

Profit & Loss

COST PRICE: The price at which an article is purchased is called its cost price (C.P.)

SELLING PRICE: The price at which the article is sold is called its selling price (S.P.)

1. If the cost price (C.P.) of the article is equal to the selling price (S.P.), then there is no loss or gain.
2. If the selling price (S.P.) > cost price (C.P.), then the seller is said to have a profit or gain,

Gain/Profit = S.P. - C.P.

3. If the cost price (C.P.) > selling price (S.P.), then the seller is said to have a loss,

Loss = C.P. - S.P.

1. Gain percent

$$\text{Gain \%} = (\text{Gain} \times 100) / (\text{C.P.})$$

Loss percent

$$\text{Loss\%} = (\text{Loss} \times 100) / (\text{C.P.})$$

2. When the selling price and gain percent are given:

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

3. When the cost and gain percent are given:

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

4. When the cost and loss percent are given:

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

5. When the selling price and loss percent are given.

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

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6. If a man buys x items for Rs. y and sells z items for Rs. w , then the gain or loss percent made by him is $(xw/zy - 1) \times 100\%$
7. If the cost price of m articles is equal to the selling price of n articles, then % gain or loss
 $= ((m - n) / n) \times 100$
 [If $m > n$, it is % gain and if $m < n$, it is % loss]
8. If an article is sold at a price S.P._1 , then % gain or % loss is x and if it is sold at a price S.P._2 , then % gain or % loss is y . If the cost price of the article is C.P. , then
 $(\text{S.P.}_1) / (100 + x) = (\text{S.P.}_2) / (100 + y) = (\text{C.P.}) / 100 = (\text{S.P.}_1 - \text{S.P.}_2) / (x - y)$
 Where x or y is $-ve$, if it indicates a loss, otherwise it is $+ve$.

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9. If 'A' sells an article to 'B' at a gain/loss of $m\%$ and 'B' sells it to 'C' at a gain/loss of $n\%$ If 'C' pays Rs. z for it to 'B' then the cost price for 'A' is

$$\left[\frac{100^2 z}{(100 + m)(100 + n)} \right]$$

where m or n is $-ve$, it indicates a loss, otherwise, it is $+ve$.

10. If 'A' sells an article to 'B' at a gain/loss of $m\%$ and 'B' sells it to 'C' at a gain/loss of $n\%$, then the resultant profit/loss percent is given by

$$(m+n+mn/100)$$

where m or n is $-ve$, if it indicates a loss, otherwise it is $+ve$.

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11. When two different articles are sold at the same selling price, getting gain/loss of $x\%$ on the first and gain/loss of $y\%$ on the second, then 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 represents overall gain or loss accordingly as its sign is $+ve$ or $-ve$.

12. When two different articles are sold at the same selling price getting a gain of $x\%$ on the first and loss of $x\%$ on the second, then the overall% loss in the transaction is given by

$$(x/10)^2 \%$$

Note that in such questions there is always a loss.

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

$$(100+g)/(100+x)=(\text{True measure})/(\text{Faulty measure})$$

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

14. A merchant uses $y\%$ less weight/length and sells his goods at gain/loss of $x\%$. The overall % gain/loss is given by

$$[(y+x)/(100-y)] \times 100 \%$$

15. A person buys two items for Rs. A and sells one at a loss of $l\%$ and other at a gain of $g\%$. If each item was sold at the same price, then

- (a) The cost price of the item sold at loss

$$= \frac{A(100 + \% \text{ gain})}{(100 - \% \text{ loss}) + (100 + \% \text{ gain})}$$

- (b) The cost price of the item sold at gain

$$= \frac{A(100 - \% \text{ loss})}{(100 - \% \text{ loss}) + (100 + \% \text{ gain})}$$

16. If two successive discounts on an article are $m\%$ and $n\%$, respectively, then a single discount equivalent to the two successive discounts will be

$$(m+n-mn/100)\%$$

17. If three successive discounts on an article are $l\%$, $m\%$ and $n\%$, respectively, then a single discount equivalent to the three successive discounts will be

$$\left[l + m + n - \frac{(lm + ln + mn)}{100} + \frac{lmn}{100^2} \right] \%$$

18. A shopkeeper sells an item at Rs. z after giving a discount of $d\%$ on labeled price. Had he not given the discount, he would have earned a profit of $p\%$ on the cost price.

The cost price of each item is given by

$$\text{C. P.} = \left[\frac{100^2 z}{(100 - d)(100 + p)} \right]$$

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