

Profit, Loss, and Discount

Concept of Cost Price (C.P.) and Selling Price (S.P.)

- **Cost Price (C.P.):** The price at which an article is bought.
- **Selling Price (S.P.):** The price at which an article is sold.
- **Profit:** If $S.P. > C.P.$, then $\text{Profit} = S.P. - C.P.$
- **Loss:** If $C.P. > S.P.$, then $\text{Loss} = C.P. - S.P.$

Formulas:

1. **Profit Percentage:** $\text{Profit \%} = (\text{Profit} / C.P.) \times 100$
2. **Loss Percentage:** $\text{Loss \%} = (\text{Loss} / C.P.) \times 100$
3. **Selling Price (S.P.):**
 - $S.P. = C.P. \times (1 + \text{Profit \%} / 100)$
 - $S.P. = C.P. \times (1 - \text{Loss \%} / 100)$
4. **Cost Price (C.P.):**
 - $C.P. = S.P. / (1 + \text{Profit \%} / 100)$
 - $C.P. = S.P. / (1 - \text{Loss \%} / 100)$
5. **Discount Calculation:**
 - $\text{Discount} = \text{Marked Price (M.P.)} - \text{Selling Price (S.P.)}$
 - $S.P. = M.P. - \text{Discount}$
6. **False Weight Profit Calculation:**
 - $\text{Profit \%} = [(\text{True weight} - \text{False weight}) / \text{False weight}] \times 100$
7. **Successive Profit Calculation:**
 - When there are two successive profits, say $m\%$ and $n\%$, the net percentage profit = $[m + n + (mn / 100)]$
8. **Mixed Profit & Loss Calculation:**
 - When the profit is $m\%$, and loss is $n\%$, the net % profit or loss = $[m - n - (mn / 100)]$
9. **Cost Price Calculation from Multiple Profits:**
 - If a product is sold at $m\%$ profit and then again at $n\%$ profit, then actual cost price:
 - $CP = [100 \times 100 \times S.P. / (100 + m)(100 + n)]$
 - In case of successive losses:
 - $CP = [100 \times 100 \times S.P. / (100 - m)(100 - n)]$
10. **Equal Profit and Loss Case:**
 - If $\text{Profit \%} = \text{Loss \%}$, then $\% \text{ Loss} = (P^2 / 100)$

Key Concepts and Examples

1. Profit & Loss Based on Percentage

- If a **75/4%** profit fetches Rs. 300, find C.P.:

- $1\% = 300 / (75/4) = 16$, so $100\% = 16 \times 100 = \text{Rs. } 1600$
- If selling price is Rs. 450 and loss is **25%**, find the price for a **50% profit**:
 - $75\% = 450$, so $1\% = 450 / 75$, then $150\% = 900$

2. Equating Profit and Loss

- If profit at Rs. 1920 equals loss at Rs. 1280, find C.P. and S.P.:
 - $\text{C.P.} = (1920 + 1280) / 2 = 1600$
 - $\text{S.P. for } 25\% \text{ profit} = 1600 \times 1.25 = 2000$

3. Profit/Loss from Selling Multiple Articles

- If **S.P. of 20 articles = C.P. of 25 articles**, find profit percentage:
 - $\text{C.P.} / \text{S.P.} = 20 / 25 = 4/5$, so $\text{Profit \%} = (1/4) \times 100 = 25\%$

4. Dishonest Selling Practices

- If a shopkeeper **marks 50% above C.P.** and **gives a 10% discount** while also **cheating 20% in weight**, find overall profit:
 - $\text{C.P.} = 100$, $\text{M.R.P.} = 150$, $\text{S.P. after discount} = 135$
 - $\text{New C.P.} = 80$ (due to cheating in weight)
 - $\text{Profit \%} = ((135 - 80) / 80) \times 100 = 68.75\%$

5. Successive Profit and Loss

- If an item is bought at **Rs. X** and sold at **Rs. Y** with a **15% profit**, and if X were **15% less** and Y **Rs. 52 less**, a **20% profit** would be earned.
- Using equations:
 - $Y = 1.15X$
 - $(X - 0.15X) \times 1.20 = Y - 52$
 - Solving gives **X = Rs. 400**

6. Weight-Based Profits

- A dishonest milkman sells at C.P. but **adds water to earn 16.66% profit**:
 - $x / (x + y) = 1 / 1.1666$
 - **Ratio of mixture to milk = 6:1**
- A dishonest shopkeeper sells using **900g instead of 1kg**:
 - $\text{Profit \%} = ((1000 - 900) / 900) \times 100 = 11.11\%$

7. Finding Cost Price from Selling Price

- If an item is sold at **Rs. 144** and **profit % = C.P.**, find C.P.:
 - $x + (x / 100) = 144$
 - $1.01x = 144$
 - $x = 72$

8. Successive Discounts

- Two successive discounts of **10% and 12.5%** are equivalent to a single discount:
 - $1 - (0.9 \times 0.875)$
 - $1 - 0.7875 = 21.25\%$

Summary of Important Points

1. **Profit occurs when $S.P. > C.P.$, and loss when $S.P. < C.P.$**
2. **Always consider cheating or weight manipulation in percentage calculations.**
3. **Successive discounts and profits must be calculated step by step, not added directly.**
4. **For dishonest practices, consider effective weight or price rather than marked ones.**
5. **For multiple item purchases and sales, break down into per-unit cost.**
6. **Formulas simplify solving for unknowns in profit-loss scenarios.**

Question for Practice

1. If the cost price and the selling price are in the ratio of 8: 9, what will be the profit percentage?
(a)12.5% (b)12% (c)10% (d)15%
2. Selling an item for ₹ 4214 leads to a loss of 12.5%. Then find the cost price of that item.
(a)4800₹ (b)4816₹ (c)4808₹ (d)4900₹
3. The cost price of 15 items equals the selling price of 10 items. What will be the profit percentage?
(a)40% (b)45% (c)33.33% (d)50%
4. Selling an item for ₹ 436 results in as much loss as selling it for ₹ 464. Find the purchase price of that item?
(a)440₹ (b)460₹ (c)450₹ (d)445₹
5. The profit from selling an item for ₹69 is double the profit from selling it at ₹78. So what is the cost price?
(a)64₹ (b)65₹ (c)61₹ (d)60₹
6. A person buys 6 pencils at ₹5 and sells 5 at ₹6. Then find the profit percentage.
(a)25%profit (b)30%profit
(c)44%profit (d)33.33%profit
7. If a shopkeeper bought 11 lemons for ₹ 10 and sold 10 lemons for ₹ 11, how many lemons would he sell for a profit of ₹42?
(a)200 (b)220 (c)210 (d)205
8. A fruit seller buys 700 oranges at a rate of ₹500 for 100 oranges and another type of 500 oranges at the rate of ₹ 700 for 100 oranges. If he sells them for ₹84/dozen, find the profit percentage.
(a)12.5% (b)30% (c)25% (d)20%
9. On selling 33m cloth, the shopkeeper makes a profit equal to the cost price of 11m. What is the profit percentage?
(a)40% (b)45% (c)33.33% (d)50%
10. On selling 33m cloth the shopkeeper makes a profit equal to the selling price of 11m cloth. what is the profit percentage?
(a)40% (b)45% (c)33.33% (d)50%
11. on selling 33 m of cloth a shopkeeper makes a loss equal to the selling price of 11 m then what is the loss percentage?
(a)20% (b)25% (c)33.33% (d)15%
12. Mohan bought 20 dining tables for ₹ 32000 and sold them at a profit equal to the selling price of 4 dining tables. What is the selling price of each dining table?
(a)2000₹ (b)1600₹ (c)1800₹ (d)1500₹
13. If a person sells an item at a loss of 7% if they sell it for ₹ 800 more than before, they will get a profit of 9% Find the cost price of that item?
(a)5500₹ (b)4500₹ (c)4000₹ (d)5000₹

14. If a person sells an item at a loss of 10% if they sell it for ₹ 45 more than before, they will get a profit of 12.5% Find the cost price of that item?
(a)150₹ (b)250₹ (c)300₹ (d)200₹
15. On selling an item for ₹350 instead of ₹400, there is a loss of 5% more. What will be the cost price of the item?
(a)2000₹ (b)1600₹ (c)1000₹ (d)1500₹
16. A person buys two watches for ₹480, he sells one at a 15% loss and the other at a 19% profit and he finds that each watch is sold at an equal price. Find the price of both watches.
(a)280,200₹ (b)220,260₹ (c)210,270₹ (d)250,230₹
17. A person bought two watches for ₹ 600. He sold one watch at a profit of 14% and the other at a loss of 14%. If the selling price of each is equal then what is the cost price of the first watch?
(a)248₹ (b)258₹ (c)243₹ (d)257₹
18. The cost price of two watches is ₹ 840, one watch is sold at a profit of 16% and the other at a loss of 12%, in the total transaction there is no profit and no loss. Find the cost price of the watch that sold at a profit.
(a)480₹ (b)360₹ (c)240₹ (d)300₹
19. A man buys two fans for ₹ 2160. Sold one at a profit of 15% and the other at a loss of 9%. There was no profit or loss in the whole transaction. Find the cost price of both fans.
(a)790,1370₹ (b)820,1340₹
(c)810,1350₹ (d)850,1310₹
20. A dishonest milkman sells milk at a cost price. But adds water to milk and earns 16.66% profit. Find the ratio of the mixture to milk.
(a)6: 7 (b)7: 6 (c)6: 1 (d)7: 1
21. A dishonest shopkeeper declares to sell the item at a cost price. If he uses 900 grams instead of 1 kg, find the percentage of his profit.
(a)14.28% (b)11.11% (c)16.66% (d)9.09%
22. A dishonest shopkeeper declares to sell the item at a cost price. If he uses 700 grams instead of 1 kg, what will be his profit percentage?
(a) $42\frac{6}{7}\%$ (b) $44\frac{4}{9}\%$ (c)66.66% (d) $36\frac{4}{11}\%$
23. A dishonest shopkeeper sells goods at a cost price. If he makes a profit of 25% by using false weight, then how many grams of weight does he use instead of 1kg?
(a)750gm (b)900gm (c)850gm (d)800gm
24. A dishonest sweet seller sells sweets at 10% profit but he uses a weight of 800 grams instead of 1 kg. Find his profit percentage.
(a)42.84% (b)44.44% (c)66.66% (d)37.5%
25. A dishonest sweet seller sells sweets at 20% profit but he uses a weight of 900 grams instead of 1 kg. What will be his profit percentage?
(a)42.84% (b)33.33% (c)66.66% (d)37.5%

26. A shopkeeper sells an item at 20% profit if he buys it at 10% less and sells it for ₹ 12 less then earns 30% profit. Find the actual cost price of the item.
(a)480₹ (b)360₹ (c)400₹ (d)300₹
27. If a person sold a horse at 15% profit if he had bought it at 25% less and sold it for ₹ 600 less, then find the cost price of the horse with a profit of 32%.
(a)3750₹ (b)3600₹ (c)2400₹ (d)3000₹
28. A person sells 12 oranges for 1 ₹ and has a loss of 20%. How many oranges should he sell for ₹ 1 to make a profit of 20%?
(a)11 (b)10 (c)9 (d)8
29. On selling 32 toffees at ₹ 1, a person has a loss of 40%. How many toffees will he sell for ₹ 1 to have a profit of 20%?
(a)16 (b)24 (c)30 (d)20
30. A person has a loss of 20% by selling 45 lemons for ₹ 40, how many lemons must he sell for ₹ 24 to earn a profit of 20%?
(a)16 (b)24 (c)18 (d)20
31. If a person sells 12 oranges for ₹ 1 and has a loss of 20%, then in how much rupees he must have bought 12 oranges?
(a)1.8₹ (b)1.25₹ (c)1.75₹ (d)1.5₹
32. A person sells two items for ₹ 1710. He has a loss of 10% on the first item and a profit of 25% on the second item. If the cost price of the first item equals the selling price of the second item, then find the profit or loss.
(a)200₹ (b)100₹ (c)110₹ (d)90₹
33. A person has bought two items for ₹ 7500 if he sells the first at 20% profit and the second at a loss of 50%. If the purchase price of the first item is equal to the selling price of the second item, then what is the profit or loss?
(a)2000₹ loss (b)2000₹ profit
(c)2500₹ loss (d)300₹ profit
34. The profit percentage made by a person for selling an item for ₹ 144 is equal to the cost price for that item, then find the cost price of that item.
(a)72₹ (b)80₹ (c)100₹ (d)90₹
35. The profit percentage made by a person for selling an item for ₹ 96 is the profit percentage equal to the cost price of that item, then find the cost price of that item?
(a)60₹ (b)80₹ (c)100₹ (d)90₹
36. A sells an item to B with a profit of 16.66%. B sells C with a profit of 9.09%. If C had to pay ₹ 5600, then how much rupees did A pay for it?
(a)5000₹ (b)3600₹ (c)2800₹ (d)4400₹
37. A sold an item to B for 33.33% profit but B sold it to C at a 10% loss and C sold it to D for 16.66% profit and D paid ₹4200, then for How many rupees did A to buy that item?
(a)2800₹ (b)3600₹ (c)3000₹ (d)4000₹

38. A person sells two chairs at the rate of ₹ 120 per chair. On selling the first chair he gained 25% and a loss of 25% on the second chair. What was his total loss?
 (a)12₹ (b)36₹ (c)25₹ (d)16₹
39. A trader sold two bulls at ₹ 8400 each and made no profit or loss on it. If he had sold one of them at 20% profit then at what loss percentage he have sold the other?
 (a)14.28% (b)11.11% (c)10% (d)20%
40. A shopkeeper made a 10% profit on a TV set while giving a 20% discount on a marked price. If the marked price was ₹ 1100, what would be the cost price?
 (a)850₹ (b)1000₹ (c)900₹ (d)800₹
41. The marked price of a radio is ₹ 480. The shopkeeper earns 8% profit while giving 10% discount on it. If no discount is given then what percentage of profit will he make?
 (a)20% (b)10% (c)15% (d)25%
42. A trader marks 40% more than the purchase price on goods and gives a 20% discount on the marked price. So what percentage will he gain?
 (a)15% (b)10% (c)12.5% (d)12%
43. A person has bought an item at a 20% discount on the marked price and wants to put a new marked price to earn 25% profit by giving a 20% discount. The new market price will be how many percent more than the previous marked price?
 (a)25% (b)20% (c)22.5% (d)27%
44. A person also earns 20% by giving a 10% discount on the cost price. If he sold at an 18% discount, what would be his new profit percentage?
 (a)9.33% (b)10% (c)12.5% (d)7.33%
45. A shopkeeper gives four items free on the purchase of 12 items and also gives a discount of 20%. What is the discount received by the customer?
 (a)45% (b)40% (c)50% (d)35%
46. A shopkeeper gives 4 goods free on the purchase of 12 goods, gives a discount of 20%, and still earns a profit of 20%. Find the ratio of cost price and marked price.
 (a)2: 1 (b)7: 2 (c)1: 2 (d)7: 10
47. A shopkeeper gives one item free on every purchase of 15 items and also a discount of 4%. Still gains 35%. Find the ratio of cost price and marked price.
 (a)2: 3 (b)7: 2 (c)8: 3 (d)3: 2
48. The cost price of 15 goods is equal to the selling price of 12 goods and the discount given on 8 goods is equal to the profit on 6 goods. So what is the discount percentage?
 (a) $13\frac{1}{23}\%$ (b) $14\frac{4}{23}\%$ (c) $12\frac{2}{23}\%$ (d)12.5%
49. The gradual discounts of $14\frac{2}{7}\%$, $11\frac{1}{9}\%$ and 12.5% would be equal to how much a single discount?
 (a)33.33% (b)22.22% (c)30% (d)25%
50. The marked price of a mixer is ₹1600. The shopkeeper sells it at 10% and x% of two successive discounts for ₹ 1224. Find the value of x.

(a)8%

(b)10%

(c)15%

(d)12%

ANSWERS

Profit loss and discount

1 a	6 c	11 b	16 a	21 b	26 c	31 b	36 d	41 a	46 c
2 b	7 b	12 a	17 b	22 b	27 a	32 d	37 c	42 d	47 a
3 d	8 d	13 d	18 b	23 d	28 d	33 a	38 d	43 a	48 a
4 c	9 c	14 d	19 c	24 d	29 a	34 b	39 a	44 a	49 a
5 d	10 d	15 c	20 b	25 b	30 c	35 a	40 d	45 b	50 c