# Dishonest dealings - Quant Study Notes for Competitive Exams

We learnt the basics of Profit and Loss & case of discounts and successive discounts in the last blogs. In today's blog,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. So, the profit percentage would be,

**Profit(%) = [(true weight - false weight) / false weight] × 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, Profit(%) = (true weight - false weight)/(false weight) × 100% Profit(%) = (1000 - 930)/930 × 100% Profit(%) = 70/930 × 100% = 7/93 × 100% = 7.53% (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.

**(100 + G) / (100 + x) (-ve if loss) = (true scale/weight) / (false scale/weight)**

**(100 + G) / (100 + x) = (true value) / (false value)**

E.g. A cloth merchant says that due to a slump in the market, he sells the cloth at 10% loss, but he uses a false-meter scale and gains 15%. Find the actual length of the scale. Sol: Let the actual length of scale be l cm and true be 100cm Final gain (%) = G = 15% x (%) = -10% So, ⇒(100 + G) / (100 + x) = (true length) / (false length) ⇒(100 + 15) / (100 - 10) = 100 / l ⇒ 115/90 × 1/100 = 1 / l ⇒ l = 90/115 × 100 ⇒ l = 78.25 cm (Ans.) The actual length would be 78.25cm instead of 1m.

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 × 0.7 = 700 g (multiplying factor) According to formula, ⇒(100 + G) / (100 + x) = (true value) / (false value) ⇒ (100 + G) / (100 + 10) = 1000 / 700 ⇒ 100 + G = 10/7 × 110 ⇒ 100 + G = 157.1428 ⇒ G = 57.1428% 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: **[(100 - a) × c/b - 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? Sol: By comparing with the formula we got, a = 6, b = 14, c = 16 So putting the values in the formula, ⇒ [(100 - 6) × 16/14 -100)] = 94 × 8/7 - 100 = (752 - 700)/7 = 52/7% Or 7.43% gain (Ans.)

E.g. A milkman makes a profit of 20% on the sale of milk. If he were to add 10% water to the milk, by what percentage his profit increases? Sol: Let the quantity of milk be 100g and if he will add 10% water then it will become 100 × 1.1 = 110g so the true value would be 110 and false would be 100 So according to formula, ⇒ (100 + G) / (100 + x) = (true value) / (false value) ⇒ (100 + G) / (100 + 20) = 110 / 100 ⇒ (100 + G) / 120 = 11/10 ⇒ 100 + G = 11/10 × 120 ⇒ 100 + G = 11 × 12 ⇒ G = 32% (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 be profit (%) he earns? Sol: Let the cost price of the milk be y Now, the milk mixture amounts (x + 10) liters Sales = (x + 10) × y and Cost = x × y Profit = Sales – Cost = 10y Profit% = Profit/Cost × 100 ⇒20 = (10y)/(xy) × 100 ⇒x = 50 liters Now, 25 liters of water added, Selling price = (100 + 20)/100 × y = 1.2y Sales = (50 + 25) × 1.2y = 90y Cost = 50 × y = 50y Profit = 90y – 50y = 40y Profit% = Profit/Cost × 100 = (40y)/(50y) × 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) 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 and 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 ⇒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? 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) ⇒ x × 100/ (100 + 25) = 4x/5 Cost price of B = (x + 2) × 100/ (100 + 10) = 10x/11 + 20/11] Cost price of C = (x + 4) × 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 ⇒3x + 6 = (176x + 200x + 275x) /220 + 75/11 ⇒3x + 6 = (651x) /220 + 75/11 ⇒3x – (651x) /220 = 75/11 – 6 ⇒(660x – 651x) /220 = (75 – 66) /11 ⇒9x/220 = 9/11 ⇒x = 220/11 = 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 is an important topic for the exams and if you wanna 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 and stay connected with us.