{3} = \frac{y - x}{2y - x}$$

$$2y - x = 3y - 3x$$

$$2x = y$$

$$\therefore \boxed{y = 2x}$$

$$\therefore P = y - x$$

$$= 2x - x = x$$

$$P\% = \frac{P}{CP} \times 100$$

$$P\% = \frac{x}{x} \times 100 = 100\%$$

Q1w: A vendor bought toffees at 6 for a rupee.
How many for a rupee must he sell to gain 20%?

Q2w: In a certain store, the profit is 320% of the cost.
If the cost increases by 25% but the SP remains constant, approximately what %age of SP is profit?

Simple Interest. $SI = \frac{P \times N \times R}{100}$

whr $P =$ Principle

$N =$ Period / Time

$R =$ Rate of Interest

To calculate overall gain due to SI, we use:

$$A = P(1 + r \cdot n)$$

whr $A =$ (Total amt + Interest)

$P =$ Principle amt

$r =$ ROI

$n =$ time

1. A sum of money at simple int amounts to Rs. 815 in 3 yrs & to Rs 854 in 4 yrs. The sum is?

Soln:

3 yrs

815

4 yrs

854

$$\therefore \text{In 1 year, } SI = 854 - 815 = \text{Rs. } 39$$

$$SI \text{ for } 3 \text{ yrs} = 39 \times 3 = 117.$$

$$\therefore \text{Principal} = 815 - 117 = \underline{\underline{698}}.$$

2 A sum fetched a total SI of ₹ 4016.25 at 10% p.a. in 5 yrs. What is the sum?

Soln: $SI = \frac{P \times N \times R}{100}$

$$P = \frac{SI \times 100}{NR} = \frac{4016.25 \times 100}{5 \times 10}$$

$$= \text{Rs. } 8032.5$$

3 Rahul took a loan of Rs. 1200 with a SI for as many years as R.I. If he paid Rs. 432 as interest at the end of loan period, what was R.I?

Soln: $\text{Loan} = 1200$

$$\text{Time} = R \text{ yrs}$$

$$\text{R.I.} = R\%$$

$$\text{SI} = \frac{P \times R}{100}$$

$$432 = \frac{1200 \times R \times R}{100}$$

$$\therefore \boxed{R = 6}$$

Compound Interest:

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

t = time in yrs
 r = interest rate

n = no. of times it is
compounded per year

P = principle

A = amt

1. A bank offers 5% compound interest calculated on $n=2$ half-yearly basis. A customer deposits P Rs. 1600 each of 1st Jan & 1st July of a year. At the end of year, amt he would have gained by way of interest is:

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

$$= \left[1600 \times \left(1 + \frac{5}{100 \times 2} \right)^2 + \left(1 + \frac{5}{100 \times 2} \right) \right]$$
$$= \underline{\underline{3321}} \quad CI = 3321 - 3200 = \underline{\underline{121 \text{ rs.}}}$$

1st Jan to 1st June: $I = PNR = 1600 \times \frac{1}{2} \times \frac{5}{100}$

$$= 40$$

July to Dec: $SI = PNR = 1640 + \frac{1}{2} \times \frac{5}{100}$

$$= 41$$

2nd Q4: June to Dec. SI = PNR

$$= 1600 \times \frac{1}{2} \times \frac{5}{100}$$

$$= 40$$

$$\therefore \text{Total Int} = 40 + 41 + 40 = \underline{\underline{121}}.$$

