



Discounts and Dishonest Dealings theory for WBP Constable Exam

In our last blog, we have learned the basics of **Profit and Loss for WBP Constable Exam**. If you haven't read that blog yet, just click on the embedded link and read it now before going through this blog.

Now, we all learned about the basics of profit and loss in that blog, so in continuation of that we will learn about Discounts and the Dishonest dealings. It's an important topic with your exam point of view and questions are widely asked from it.

We all are slaves of marketization; we all are greedy for more products and the market is providing us our needy things. Last time when you went to markets did you notice there are terms like 20% off, SALE SALE SALE. On e-commerce sites, we saw discounts on items. We will try to solve this type of question where we have to find questions related to this which are asked in the WBP Constable Exam.

Discounts

A discount is a reduction in the selling price of a product or service. Discounts can be offered in a variety of ways, including as a percentage of the original price, a fixed amount off the original price, or a free gift or service with purchase.

In simple words, Discount is defined as the amount of rebate given on a fixed price (called a marked price) of an article.

Marked Price: The marked price is the price at which a product or service is offered for sale. It is also known as the list price or tag price. The marked price is usually set by the retailer, but it can also be set by the manufacturer or wholesaler.

Marked price = CP + Mark-up,

So, we got to know, Goods are sold at market price and if there is no discount then,

⇒ Marked price = CP

So, we got to know how marked price is calculated but in case of discount product it sold at d% discount,

Selling price = Marked price - Discount

Selling price = Marked Price (MP) - discount on MP(d%)

[NOTE: Discount is always calculated on the marked price, not on cost price and mark-up is calculated on the basis of CP.]

$MP(1 - d/100) = SP = CP(1 + a/100)$

Where, SP = selling price, MP = Marked price, CP = Cost price, d = Discount % and a = Gain%.

Now, let's look at some examples on discounts.

E.g. A trader offers his consumer 10% discount still makes a profit of 26%. Then what is the actual cost of an article marked at rs 280?

Sol: By putting the values in the formula

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$$\Rightarrow MP(1 - d/100) = SP = CP(1 + a/100)$$

$$\Rightarrow 280(1 - 10/100) = CP(1 + 26/100)$$

$$\Rightarrow 280 \times 0.9 = CP \times 1.26$$

$$\Rightarrow CP = (280 \times 0.9) / 1.26 = 200 \text{ rs. (Ans.)}$$

E.g. If the marked price of an article is Rs.660 and the discount is 10%, then what is the selling price of the article?

Sol: Putting the values in formula

$$\Rightarrow MP(1 - d/100) = SP = CP(1 + a/100)$$

$$\Rightarrow MP(1 - d/100) = SP$$

$$\Rightarrow 660(1 - 10/100) = SP$$

$$\Rightarrow 660(1 - 0.1) = SP$$

$$\Rightarrow 660 \times 0.9 = SP$$

$$\Rightarrow SP = 600 \text{ Rs. (Ans.)}$$

Let's level up the questions a bit more.

E.g. The marked price of a bicycle is 1100. A shopkeeper allows a discount of 10% and gets a profit of 10%. Find the cost price of the bicycle.

Sol: As we have given gain%, MP and discount% so we will use our general formula

$$\Rightarrow MP(1 - d/100) = SP = CP(1 + a/100)$$

$$\Rightarrow MP(1 - d/100) = CP(1 + a/100)$$

$$\Rightarrow 1100(1 - 10/100) = CP(1 + 10/100)$$

$$\Rightarrow 1100 \times 0.9 = CP \times 1.1$$

$$\Rightarrow CP = (1100 \times 0.9) / 1.1 = 900 \text{ rs. (Ans.)}$$

So, now we have a clear understanding on discounts, let's understand the next topic i.e. **Successive Discounts**.

Successive Discounts

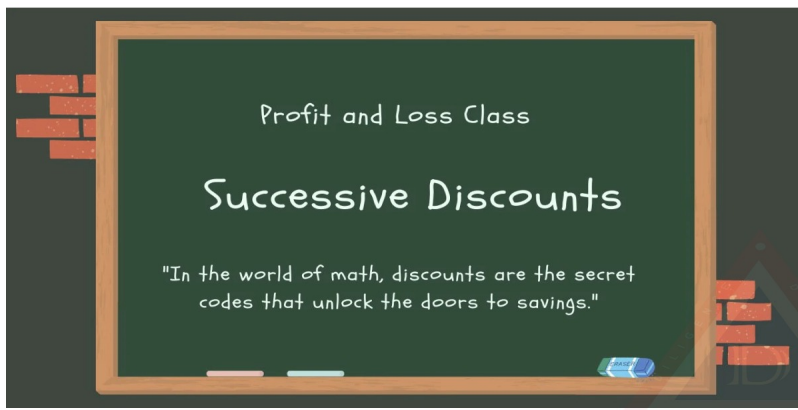
In simpler words, when two or more discounts are allowed one after the other, then such discounts are known as successive discounts.

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Let $r_1\%$, $r_2\%$, $r_3\%$... be the series of discounts on an article with marked price P then the selling price (SP) of the article is given by:

$$SP = P \times (1 - r_1/100)(1 - r_2/100)(1 - r_3/100) \dots$$

This is the general formula for successive discounts. If you observe it closely, you can solve this equation if you have a good command on Multiplying Factor, that we've learned in our previous blog. Let's understand this formula first and then we will discuss some shortcut formulas for two successive discounts to avoid the calculations.



E.g. An item is sold for 680 rs. by allowing a discount of 15% on its marked price. What is the marked price of an item?

Sol: $SP = P \times (1 - r/100)$

$$\Rightarrow P = SP / (1 - r/100)$$

$$\Rightarrow P = 680 / (1 - 0.15)$$

$$\Rightarrow P = 680 / 0.85 = 800 \text{ rs. (Ans.)}$$

E.g. Which is a better bargain for the customer?

1. Successive discounts of 20% and 15%
2. Successive discounts of 10% and 25%

Sol: Let's calculate the total discount for the first case, as we don't have given marked price so we assume $MP = 100$

$$\Rightarrow SP = 100 \times (1 - 20/100)(1 - 15/100) = 100 \times 0.8 \times 0.85 = 68$$

So the discount would be $100 - 68 = 32\%$

In the second scenario,

$$\Rightarrow SP = 100 \times (1 - 10/100)(1 - 25/100) = 100 \times 0.9 \times 3/4 = 67.5$$



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The discount would be $100 - 67.5 = 32.5\%$

So the second bargain would be better. (Ans.)

E.g. Successive discount of 10%, 15%, 20%, and 25% is equivalent to?

Sol: Let the marked price of the item be 100 rs.

Then the selling price would be

$$\Rightarrow SP = P \times (1 - r_1/100)(1 - r_2/100)(1 - r_3/100)(1 - r_4/100) = 100 \times (1 - 10/100)(1 - 15/100)(1 - 20/100)(1 - 25/100)$$

$$\Rightarrow SP = 100 \times 0.9 \times 0.85 \times 0.8 \times 0.75 = 45.9 \text{ rs.}$$

So, the discount would be $= 100 - 45.9 = 54.1\%$ (Ans.)

NOTE:

In the case of two successive discounts:

$$\text{Total discount} = x + y - xy/100$$

Where x, y are the successive discounts.

Now, let's check the above example again.

E.g. Which is a better bargain for the customer?

1. Successive discounts of 20% and 15%
2. Successive discounts of 10% and 25%

Sol: In the first case, the total discount would be,

$$\Rightarrow 20 + 15 - (20 \times 15)/100 = 35 - 300/100 = 35 - 3 = 32\%$$

In the second case,

$$\Rightarrow 10 + 25 - (10 \times 25)/100 = 35 - 2.5 = 32.5\%$$

The bargain would be higher in the second case. (Ans.)

This is much easier than the above one. Right?

NOTE:

If a shopkeeper wants a profit of R% after allowing a discount of r% then

$$\text{Marked Price} = CP \left(\frac{100 + R}{100 - r} \right)$$



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Or

$$\text{Cost Price} = \text{MP} \left\{ \frac{100 - r}{100 + R} \right\}$$

E.g. The marked price of a bicycle is 1100. A shopkeeper allows a discount of 10% and gets a profit of 10%. Find the cost price of the bicycle.

Sol: So by formula,

$$\Rightarrow \text{Cost Price} = \text{MP} \left\{ \frac{100 - r}{100 + R} \right\}$$

$$\Rightarrow \text{Cost Price} = 1100 \times \left\{ \frac{100 - 10}{100 + 10} \right\} = 1100 \times \frac{90}{110} = 900 \text{ rs. (Ans.)}$$

Now let's take one hard examples so that you can understand it more clearly.

E.g. A shopkeeper offers two plans of discount. In scheme A, two successive discounts of 25% and 16% are offered and in scheme B, 38% of one-time discount is offered. If the marked price is Rs 200, what is the difference between the discounted amount if scheme I and scheme II?

Sol: In scheme I:

$$\text{Effective discount on two successive discounts} = (x + y - \frac{xy}{100})$$

$$\Rightarrow (25 + 16 - \frac{25 \times 16}{100}) = 25 + 16 - 4 = 37\%$$

$$\text{Difference in the discount\% in scheme I and scheme II} = 38 - 37 = 1\%$$

$$1\% \text{ of M.P.} = \frac{1}{100} \times 200 = \text{Rs } 2, \text{ scheme II offers more discounts.}$$

So, this is all for discounts. Now, let's move on to the most interesting topic of this Profit and Loss blog series for WBP constable Exam i.e. **Dishonest Dealings**.

Dishonest Dealings

We learnt the basics of Profit and Loss & case of discounts and successive discounts in the last chapters. We will try to understand the concept of the Dishonest Shopkeepers in which we will calculate profit and loss when a dealer uses different cheat tricks with customers to fool them.

Some shopkeepers use different ways to gain profit illegally by cheating with customers. He might use false weights, report the lower weight of his weighing instrument, etc. This will be profitable for the shopkeeper but would cause loss to the buyer.

Use of False weight for Selling an Article:

A shopkeeper uses a false scale to sell his goods to the customer. The value of a false scale would be lower than the true scale, so the shopkeeper gains profit by selling a lesser quantity of goods to the customer.

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So, the profit percentage would be:

$$\text{Profit\%} = \frac{(\text{true weight} - \text{false weight})}{(\text{false weight})} \times 100\%$$

Here, while calculating gain or profit percent, we have taken false weight as a base. Because CP is what is paid when an item is purchased or manufactured. Here, in this case, the dishonest shopkeeper is telling false weight to be the CP and he is gaining only when sells at the false weight.

E.g. A dishonest dealer professes to sell his goods at cost price but he uses a weight of 930g for 1kg weight. Find his gain percent.

Sol: This dealer sells his goods at CP but uses false weight so

$$\text{Profit\%} = \frac{(\text{true weight} - \text{false weight})}{(\text{false weight})} \times 100\%$$

$$\text{Profit\%} = \frac{(1000 - 930)}{930} \times 100\% = 70/930 \times 100\%$$

$$\text{Profit\%} = 7/93 \times 100\% = 7.53\% \text{ (Ans.)}$$

We discussed the case where the dealer sells his goods at cost price. What would happen if he did not sell his product at cost price and used a false scale too. Let him not sell his product at CP and gains/loss of x%.

By combining these two effects the dealer would get a gain of G% in selling his goods to the consumer by using false weight.

E.g. A man sells rice at 10% profit and uses 30% less than the actual measure. His gain percent is?

Sol: Let the weight be 1000 g and if he uses 30% less weight then the false scale would be $1000 \times 0.7 = 700$ g (multiplying factor)

According to formula,

$$\Rightarrow \frac{(100 + G)}{(100 + x)} = \frac{(\text{true value})}{(\text{false value})}$$

$$\Rightarrow \frac{(100 + G)}{(100 + 10)} = \frac{1000}{700}$$

$$\Rightarrow 100 + G = 10/7 \times 110$$

$$\Rightarrow 100 + G = 157.1428$$

$$\Rightarrow G = 57.1428\% \text{ Profit (Ans.)}$$

SPECIAL CASE: If a shopkeeper sells his goods at a% loss on cost price but uses 'b' g instead of 'c' g, then his percentage profit or loss is

$$\text{Profit or Loss \%} = \frac{[(100 - a) \times c/b - 100]}{100}\%$$

E.g. A dealer sells goods at a 6% loss on cost price but uses 14g instead of 16g. What is his percentage profit or loss?



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Sol: By comparing with the formula, we got,

$$a = 6, b = 14, c = 16$$

So putting the values in the formula,

$$\Rightarrow [(100 - 6) \times 16/14 - 100] = 94 \times 8/7 - 100$$

$$\Rightarrow (752 - 700)/7$$

$$\Rightarrow 52/7\% \text{ Or } 7.43\% \text{ gain (Ans.)}$$

Now let's take some hard examples so that you can understand the whole topic more clearly.

E.g. A milkman who claims to sell the milk at the cost price of milk adds 10 litres of water to 'x' liters of milk. Due to this dishonest dealing, he earns 20% profit. If he added 25 liters of water instead of 'x' liters and also sold at selling price which is 20% more than the cost price, what will the profit (%) he earns?

Sol: Let the cost price of the milk be y

Now the milk mixture amounts (x + 10) liters

$$\text{Sales} = (x + 10) \times y$$

$$\text{Cost} = x \times y$$

$$\text{Profit} = \text{Sales} - \text{Cost} = 10y$$

$$\text{Profit}\% = \text{Profit}/\text{Cost} \times 100$$

$$\Rightarrow 20 = (10y)/(xy) \times 100$$

$$\Rightarrow x = 50 \text{ liters}$$

Now 25 liters of water added

$$\text{Selling price} = [(100 + 20)/100] \times y = 1.2y$$

$$\text{Sales} = (50 + 25) \times 1.2y = 90y$$

$$\text{Cost} = 50 \times y = 50y$$

$$\text{Profit} = 90y - 50y = 40y$$

$$\text{Profit}\% = \text{Profit}/\text{Cost} \times 100 = (40y)/(50y) \times 100 = 80\%$$

E.g. A restaurant incurs two costs to make a delivery - food preparation cost and delivery cost. Initially, the food was sold at marked price and the actual delivery cost of Rs 12 was collected as delivery cost, giving the owner 32% profit on overall cost. Now the restaurant gives 10% discount but increases the delivery charge by 50%, this gives a profit of 26%. What is the cost of food preparation? (in rupees)



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Sol: Let the food preparation cost and the marked price be Rs x and Rs y respectively

Total charge = S.P. + Delivery charge

Total cost = Food preparation cost + Delivery cost

When sold at M.P.

Total sales = M.P. + 12 = y + 12

Cost = x + 12

Profit = 32%

S.P. = (100 + Profit%)/100 × C.P.

y + 12 = 1.32 × (x + 12) --- 1)

When sold at 10% discount

Delivery charge = (100 + 50)/100 × 12 = Rs 18

Total sales = MP × (100 - 10)/100 + 18

⇒ 0.9y + 18 = (100 + 26)/100 × (x + 12)

⇒ 0.9y + 18 = 1.26 (x + 12) --- 2)

Equation 2) + 1)

⇒ 1.26/1.32 = (0.9y + 18) / (y + 12)

⇒ 21/22 = (0.9y + 18) / (y + 12)

⇒ 21y + 252 = 19.8y + 396

⇒ 144 = 1.2y

∴ y = Rs 120

Substituting in equation 1)

⇒ 132 = 1.32 × (x + 12)

∴ x = Rs 88

E.g. Three types of soaps are sold in a shop. Selling price of soap C is Rs 2 more than the selling price of soap B which is in turn Rs 2 more than the selling price of A. By selling each unit of soap A and soap B the shopkeeper earns a profit of 25% and 10% respectively and suffers a loss of 20% by selling soap C. If the shopkeeper sells one unit of soaps A, B and C, he makes no net profit nor loss, then what is the selling price of one unit of soap B?



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Sol: Let the selling price of soap A = x

Selling price of soap B = x + 2

Selling price of soap C = (x + 2) + 2 = x + 4

Cost price of A = S.P. × 100/(100 + Profit)

$$\Rightarrow x \times 100/(100 + 25) = 4x/5$$

$$\text{Cost price of B} = (x + 2) \times 100/(100 + 10) = 10x/11 + 20/11$$

$$\text{Cost price of C} = (x + 4) \times 100/(100 - 20) = 5x/4 + 5$$

For no loss nor profit, Sum of S.P. = Sum of C.P.

$$x + (x + 2) + (x + 4) = 4x/5 + 10x/11 + 20/11 + 5x/4 + 5$$

$$\Rightarrow 3x + 6 = (176x + 200x + 275x)/220 + 75/11$$

$$\Rightarrow 3x + 6 = (651x)/220 + 75/11$$

$$\Rightarrow 3x - (651x)/220 = 75/11 - 6$$

$$\Rightarrow (660x - 651x)/220 = (7566)/11$$

$$\Rightarrow 9x/220 = 9/11$$

$$\Rightarrow x = 220/11 = \text{Rs } 20$$

Selling price of soap B = x + 2 = Rs 22

We have covered all aspects of questions which can be asked in profit and loss now. Profit and Loss and specially discount is the important topic for the WBP Constable Exam and if you want to score well in the quant section then you can't miss this topic because questions on profit and loss will be definitely asked in your paper. Do practice as it is the key to success in the quant section.

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