Profit - Loss - Discount

- Course overview

Presented By

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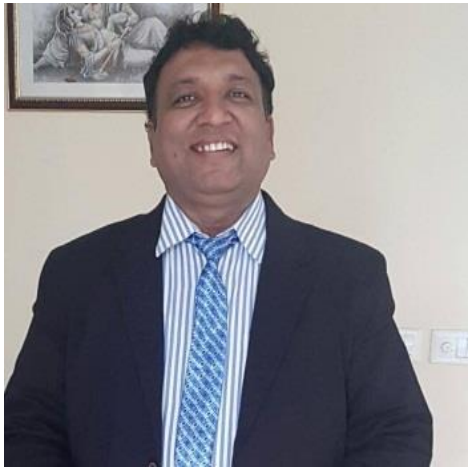
About me



- M.Tech. from IIT Kharagpur.
- Over 18 years of Corporate experience.
- Teaching from 10+ years
- Core Areas : Mathematics, Aptitude, English.
- Follow me @ https://unacademy.com/user/quizrakesh

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Introduction

Profit, Loss, Discount : These terms we use very often in daily life. **Right ???**

This topic has quite a importance not only for day-to-day life but also for all the competitive exam math.

Any competitive exam whether its banking or railways or management or civil services or any other exam, aptitude will have question on Profit & Loss.

So let's learn all about **Profit** **Loss** **Discount**

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Objective

Some may feel that what's all these **Profit** **Loss** **Discount** **Cost price** **Selling price** **Market price** **Display price** **Tag price** **Gain** **etc. …..**

it's too confusing !!!!!

This course attempts to remove this confusion and explain core concepts in very easy and simple way.

Methods are explained in a very clear and interesting way so that students will be excited and inclined to learn, understand and apply to solve problems with ease.

Course Plan

This course is planned in following way :

- Basic understanding of Profit, Loss and discount
- Cost price, Selling price, Market price explanation.
- Core concepts explanation with examples.
- Easy methods to solve problems on profit and loss.
- Universal method to find Percentage profit or loss

Course Plan

- Concept of flat discount and successive discount.
- Problems on discount and CP, SP, MP.
- Difficult problems involving Profit, Loss and Discount together.
- High level and complex problems
- Various scenarios when multiple discounts are given.
- Problems on error, dishonesty and miscellaneous situations.

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Course Plan

- Strategies for interpreting questions correctly.
- Commonly asked question types in various exams.
- Tips to be successful in exams for Profit & Loss problems.
- Previous years Questions and solutions with easy method.
- Practice Quiz.

Profit - Loss - Discount : Meaning

What is Profit?

→A financial gain / benefit / advantage.

What is Loss?

→ Amount of money lost in a financial transaction..

What is Discount?

→ A deduction from usual cost or amount.

Cost price and Selling price : Concept

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Cost price (CP)

→ Buying price of goods.

Selling price (SP)

→ Price at which goods are sold

If SP > CP → Profit or **Gain**

If SP < CP → Loss

If SP = CP → No profit, No loss

Marked Price meaning

Marked Price (MP) : Price at which goods are marked or labeled.

Also known as :

- ➔ Labeled price
- ➔ Market price
- ➔ Tag price
- ➔ Max retail price
- ➔ MRP
- ➔ Display price

Profit – Loss – Discount concept

Core Concept

Profit or Loss % is always calculated on Cost price (CP) Unless mentioned otherwise in question

Discount % is always calculated on Market price (MP) Unless mentioned otherwise in question

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Universal concept for profit and Loss %

Core Concept

Percentage Profit or Loss

$$= \frac{\text{Amount of Profit or Loss}}{\text{Cost Price}} \times 100$$

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

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

Profit - Loss – Discount examples

Ex : A cycle was bought at Rs 500 and sold for Rs 600. Find profit percent.

Solution :

Cost price : Rs 500 **Selling price : Rs 600**

Since SP > CP its profit → Profit = 600 – 500 = 100

Profit % = Amount of profit x 100 / CP

= 100 x 100 / 500

= 20 %

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Profit or Loss % is always calculated on Cost price

Profit - Loss – Discount examples

Ex : A vendor marked the microwave at Rs 5000 but sold with 10% discount whose cost was Rs 4000. Find the percent profit or loss.

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Solution :

Marked price : Rs 5000 Cost price : Rs 4000 Discount : 10%

➔ **Selling price after discount = 90% of Market price**

= 90 % of 5000 = Rs 4500

➔ **Since SP > CP its profit. Profit = Rs 4500 – Rs 4000 = Rs 500**

➔ **Profit % = 500 * 100 / 4000 = 12.5 %**

Concept : Profit % is always calculated on CP and discount % always on MP.

Key Aspects

- Profit and Loss is one of the most important topic.
- For all the competitive exams, this is a popular topic.

- Just 2 basic concepts to understand it completely.

  Profit or Loss % is always calculated on cost price

  and

  Discount % is always calculated on marked price.
- In forthcoming lessons we will learn how to solve profit and loss problems in a simple way.

Profit – Loss – Discount concept

Core Concept

Profit or Loss % is always calculated on Cost price (CP) Unless mentioned otherwise in question

Discount % is always calculated on Market price (MP) Unless mentioned otherwise in question

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Universal concept for profit and Loss %

Core Concept

Percentage Profit or Loss

$$= \frac{\text{Amount of Profit or Loss}}{\text{Cost Price}} \times 100$$

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

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

Unitary method concept

- **A very important and useful method.**

Let's say SP is given as 500 and Profit as 25%. Find CP.

Point 1 : Assume CP as 100. Then SP will be 125.

Point 2 : Given SP = 500 (LHS), CP to find out (RHS)

Method ➔

Step 1 : If SP is 125 then CP would be 100 (Refer Point1)

Step 2 : If SP is 1 then CP would be 100 / 125

Step 3 : If SP is 500 *(given)* then CP would be (100/125) x 500

CP = 400

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Concept : Get the value in unit cost. (Unitary)

Problems on Profit - Loss

Q : Pooja sold a mobile phone at the cost of Rs 3750 at a loss of 25%. At what cost will she have to sell it to get a profit of 30% ?

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Solution :There are 2 scenarios here.

Scenario 1: SP = Rs 3750 and Loss = 25%

➔ CP can be found out ➔ CP = 3750 * 100 / 75 (Unitary method)

➔ ➔ CP = Rs 5000

Scenario 2: Now CP = Rs 5000 and Profit = 35%

➔ SP can be found out ➔ SP = 135 % of * 5000 (Percent method)

➔ ➔ SP = Rs 6750

She will have to sell at Rs 6750

Concept : Profit or Loss % is always calculated on Cost price.

Problems on Profit - Loss

Q : The selling price of 30 items is equal to purchase price of 25 items. What is profit or loss % ?

Solution : This looks tricky but its really simple.

Method : Let's assume CP of 25 items is Rs 100 (anything is fine)

➔ **Then SP of 25 items also would be Rs 100. Right?**

Core Concept : Find CP and SP of one item

- **CP of 1 item = Rs 100/25 = Rs 4**
- **SP of 1 item = Rs 100/30 = Rs 3.33**
- ***CP > SP so its LOSS !!!!!!***
- **Loss % = Amount of Loss x 100 / CP = (4 – 3.33) x 100 / 4**
- **Loss = 16.66 %**

Problems on Profit - Loss

Q : By selling 33 metres of wire, one gains the selling price of 11 metres. Find loss or gain percent ?

Method : Looks confusing ? Lets see.

Let's assume CP of 1 metre wire is Rs 1 (point 1)

- **Given that SP of 33 m wire enables gain as SP of 11 m**
- **Means *Gain = SP of 11m = SP of 33m – CP of 33 m***
- **SP of 22 m wire = CP of 33 m wire**
- **SP of 22 m wire = Rs 33 (See point 1)**
- **CP of 22m wire = Rs 22 (See point 1)**
- **Profit % = [(33-22)/22] x 100** ***SP > SP so its Profit !!!!***

  Profit % = 50 %

Universal concept for profit and Loss %

Core Concept

Percentage Profit or Loss

$$= \frac{\text{Amount of Profit or Loss}}{\text{Cost Price}} \times 100$$

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

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

Unitary method concept

- **A very important and useful method.**

Let's say SP is given as 500 and Profit as 25%. Find CP.

Point 1 : Assume CP as 100. Then SP will be 125.

Point 2 : Given SP = 500 (LHS), CP to find out (RHS)

Method ➔

Step 1 : If SP is 125 then CP would be 100 (Refer Point1)

Step 2 : If SP is 1 then CP would be 100 / 125

Step 3 : If SP is 500 *(given)* then CP would be (100/125) x 500

CP = 400

Concept : Get the value in unit cost. (Unitary)

Maths is Easy

Problems on Profit - Loss

Q : A vendor purchased 800 kg of sugar at Rs 14 per kg and mixed it 1200 kg sugar at Rs 16 per kg. At what rate should he sell the mixture to gain 20% ?

Method : First find total CP, then SP to find selling rate.

Total CP = [800 x 14] + [1200 x 16] = Rs 30400 for 2000 kg

➔ **Gain is 20% so SP = 120 % of CP {percent method}**

➔ **SP = 1.2 * 30400 = Rs 36480**

To find selling rate, find per kg price.

➔ **= 36480 / 2000 = Rs 18.24**

So will have to sell at the rate of Rs 18.24 per kg.

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Concept : Find SP and SP of total quantity.

Problems on Profit - Loss

Q : A dishonest merchant sells the goods at 10% loss on cost price but uses 15 % less weight. What is his percentage profit or loss ?

This looks tough?? Lets see.

Method : Let's assume CP of 1 kg item is Rs 100.

But item sold is 15% less weight. Means (1- 0.15) = 0.85 kg

➔ **SP of 0.85 kg = (100 – 10) = Rs 90 Right?**

➔ **SP of 1 kg = Rs 90 / 0.85 = Rs 105.88 (approx.)**

➔ **Profit % = 105.88 – 100 = 5.88 %**

➔ ***Core Concept : Find actual weight and cost and compute.***

Problems on Profit - Loss

Q : A dealer sold an article at a loss of 20%. If the selling price had been increased by Rs 100, there would have been a gain of 5%. What was the cost price of the article ?

Method : Let's assume original CP is Rs y

Gain is 5% so final SP would have been = 1.05 y *(percent method)*

➔ **But actually sold at 20% loss**

➔ **So actual SP = 0.8 y** **Right?**

Given that if SP increased by 100

➔ **Means difference of SP is Rs 100**

➔ **Hence 1.05 y – 0.8 y = 100** ➔ **y = 400**

So Cost price would be Rs 400.

Key Aspects

- **Unitary method is very useful in solving problems**
- Just 2 basic concepts to understand it completely.

  Profit or Loss % is always calculated on cost price

  and

  Discount % is always calculated on marked price.
- In forthcoming lessons we will learn how to solve discount problems in a simple way.

Discount and Marked Price

Discount is always on Marked Price (MP)

unless specified otherwise.

Marked Price (MP) : Price at which goods are marked or labeled.

Also known as :
- ➔ **Labeled price**
- ➔ **Market price**
- ➔ **Tag price**
- ➔ **Max retail price**
- ➔ **MRP**
- ➔ **Display price**

Successive discount concept

Is single equivalent discount and successive discount same??? **Lets see !!!**

Say an item is marked as Rs 100.

Shop 1 : Giving flat 50% discount.

Shop 2 : Giving successive discount of 10%, 20%, 30%

(10%, 20%, 30% ➔ 60% ??)

Which is better deal? Both discounts same or different ??

Let's find out

Successive discount concept

Say an item is marked as Rs 100.

Shop 1 : Giving flat 50% discount.

Discount amount = Rs 50. So **Final price** would be **Rs 50**

Shop 2 : Giving successive discount of 10%, 20%, 30%

➔ First discount is 10% = Rs 10. So price would be Rs 90

➔ 2nd discount is 20% of Rs 90 = Rs 18. So Price = Rs 72

➔ 3rd discount is 30% of Rs 72 = Rs 21.60. So Price = Rs 50.40

Final price = Rs 50.40

Means Flat discount and successive discounts are not same.

Shop 1 deal is Better. Right?

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Problems on Discount

Q : After getting two successive discounts, a bag with a tag price of Rs 450 is available at Rs 315. If the second discount is Rs 12.5%, find the first discount.

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Method : Let first discount be y % and 2nd discount given as 12.5 %

➔ **Successive discount means Price after series of two discount.**

➔ **Given Tag price = Rs 450. Means MP = Rs 450**

➔ **Price after 1st discount = (100 – y) % of 450**

➔ **Price after 2nd discount = (100- 12.5) % of (100 – y) % of 450**

➔ **315 = 87.5 % of (100 – y) % of 450**

➔ **Solving, we get y = 20 % So first discount is 20 %**

Concept : Find successive discount and price one after other.

Problems on Discount

Q : A shopkeeper buys 40 items at marked price of 36 items from a vendor. If he sells these items giving a discount of 1%, what is % profit ?

Method : Let Marked price of each item as Rs 100.

➔ **CP of 40 items is Rs 3600. Marked price of 40 items = 4000**

Discount is 1%. So SP would be 99%

➔ **SP of 40 items = 99% of Rs 4000 = Rs 3960**

➔ **SP of 40 items is Rs 3960**

➔ **Profit % = [(3960-3600) / 3600] x 100**

➔ ***Profit % = 10%***

Core concept : Profit % is calculated on CP and discount on MP

Key Aspects

- Successive discount and Flat discount are **NOT** same.
- Just 2 basic concepts for Profit / Loss / Discount.

  Profit or Loss % is always calculated on cost price

  and

  Discount % is always calculated on marked price.

- In forthcoming lessons we will learn how to solve complex problems on profit, loss and discount in a simple way.

Profit – Loss – Discount problems

Q : The cash difference between selling prices of an article at a profit of 4% and6% is Rs 3. Ratio of two selling prices is ?

Easy Method : Let CP of an article = y

Then, First SP = 104 % of y {since profit is 4%}

Second SP = 106 % of y {since profit is 6%}

Require ratio = 104 % of y / 106% of y

= 104 / 106

= 52 /53 ➔ 52 : 53

Simple way right ?

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Profit – Loss – Discount problems

Q : If S.P. of Rs 24 results in a 20% discount, what S.P. would result in a 30% discount on tag price ?

Core concept: Discount is always on marked price.

Let Marked price is P

Then S.P. would be 80% of P {discount is 20%}

➔ 0.8 P = 24 {Given}

➔ P = 24 / 0.8 = 30

Required S.P. would be 70% of P {discount is 20%}

➔ S.P. = 0.7 x 30 = 21

Hence Selling price would be Rs 21

Profit – Loss – Discount problems

Q : A merchant marks his goods at 25% above cost price. Due to slump in demand, his cost reduces by 5%. He thus offers discount of 8% due to which sales go up by 25%. What would be change in his profit % ? Will it be higher or lower and how much ?

Concept: Here how much items sold needs to be assumed.

Scenario 1

Let original C.P of each item is Rs 100 and y items sold.

For each item, CP = Rs 100, then SP = Rs 125 {marked 25% above}

➔ Total original profit = 25 y

New C.P of each item would be Rs 95 {5 % reduction}

Profit – Loss – Discount problems

Q : A merchant marks his goods at 25% above cost price. Due to slump in demand, his cost reduces by 5%. He thus offers discount of 8% due to which sales go up by 25%. What would be change in his profit % ? Will it be higher or lower and how much ?

Scenario 2

New C.P of each item would be Rs 95 {5 % reduction}

➔ New S.P. = 92% of Rs 125 {8% discount}

➔ New S.P. = Rs 115

Number of articles sold now = 1.25 y {25 % sales up}

➔ New profit = 1.25 y * New S.P. - 1.25y * New C.P.

➔ Total New profit = 1.25y (115 – 95) = 25y

Total new profit = 25 y = total original profit. ***So no change***

Successive selling problems

Q : A sells a computer to B at profit of 20% and B sells it to C at gain of 10% and C sells it to D at a gain of 12.5%. If D pays Rs 71280, what did it cost A ?

Note : This is a successive selling kind of problem

Concept : We will utilize % concept to solve it in easy way.

D paid : Rs 71280 and C gained 12.5%,

➔ C got it at price of 71280 / 1.125 **{Percentage concept}**

➔ **C got it at Rs 63360**

Successive selling problems

Q : A sells a computer to B at profit of 20% and B sells it to C at gain of 10% and C sells it to D at a gain of 12.5%. If D pays Rs 71280, what did it cost A ?

C paid : **Rs 63360, B sells to C at 10% gain**

➔ B got it at price of 63360 / 1.1 **{Percentage concept}**

➔ **B got it at Rs 57600**

B paid : **Rs 57600, A sells to B at 20% gain**

➔ A got it at price of **57600** / 1.2 **{Percentage concept}**

A got it at Rs 48000

Discount and profit problems

Q : How much % must be added to the cost price of goods so that a profit of 20% must be made after giving discount of 20% from marked price ?

Core concept : Discount is always on marked price and profit is always on cost price.

Method : Let Marked price be Rs 100

Now 20% discount so selling price should be 80% of MP

➔ SP = 20 % of 100 = Rs 80

➔ **SP = Rs 80**

Discount and profit problems

Q : How much % must be added to the cost price of goods so that a profit of 20% must be made after giving discount of 20% from marked price ?

MP : Rs 100 SP = Rs 80

Now 20% profit is required. So SP would be 120% of CP

➔ CP = 80 / 1.2 = Rs 66.67

Question is How much % to be added to CP to make MP

% Change =(100 - 66.67) * 100 /66.67 (Universal method !!!)

= 50% **It should be marked 50% above CP**

or we can say (100-66.66) = 33.33 % must be added.

Discount and profit problems

Q : Tushaam marks his goods up by 50% and then allows discount of 1/5th and sells it to Daman. Then Daman sells it for Rs 20 more than his purchase price. SP is 30% more than original CP of article. Then Daman's profit % is ?

Core concept : Discount is always on Marked price and profit is always on cost price.

Let original CP is Rs 100 then Marked price would be Rs 150.

Now discount is 1/5th ➔ 1/5th of Rs 150 = Rs 30

So CP for Daman = 150 – 30 = **Rs 120**

Daman sells it for Rs 20 more ➔ SP for Daman = **Rs 140**

Discount and profit problems

Q : Tushaam marks his goods up by 50% and then allows discount of 1/5th and sells it to Daman. Then Daman sells it for Rs 20 more than his purchase price. SP is 30% more than original CP of article. Then Daman's profit % is ?

Original CP = **Rs 100,** MP = **Rs 150**.

CP for Daman = **Rs 120**

Now SP of Daman is 30% more than original CP (Rs 100)

➔ **SP of Daman = Rs 130**

➔ Profit for Daman is 130 – 120 = Rs 10

➔ But it's given that *" Daman sells it for Rs 20 more"*

Discount and profit problems

Q :Tushaam marks his goods up by 50% and then allows discount of 1/5th and sells it to Daman. Then Daman sells it for Rs 20 more than his purchase price. SP is 30% more than original CP of article. Then Daman's profit % is ?

Original CP = **100**, MP = **150**, CP for Daman = **120**, SP of Daman = **130**

➔ Profit for Daman = Rs 10,

But given *"Daman sells it for Rs 20 more"*

So profit has to be double, means CP, SP, MP would be double.

➔ *Hence CP = Rs 200, MP = Rs 300,*

➔ ➔ *CP for Daman = Rs 240, SP = Rs 260*

Discount and profit problems

Q : Tushaam marks his goods up by 50% and then allows discount of 1/5th and sells it to Daman. Then Daman sells it for Rs 20 more than his purchase price. SP is 30% more than original CP of article. Then Daman's profit % is ?

CP for Daman = Rs 240, SP for Daman = Rs 260

Apply Universal formula for finding Profit %

$$\text{Profit \%} = \frac{260 - 240}{240} \times 100$$

Profit % = 8.33%

Key Aspects

- Profit and Loss is very important topic. Useful for all competitive exams.
- Just 2 basic concepts for Profit / Loss / Discount.

  Profit or Loss % is always calculated on cost price

  and

  Discount % is always calculated on marked price.

- In forthcoming lessons we will learn how to solve more complex problems on profit, loss and discount.

My courses

"Art of speed math" "SSC-CGL Quant Crash course"

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