Profit, Loss, and Discount

Let us now discuss this topic. Consider the information below -
Raunak was traveling to Jaipur from New Delhi by train. On the platform, he purchased a novel "Half Girlfriend". The printed price of the novel was 250. He negotiated with the vendor and asked for a discount of 30%. The vendor didn't agree with 30% and finally, the deal ended at a 20% discount. He studied the novel in train and after reaching Jaipur, Raunak sold it to Manish at the MRP of the novel. After studying the novel Manish sold it to Navneet after giving a discount of Rs.150.

Now, let us have a look at some common questions or terms that often confuse students.

1. What is the MRP of the novel?

MRP: Marked Retail Price is the price that is printed on an object. So MRP of the novel is 250.

2. What is the discount?

Discount is calculated on MRP, Raunak and vendor both agreed at 20% discount.
So, Discount = 20% of MRP = 20% of 250
  = (20×250)/100 = 50

3. What is the Selling Price of the novel for a Vendor?

Selling Price (SP) is the price at which an object is sold.
SP = MRP – discount
SP = 250 – 50 = Rs.200

4. What is the Cost Price of the novel for Raunak?

Cost Price is the price at which an object is purchased.
Raunak purchased this novel at Rs.200.

5. What is the Selling Price of the novel for Raunak?

Raunak sold it at the MRP, so the SP for Raunak is 250.

6. What is the Cost Price of the novel for Manish?

Manish purchased it at the MRP. So, CP for Manish is Rs.250.

7. What is the profit for Raunak?

Raunak purchased it at Rs.200 and sold it at Rs. 250
So, Profit = SP – CP = 250 -200 = Rs.50

8. What is the SP for Manish?

He sold it to Navneet at Rs. 150. So, SP for Manish is Rs.150

9. How much discount Manish give to Navneet?

Discount = CP of Manish – SP of Manish
= 250 – 150 = 100

10. What is the discount% given to Navneet by Manish?

discount% = (Discount/ CP for Manish)$\times$ 100
= (100/250)$\times$ 100
= 40%

11. What is the Loss for Manish?

Loss = CP for Manish – SP for Manish
Loss = 250 – 150 = 100 Rs.

Now, we will discuss concepts by solving the questions based on this topic.

Example 1:

If a man purchases 12 toys for Rs.10 and sells 10 toys for Rs.12. How much profit or loss does he make?

Approach:
You can see that the man purchases a number of toys at less price than selling less number of toys at more price. So, definitely, we can say that he makes the profit. In the exam the options which have the loss, you can easily eliminate those options.
Solution: CP of 12 toys = Rs.10
SP of 10 toys =Rs. 12
So, SP of 12 toys = (12/10)$\times$ 12 = 14.4
Profit% = ((SP-CP)/CP)$\times$ 100 = (4.4/10)= %
Tricks for this type of questions:
Purchases: 12 toys for Rs.10
Sells: 10 toys for Rs.12
For profit% or loss% Cross multiply
profit% or loss% = ((12$\times$ 12 – 10$\times$ 10)/(10$\times$ 10))$\times$ 100
= 44%

Example 2:

If a man purchases 12 toys for Rs.10 and sells 10 toys for Rs.8. How much profit or loss does he make?

Solution:
There will be loss using the same approach.
profit% or Loss% = ((12×8-10×10)/(10× 10))× 100
 = -4% (Don't be confused with a negative sign, it represents loss)
So the loss is 4%.
SP = [(100±profit or loss)/100]× CP

Example 3:

A person sells an article for ₹890 at a loss of 11%. What will be the price of the article when sold at a profit of 10%?

Solution:
$SP_1 = 890$, loss 11%
We know that loss% = [(CP-SP)/CP]×100
11CP =(CP-890)×100
11CP = 100CP – 890×100
89CP = 890×100
CP = 1000
If he had sold it at 10% profit,
then new SP = CP + 10%CP
New SP = 1000+100 = 1100

Approach: Loss is 11% and it is calculated on CP, So we can say loss = 11% CP
New SP = [(100±new profit or loss %)/100]× CP….(1)
Old SP = [(100±old profit or loss%)/100]×CP….(2)
CP = Old SP/ [(100±old profit or loss%)/100]….(3)
Now, putting eqn 3 it in eqn 1.
New SP = Old SP [(100±new profit or loss %)/(100±new profit or loss %)]
Important: Put + sign for-profit and – sign for negative.
New SP = 890 [(100+10)/(100-11)] = 1100

Example 4:

A shopkeeper sold an item for Rs.6080 after giving 20% discount on the labelled price and made 18% profit on the cost price. What would have been the percentage profit if he had not given the discount?

Solution:
SP = MP (100-discount)%
6080 = MP(80%)
MP = 7600
Also, SP = CP [(100+profit%)/100]
SP = CP(118/100)
CP = (6080×100)/118
CP = 5125.54

He sold it at MP. So New SP = MP
profit% = [(MP-CP)/CP]×100
= [(7600-5125.24)/5125.24]×100
=47.5%

Another approach:

Reqd. profit% = [(Discount±Profit or loss)/(100-discount%)]× 100
Reqd. profit% = [(20+18)/(100-20)]× 100
Reqd.profit% = 380/8 = 47.5%
Example5: A shopkeeper sells an object at a profit of 25% after giving a discount of 20%. Find the ratio of Cost price, selling price and Marked price.
Solution: Let the Cost price of an object be Rs.100.
SP = (125/100)×100 = 125
SP = [(100-discount%)/100]MP
SP = (80/100)MP
MP= (125×100)/80
MP= 625/4
ratio CP : SP :MP
    100: 125 : (625/4)
      4: 5 : (25/4)
       16: 20:25

Another approach: Let MP is 100 Rs
MP = 100
SP = 80
then, SP =125% of CP
So, CP = 64
ratio of CP:SP:MP = 64:80:100
 = 16:20:25
Dishonest Shopkeeper Concept

Example 6:

A dishonest dealer professes to sell his goods at cost price, but he uses a weight of 900gm of weight for the kg. Find his gain percent.

Solution: Let price of 1kg is Rs.100 then, price for 900gm will be Rs.90
Hence, he sells 900gm instead of 1kg for Rs.100 but cost price of it is only Rs.90.
So he earns a profit of Rs.10 on Rs.90 **not on Rs.100**
So, profit% = (10/90)×100
 = 11(1/9)%
You can also use formula:
gain% = [Error/(true value-error)]×100
gain% = [100/(1000-100)]×100
 = 100/9 = 11(1/9)%

Example7:

A dishonest dealer professes to sell his goods at cost price, but he earns the profit of 25%.Find the weight he has used instead of 800gm?

Solution:

Let cost price of 800gm goods is Rs. 100
He sells well at cost price i.e. Rs.100 but earns 25% profit.
So, CP of goods he sold = [SP/(100+profit)]× 100
 CP of goods = (100/125)× 100 = 80
100Rs. costs for 800gm
80Rs. costs for (800/100)×80 = 640 gm.
He used 640gm instead of 800gm.

Example8:

A machine is sold for Rs.5060 at a gain of 10%. What would have been the gain or loss if it had been sold for Rs.4370?

Solution:
SP = CP × [(100+10)/100]
SP = CP×(11/10)
CP = 4600
New SP = 4370
Loss% =(230/4600)×100 = 5%

Example9:

Ashish sold a pen at 5% loss and a book at 15% profit. In the whole business, he earned Rs.7. If he had sold a pen of 5%profit and a book at 10% profit then he has earned Rs.6 more. What are the cost price of a pen and a book?

Solution:
Let CP of a book is B and a pen is P. We know that profit or loss is calculated on CP.
So, In case 1: loss for pen = 5%P, profit for book = 15%B
In case 2: profit for book = 10%B, profit for pen = 5%P
Use sign (-) for loss and (+) for profit.
In case 2 he earned Rs. 13(6 more than previous one)
15%B-5%P =7…..(1)
10%B+5%P =13…(2)
Adding eqn (1) and (2)
25%B = 20
B = 20×(100/25)
B = 80Rs.
Putting B=80 in Eqn(2)

5%P = 13-8
5%P = 5
P = Rs. 100