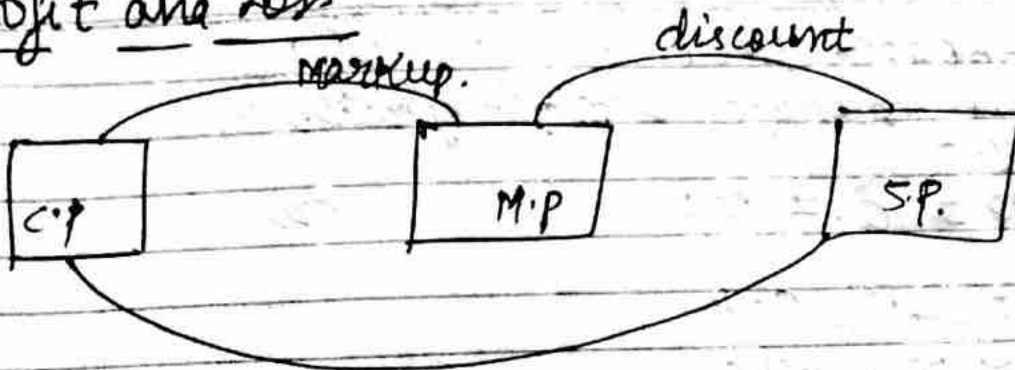


Profit and Loss



profit/loss

$$\text{Profit \%} = \frac{\text{Profit}}{\text{C.P.}} \times 100.$$

$$\text{Loss \%} = \frac{\text{C.P.} - \text{S.P.}}{\text{C.P.}} \times 100.$$

$$\text{Discount \%} = \frac{\text{discount} \times 100}{\text{M.P.}} \Rightarrow \frac{\text{M.P.} - \text{S.P.}}{\text{M.P.}} \times 100.$$

$$\text{Markup \%} = \frac{\text{M.P.} - \text{C.P.}}{\text{C.P.}} \times 100.$$

$$\Rightarrow 20\% \text{ profit} \Rightarrow \text{S.P.} = 1.2 \text{ C.P.}$$

$$\Rightarrow 20\% \text{ loss} \Rightarrow \text{S.P.} = 0.8 \text{ C.P.}$$

$$\Rightarrow 20\% \text{ discount} \Rightarrow \text{S.P.} = 0.8 \text{ M.P.}$$

$$\Rightarrow 20\% \text{ markup} \Rightarrow \text{M.P.} = 1.2 \text{ C.P.}$$

Q. A shopkeeper gives a discount of 20% and still manages a profit of 20%. Find markup %?

$$\frac{\text{S.P.}}{\text{C.P.}} \times 100 = 1.2$$

$$\frac{0.8 \text{ M.P.}}{\text{C.P.}} = 1.2$$

$$\text{M.P.} = 1.5 \text{ C.P.}$$

$$\text{S.P.} = 0.8 \text{ M.P.}$$

$$\text{S.P.} = 1.2 \text{ C.P.}$$

$$20\% \times \text{C.P.} = (\text{S.P.} - \text{C.P.}) \times 100$$

$$0.2 \text{ C.P.} = 0.2 \text{ S.P.}$$

$$\frac{1.2 - 0.8}{0.8} \times 100 = 50\%$$

$$0.8 \text{ M.P.} = 1.2 \text{ C.P.}$$

$$\text{M.P.} = \frac{1.2}{0.8} \text{ C.P.} = 1.5 \text{ C.P.}$$

$$\frac{1.5 - 1.2}{1.2} \times 100 = 25\%$$

So, 50%

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

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

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

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

$$\Rightarrow CP \times P\% = SP \times 100 - CP \times 100$$

$$** SP = \frac{CP(100 + P\%)}{100}$$

$$** SP = \frac{CP(100 - L\%)}{100}$$

20% profit \rightarrow $SP = 1.2 CP$
20% loss \rightarrow $SP = 0.8 CP$

Qn) Eggs are bought at the rate of 7 for Rs 1 of the shopkeeper wants to make a profit of 40%. ~~How~~ How many eggs should he sell for 1 Re ?

Solution >

$$C.P \text{ of } 1 \text{ egg} = \frac{1}{7}$$

$$P\% = 40\%$$

profit of 40%

$$S.P \text{ of } 1 \text{ egg} = \frac{1}{7} \times 1.4$$

$$= \frac{14}{70} = \frac{1}{5}$$

Basic Formulae

1. When SP and Gain% are Given then

$$CP = \left(\frac{100}{100 + \text{Gain}\%} \right) \times \text{S.P.}$$

2. When the C.P. and Gain % are given then

$$\text{S.P.} = \frac{100 + \text{Gain}\%}{100} \times \text{C.P.}$$

3. When C.P. and loss% are given then

$$\text{SP} = \frac{100 - \text{Loss}\%}{100} \times \text{C.P.}$$

4. When S.P. and loss percentages are given

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

5. If the cost price (C.P.) of m articles is equal to selling price of n article, then

$$\% \text{ gain or loss} = \left[\frac{m-n}{n} \right] \times 100$$

If $m > n$, it is % gain and if $m < n$, it is % loss

Example: If the S.P. of 12 articles is equal to the cost price of 18 articles, what is profit%?

Solution:

Here $m=18, n=12$

$$\text{Profit \%} = \frac{(m-n)}{n} \times 100$$

$$= \frac{18-12}{12} \times 100 = \frac{6}{12} \times 100 = 50\%$$

Example: If the S. P. of a dozen apple is equal to cost price of 9 apples find gain or loss%?

$$= \frac{1}{4} \times 100 = -25\%$$

(-ve) sign indicates loss

6. When two different articles are sold at the same S.P., getting gain/loss of $x\%$ on the first and gain/loss of $y\%$ on the second, the overall % gain or % loss in the transaction is given by

$$\left[\frac{100(x+y) + 2xy}{(100+x) + (100+y)} \right] \%$$

The above expression represent overall gain or loss according to its given (+)ve or (-)ve.

7. When two different articles are sold at the same selling price getting gain of $x\%$ on the first and loss of $x\%$ on the second, then there will always be loss on such transaction. The overall loss % in such transaction is given by

$$\left(\frac{x}{10} \right)^2 \%$$

Example: Michael sold two T.V. sets for Rs. 3600 each gaining 20% on one and losing 20% on the other. Find the total gain or loss percent.

Solution:

There will always be loss on such transaction

Here $x = 20$

$$\text{So, overall loss} = \left(\frac{x}{10} \right)^2 \% = \left(\frac{20}{10} \right)^2 \% = 4\%$$

8. A merchant uses faulty measure and sells his goods at gain/loss of $x\%$. The overall % gain or loss (g) is given by

$$\frac{100+g}{100+x} = \frac{\text{True measure}}{\text{Faulty measure}}$$

Note: If merchant sells his goods at cost price then $x = 0$.

Example: A dishonest shopkeeper professes to sell his goods at the cost price but use faulty measure. His 1 kg weight measures 950 gms only. Find his gain percent.

Solution:

Here, True measure = 1000 gms

False measure = 950 gms

Since the Shopkeeper sells the goods at cost price.

$$\therefore x = 0,$$

\therefore overall gain % is given by

$$\frac{\text{True measure}}{\text{Faulty measure}} = \frac{100+g}{100+x}$$

$$\Rightarrow \frac{1000}{950} = \frac{1000+g}{1000}$$

$$\text{So, } 100+g = \frac{1000 \times 100}{950} \Rightarrow g = 5\frac{5}{19}\%$$

Note: If g is (-)ve then shopkeeper incurs loss.

Discounts

9. If two successive discount of an article are $m\%$ and $n\%$ respectively, then a single discount equivalent to the two successive

$$\text{discounts will be } \left(m+n - \frac{mn}{100}\right)\%$$

It can also be calculated as

$$\left[100 - 100 \times \frac{(100-m)}{100} \times \frac{(100-n)}{100}\right]\%$$

- Ex.1. Two successive discounts of 10% and 20% is equivalent to a single discount of

$$\left(10+20 - \frac{10 \times 20}{100}\right) = 28\%$$

Which is less than 30%.

- Ex.2 Find the single discount which is equivalent to a successive discounts of 50% and 40%.

Sol.: Single discount will be equal to

$$\left(m+n - \frac{mn}{100}\right)\%$$

$$\Rightarrow \left(50+40 - \frac{50 \times 40}{100}\right)\%$$

$$\Rightarrow 70\%$$

- Ex.3 Find the single discount which is equivalent to three successive discounts of 10%, 20% and 30%.

Sol.: Here first of all we will determine the single discount, which is equivalent to two successive discounts of 10% and 20%.

$$\Rightarrow \left[10+20 - \frac{10 \times 20}{100}\right]\%$$

$$\Rightarrow 28\%$$

Now, we will find a single discount which is equivalent to two successive discounts of 28% and 30%

$$\Rightarrow \left[28+30 - \frac{28 \times 30}{100}\right]\%$$

$$\Rightarrow 49.6\% \text{ Ans.}$$

- Ex.4 Find a single discount which is equivalent to three successive discounts of 50%, 40% and 20%.

\Rightarrow Two articles are sold at a common selling price of Rs S each, one is sold at a profit of $p\%$ and another at a loss of $p\%$. Then effectively there is always a loss during the entire transaction.

$$\begin{array}{l}
 \text{**} \\
 \text{(Value)} \\
 \text{Rupees}
 \end{array}
 \left[\begin{array}{l}
 \text{Loss} = \frac{2p^2 S}{(100^2 - p^2)}
 \end{array} \right]$$

$$\text{**} \left[\begin{array}{l}
 \text{Loss \%} = \frac{p^2}{100} \%
 \end{array} \right]$$

\Rightarrow Two articles are bought at a common cost price, one is sold at a profit of $p\%$ and another at a loss of $p\%$. Then effectively there is no profit no loss.