

PROFIT & LOSS, PARTNERSHIPS AND AVERAGES

Concepts

Selling Price (SP) – Price at which an article is sold

Cost Price (CP) – Price at which an article is bought

Marked Price (MP) – Initial price quoted for the article

Profit/loss = SP – CP

Profit/loss percentage = $\frac{SP-CP}{CP} \times 100$

Mark-up amount = MP – CP

Mark-up percentage = $\frac{MP-CP}{CP} \times 100$

Discount = MP – SP

Discount percentage = $\frac{MP-SP}{MP} \times 100$

Note: Profit/loss percentage and mark-up percentage are always calculated on the cost price and discount percentage is always calculated on the marked price.

- If a seller sells his goods at cost price, but uses false weight, then the profit earned is given by the formula

$$\text{Gain \%} = \frac{\text{Error}}{\text{True value} - \text{Error}} \times 100$$
- If the investments are in the ratio a : b : c, for a fixed time period, then the profit should be divided in the ratio a : b : c.
- If the investments are in the ratio a : b : c for a time period, of x, y, z respectively, then the profit should be divided in the ratio ax : by : cz.
- Average of N items = $\frac{\text{Total value of all the items}}{\text{Number of items (N)}}$
- Average (using the deviations)

$$= \text{Assumed value} \pm \frac{\text{Deviation}}{\text{Number of elements}}$$
- **Weighted Average:** If there are 'n' items with an average of 'a' and another 'm' items with an average of 'b', then the overall average = $\frac{an+bm}{n+m}$
- **Alligation Rule:** If two solutions of concentration P₁ and P₂ are mixed in the ratio Q₁:Q₂ to result in an average concentration of P, then by rule of alligation, $\frac{P_2-P}{P-P_1} = \frac{Q_1}{Q_2}$

Drill

1. Assume that you are going to a shop to buy a dress. You find the dress on the mannequin very attractive and wish to buy it. The tag price of the dress is Rs. 5400. You buy that dress at a special discount of 20%. When you show that dress to your friend, he reveals that he was the one who designed that dress and had sold it to the shop for Rs. 1080.
 From the shop owners point of view,
 - A. How is the amount Rs. 1080 called? _____
 - B. How is the amount Rs. 5400 called? _____
 - C. What is the discount given? _____
 - D. What is the profit/loss incurred by the shopkeeper? _____
 - E. What is the profit/loss %? _____
2. Now assume you are the owner of an ornaments shop.
 - A. You are buying a diamond ring for Rs. _____

- B. What is your expected profit on the sale of that ring? _____
 - C. What should be your selling price? _____
 - D. If you wish to give a discount of 20% and still make the same profit, what should be the marked price? _____
 - E. From your marked price, if you give a discount of 20%, are you getting your selling price? _____
3. Ram sells 2 flats for Rs. 198 lakhs each. On one transaction he loses 10% and on the other he gains 10%. What is his net profit or loss percentage?
 - A. In the first transaction what is the cost price? _____
 - B. In the second transaction what is the cost price? _____
 - C. What is the total cost price? _____
 - D. What is the total selling price? _____
 - E. Total profit/ loss? _____
 - F. Profit/ loss %? _____
 4. A dishonest shopkeeper professes to sell his goods at cost price, but he gives only 800 g instead of 1000 g. What is his profit %?
 5. Anand and Babu invest in a business in the ratio 4 : 3. If 2% of the total profit goes to charity and Anand's share is Rs. 854, what is Babu's share?
 6. Dhivya and Ramya started a business. They both invested Rs. 100,000 each. At the end of 6 months, Ramya predicts that the business will end up in a loss and she withdrew Rs. 60,000 from the business. But, at the end of one year, the business generated a profit of Rs. 34,000. What will be the profit share of each person?
 7. You along with 5 of your friends go for an outing. You have Rs. 31,348, Rs. 26,348, Rs. 23,348, Rs. 27,348, Rs. 32,348 and Rs. 35,348 with you. You plan to divide that amount equally among yourselves before starting for this trip. All six of you agree to donate the unspent money to an orphanage.
 - A. What is the amount with each person at the start of the journey? _____
 - B. If the last person lost his money when he was about to reach the starting point and you still agree to share the money equally, what will be the amount with each of you when you are starting? _____
 - C. If the last person is not coming for the trip, what will be the amount with each of you at the time of starting? _____
 - D. If the expense per head at the end of the trip was Rs. 32,000, then, what is the total amount donated to the orphanage? _____
 8. Four friends have an average weight of 68. If John is also included in the group, the average weight becomes 72. What is John's weight?
 9. Average height of class A is 160 cm and that of class B is 170 cm. Find the average height of students of both the classes put together.
 10. One litre of bottle A with 8% sugar solution is mixed with an unknown quantity of bottle B with 11% sugar solution such that the mixture has 10% sugar solution. How many litres of sugar solution from bottle B was mixed with bottle A?
 11. A milk man mixes two bottles of milk with concentrations of milk being 0.6 and 0.9. The resultant mixture has a

concentration of 0.7. Find the ratio in which milk from the two bottles is mixed.

12. 20 ml of sulphuric acid of concentration 0.4 is diluted by adding water such that the concentration becomes 0.3. What is the quantity of water added?

Concept review questions

1. If the S.P. of 10 articles is the same as the C.P. of 11 articles, find the gain percentage.
a. 20 b. 10 c. 15 d. 40
2. The price of sugar is raised by 10%. By how much percent must a man reduce his consumption of sugar so as to not increase his expenditure?
a. 9.09 b. 8.08 c. 7.06 d. 9.50
3. An article worth Rs. 120 is sold for Rs. 145. What is the profit percent?
a. 30.83 b. 20.83 c. 40.83 d. 25
4. A man purchased a scooter for Rs. 20000 and got it insured for 80% of its value. The scooter was totally destroyed in an accident and the insurance company compensated him for only 80% of the claim. What was the loss suffered (in %)?
a. 30 b. 36 c. 38 d. 40
5. If an article is sold for Rs. X, the profit is 10% and if the price is reduced by Rs. 88, the loss is 10%. Find the cost price of the article.
a. 440 b. 400 c. 444 d. 800
6. Two articles are sold at Rs. 199 each such that a profit of 10% is made on the first while a loss of 10% is incurred on the other. What would be the net profit/loss on the two transactions?
a. loss of 1% b. gain of 1% c. loss of 10% d. gain of 10%
7. A and B together invested Rs. 18000 in a business. The ratio of their investments was 4 : 5. At the end of the year, a total profit of Rs. 2700 was generated. Find their profits.
a. 1200, 1500 b. 1300, 1400 c. 1400, 1300 d. None
8. Monish started a business by investing Rs. 80000. Six months later, Mani joined him with a capital of Rs. 140000. If at the end

of the year, the total profit is Rs. 37500, then what is Mani's share of profit?

- a. 25000 b. 17500 c. 15000 d. None
9. A, B, C rent a pasture. A puts 10 oxen for 7 months, B puts 12 oxen for 5 months and C puts 15 oxen for 3 months for grazing. If the rent of the pasture is Rs. 175, how much must C pay as his share of rent?
a. Rs.45 b. Rs.50 c. Rs.55 d. Rs.60
10. In the first 5 overs of a cricket game, the run rate was 4.6. What should be the run rate in the remaining 15 overs to reach the target of 183 run in 20 overs match?
a. 6.25 b. 10.5 c. 10.67 d. 10.75
11. The average weight of 32 students in class A is 78 kg and the average weight of 96 students in class B is 38 kg. Find the combined average of both the classes.
a. 42 b. 58 c. 48 d. 59
12. The average score of 70 students is 35. The average score of first 28 students is 53. Find the average of the remaining students.
a. 42 b. 23 c. 53 d. 67
13. A pupil's mark was wrongly entered as 83 instead of 63. Due to that, the average mark of the class increased by half a mark. The number of pupils in the class is:
a. 40 b. 20 c. 10 d. 73
14. In what ratio must a grocer mix two varieties of pulses costing Rs. 15 per kg and Rs. 20 per kg respectively so as to get a mixture worth Rs. 16.50 per kg?
a. 3:7 b. 5:7 c. 7:3 d. 7:5
15. A mixture of a certain quantity of milk and 10 litres of water is worth Rs. 80. If pure milk of same quantity is worth Rs. 100, what is the amount of milk in the mixture? (Assume water is free of cost)
a. 10 b. 40 c. 50 d. None