02

Profit and Loss

Theory and Concepts :-

In day- to-day life we sell and purchase the things as per our requirement. A customer can get things in the following manner :

Manufacturer(or producer) $\longrightarrow$ Whole-seller (shopkeeper or sales person) $\longrightarrow$ Retailser $\longrightarrow$ Customer

Terminology

- **Cost Price (C.P.) :** The price at which an article is bought is called its cost price. It is abbreviated as C.P.
- **Selling Price (S.P.) :** The price at which an article is sold is called its selling price. It is abbreviated as S.P.
- **Profit or Gain :** If the selling price of an article is more than the cost price, there is a gain or profit.

  Thus, profit or gain =S.P – C.P. when S.P > C.P.
- **Loss :** If the cost price of an article is greater than the selling price, the seller suffers a loss.

  Thus, Loss = C.P. – S.P., C.P. > S.P.

Important Formulae

(i) Profit = S.P. – C.P.

(ii) Loss = C.P. – S.P.

(iii) Profit Percentage

$$= \frac{\text{Profit}}{\text{C.P.}} \times 100$$

(iv) `Loss percentage

$$= \frac{\text{Loss}}{\text{C.P.}} \times 100$$

(v) $\text{S.P.} = \left(\frac{100 + \text{gain}\%}{100} \times \text{C.P.}\right)$

$$= \left(\frac{100 - \text{loss}\%}{100}, \text{C.P.}\right)$$

(vi) $\text{C.P.} = \left(\frac{100}{100 + \text{gain}\%} \times \text{S.P.}\right)$

(v) $= \left(\frac{100}{100 - \text{loss}\%} \times \text{S.P.}\right)$

(vii) S.P. = (100 + x)% of C.P.; when profit = x % of C.P.

(viii) S.P. = (100 – x) % of C.P; when loss = x % of C.P.

Note :- Profit or loss is always calculated on the basis of cost price unless otherwise mentioned in the problem.

Overhead Expenses (or overheads): If an article is purchased for some amount and there are some additional expenses on transportation, labour, commission etc, these are to be added in the cost price. Such expenses are called overheads.

→ We will solve all the problems with the help of ratio . For this some percentage in the form of fraction given below (memorize all of them to speed up your calculation)

$2\% = \frac{1}{50}$

$4\% = \frac{1}{25}$ (×3)

$12\% = \frac{12}{100} = \frac{3}{25}$ (×3)

$36\% = \frac{36}{100} = \frac{9}{25}$

$20\% = \frac{1}{5}$

$6\frac{1}{4}\% = \frac{1}{16}$

$11\frac{1}{9}\% = \frac{1}{9}$

$66\frac{2}{3}\% = \frac{2}{3}$ (×$\frac{1}{2}$)

$33\frac{1}{3}\% = \frac{1}{3}$ (×$\frac{1}{2}$)

$16\frac{2}{3}\% = \frac{1}{6}$ (×$\frac{1}{2}$)

$8\frac{1}{3}\% = \frac{1}{12}$

$14\frac{2}{7}\% = \frac{1}{7}$

$12\frac{1}{2}\% = \frac{1}{8}$ (×7) → $87\frac{1}{2}\% = \frac{7}{8}$

(×3) → $37\frac{1}{2}\% = \frac{3}{8}$

$69\frac{3}{13}\% = \frac{9}{13}$

Note :- When we change profit % or loss % in fraction then numerator shows porfit value or loss value respectively and denominator value shows Actual value at which profit % or loss % is calculated. It can be C.P. or S.P.

Examples

(i) If profit is $11\frac{1}{9}\%$ (calculated on C.P.), then

$11\frac{1}{9}\% = \frac{1}{9}$ → Profit

$\frac{1}{9}$ → C.P.

$\Rightarrow$ profit : C.P. = 1 : 9

Since S.P. = C.P. + profit

= 9 + 1 = 10

$\therefore$ CP : SP = 9 : 10

(ii) If loss in $14\frac{2}{7}\%$ calculated on C.P. then

$14\frac{2}{7}\% = \frac{1}{7} \longrightarrow$ Loss
$\longrightarrow$ C.P.

$\Rightarrow$ Loss : C.P. = 1 : 7

$\therefore$ S.P. = C.P. – Loss = 7 – 1 = 6

$\Rightarrow$ S.P. : C.P. 6 : 7

(iii) If profit is $6\frac{1}{4}\%$ calculated on C.P., then

$6\frac{1}{4}\% = \frac{1}{16} \longrightarrow$ Profit
$\longrightarrow$ C.P.

Profit : C.P. C.P. : S.P.

1 : 16 $\Rightarrow$ 16 : 17

(iv) If loss is $6\frac{1}{4}\%$ calculated on C.P., then

$6\frac{1}{4}\% = \frac{1}{16} \longrightarrow$ Loss
$\longrightarrow$ C.P.

Loss : C.P. C.P. : S.P.

1 : 16 $\Rightarrow$ 16 : 15

Note :- While solving the questions we compare (actual) value with the ratio value to find out the required value of answer.

e.g. C.P. = 50 , profit = 20 %, S.P. = ?

Sol. 20 % = $\frac{1}{5} \longrightarrow$ Profit
$\longrightarrow$ C.P.

$\therefore$ S.P. = 5 + 1 = 6

$\Rightarrow$ S.P. : C.P.
6 : 5
$\downarrow \times 10$ $\downarrow \times 10$
60 50 (given)

or $5 \cong 50$

$\therefore 6 \cong \frac{50}{5} \times 6 = 60$

i.e. S.P. = Rs. 60

Some Useful Shortcut Methods :

1. If a man buys x items for Rs. y and sells z items for Rs. w , then the gain or loss per cent made by him is

$$\left(\frac{xw}{zy} - 1\right) \times 100\%$$

Quantity Price

x — y

z — w

Example :- If 6 oranges are nought for Rs. 5 and sold at 5 for Rs. 6, what is the gain or loss per cent ?

Sol. Quantity Price

6 — 5 (c.p) $5 \times 5 = 25$

5 — 6 (s.p) $6 \times 6 = 36$

$\therefore$ % profit = $\frac{36-25}{25} \times 100 = 44\%$

2. If the cost price of m articles is equal to the selling price of n articles, then

$$\% \text{ gain or loss} = \frac{m-n}{n} \times 100$$

[If m > n, it is % gain and if m<n, it is % loss]

Example :-

If the selling price of 9 articles is equal to the cost price of 12 articles. What is the profit % or loss % ?

Sol. Here, m = 12, n = 9

Θ m > n

$$\therefore \text{ profit \%} = \frac{m-n}{n} \times 100$$

$$= \frac{12-9}{9} \times 100 = \frac{1}{3} \times 100 = 33\frac{1}{3}\%$$

3. If 'A' sells an article to 'B' at a gain/loss of m% and 'B' sells it to 'C' at a gain/loss of n%, then the resultant profit/loss percent is given by

$$m + n + \frac{mn}{100} \quad \text{.....(i)}$$

where m or n will be negative, if it indicates a loss, otherwise it will be positive.

Note :- The expression given by (i) represents resultant profit or loss accordingly as it can be positive or negative.

4. When two different articles are sold at the same selling price getting a gain of x % on the first and loss of x % on the second, then the overall % loss is the transaction in given by

$$\left(\frac{x}{10}\right)^2 \%$$

Note:- that in such questions there is always a loss.

5. A merchant uses faulty measure and sells his goods at a gain/loss of x %. The overall percent gain/loss is given by

$$\frac{100+g}{100+x} = \frac{\text{True measure}}{\text{Faulty measure}}$$

Note :- If the merchant sells his goods at cost price, then $x = 0$

6. If the price of an item is increased by x %, then the consumption should be decreased by $\left(\frac{x}{100+x}\right)\%$

So that expenditure remains same.

7. If the price of an item is decreased by x %, then the consumtion should be increased by $\left(\frac{x}{100-x}\right)\%$ so that expenditure remains same.

8. If a shopkeeper do x % cheating at the time of selling. Or In other word, A shopkeeper gains x % while buying the goods and y% while selling them, then his total profit %

$$= \left(x + y + \frac{xy}{100}\right)\%$$

Examples

1. The cost price of 36 books is equal to the selling price of 30 books. The gain percent is:

(a) 20% (b) $16\frac{4}{6}\%$

(c) 18% (d) $82\frac{2}{6}\%$

Sol. (a) Given :

36 C.P = 30 S.P

$\frac{CP}{SP} = \frac{30}{36} = \frac{5}{6} \Rightarrow 1$ (Profit)

Profit% = $\frac{\text{profit}}{C.P} \times 100$

= $\frac{1}{5} \times 100 = 20\%$

2. The cost price of 15 articles is same as the selling price of 10 articles. The profit percent is :

(a) 30% (b) 40%

(c) 50% (d) 45%

Sol. (c) Given

15C.P = 10 S.P

$\frac{CP}{SP} = \frac{10}{15} = \frac{2}{3} \Rightarrow 1$ (Profit)

Profit% = $\frac{1}{2} \times 100 = 50\%$

3. The selling price of 5 articles is the same as the cost price of 3 articles. The gain or loss percent is:

(a) 20% gain (b) 25% gain

(c) 33.33% loss (d) 40% loss

Sol. (d) S.P of 5 article = C.P of 3 article

$\frac{S.P}{C.P} = \frac{3}{5}$

$\therefore$ Loss = 5 – 3 = 2

Loss = $\frac{2}{5} \times 100 = 40\%$

4. If 3 toys are sold at the cost price of 4 toys of the same kind, the profit will be:

(a) 25% (b) $33\frac{1}{3}\%$

(c) $66\frac{2}{3}\%$ (d) 50%

Sol. (b) According to question,

3 S.P = 4 C.P

$\frac{S.P}{C.P} = \frac{4}{3} \Rightarrow 1$ gain

gain% = $\frac{\text{Gain}}{C.P} \times 100$

= $\frac{1}{3} \times 100 = 33\frac{1}{3}\%$

5. If the cost price of 15 tables is equal to selling price of 20 tables. The loss percent is :

(a) 20% (b) 30%

(c) 25% (d) 37.5%

Sol. (c) According to question,

15 C.P = 20 S.P

$\frac{C.P}{S.P} = \frac{20}{15} \Rightarrow 5$ units loss

$\therefore$ Loss% = $\frac{5}{20} \times 100 = 25\%$

6. The cost price of 18 articles is equal to the selling price of 15 articles. The gain percent is :

(a) 15% (b) 20%

(c) 25% (d) 18%

Sol. (b) According to question,

18 C.P = 15 S.P

$\frac{C.P}{S.P} = \frac{15}{18} \Rightarrow 3$ units profit

Profit% = $\frac{3}{15} \times 100 = 20\%$ profit

7. The ratio of cost price and selling price is 5 : 4 the loss percent is :

(a) 20% (b) 25%

(c) 40% (d) 50%

Sol. (a) According to question,

$\frac{C.P}{S.P} = \frac{5}{4} \Rightarrow 1$ unit loss

loss% = $\frac{1}{5}$ = 20% loss

8. The ratio of the C.P and S.P of an article is 20 : 21. What is the gain percent ?

(a) 5% (b) 5.5%

(c) 6% (d) 6.25%

Sol. (a) According to question,

$\frac{C.P}{S.P} = \frac{20}{21} \Rightarrow 1$ unit profit

profit% = $\frac{1}{20} \times 100 = 5\%$

9. If selling price of an article is $\frac{8}{5}$ times of its cost price, the profit percent on it is :

(a) 120% (b) 160%

(c) 40% (d) 60%

Sol. (d) According to question,

S.P = $\frac{8}{5} \times$ C.P

$\frac{S.P}{C.P} = \frac{8}{5} \Rightarrow 3$ gain

$\therefore$ gain% = $\frac{3}{5} \times 100 = 60\%$

10. If the cost price of 10 articles is equal to the selling price of 9 articles, the gain or loss percent is

(a) $11\frac{1}{9}\%$ profit

(b) $7\frac{6}{11}\%$ profit

(c) $11\frac{1}{9}\%$ of loss

(d) $1\frac{12}{13}\%$ loss

Sol. (a) According to question,

10 C.P = 9 S.P

$$\frac{C.P}{S.P} = \frac{9}{10} \Rightarrow 1 \text{ profit}$$

$$\text{Profit\%} = \frac{1}{9} \times 100 = 11\frac{1}{9}\%$$

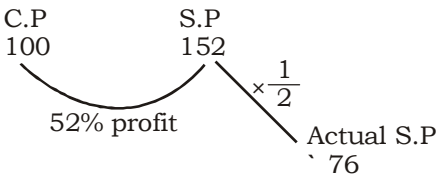
11. In selling an article for ` 76, there is a profit of 52%. If it is sold for ` 75, the profit percent will be

(a) 44 (b) 46

(c) 48 (d) 50

Sol. (d) According to question,

Let the CP = 100



152 units ® ` 76

1 unit ® $\frac{76}{152}$ Þ $=\frac{1}{2}$

100 units ® $\frac{1}{2} \times 100 = 50$

C.P ® ` 50

\ If SP ® ` 75

$$\text{Profit\%} = \frac{25}{50} \times 100 = 50\%$$

12. The cost price of 8 articles is equal to the selling price of 9 articles. The profit or loss per cent in the transaction is

(a) $12\frac{1}{2}\%$ loss (b) $12\frac{1}{2}\%$ profit

(c) $11\frac{1}{9}\%$ loss (d) None of these

Sol. (c) According to question,

8 C.P = 9 S.P

$$\frac{C.P}{S.P} = \frac{9}{8} \Rightarrow 1 \text{ loss}$$

$$\text{Loss\%} = \frac{1}{9} \times 100 \text{ Þ } 11\frac{1}{9}\%$$

13. A coconut merchant finds that the cost price of 2750 coconut is the same as the selling price of 2500 coconuts. His loss or gain will be

(a) 5% (b) 10% gain

(c) 15% loss (d) 20% gain

Sol. (b) According to question,

2750 C.P = 2500 S.P

$$\frac{C.P}{S.P} = \frac{2500}{2750} = \frac{10}{11} \Rightarrow 1 \text{ profit}$$

$$\text{Profit\%} = \frac{1}{10} \times 100 \text{ Þ } 10\% \text{ gain}$$

14. The cost price : selling price of an article is a : b. If b is 200% of a then the percentage of profit on cost price is

(a) 75% (b) 125%

(c) 100% (d) 200%

Sol. (c) CP : SP

a : b

According to question,

b = 200% of a

$$b = \frac{200}{100} \times a$$

$$\frac{b}{a} = \frac{2}{1}$$

$$\frac{C.P}{S.P} = \frac{a}{b} = \frac{1}{2} \Rightarrow 1 \text{ profit}$$

$$\text{Profit\%} = \frac{1}{1} \times 100 \text{ Þ } 100\%$$

15. If toys are bought at ` 5 each and sold at ` 4.50 each, then the loss is :

(a) 10% (b) 115%

(c) 12% (d) 13%

Sol. (a) According to question,

C.P of toys = ` 5

S.P of toys = ` 4.5

Loss = C.P – S.P = 5 – 4.5 = 0.5

$$\text{Loss\%} = \frac{SP - CP}{CP} \times 100$$

$$\text{Loss\%} = \frac{0.5}{5} \times 100 = 10\%$$

16. A person sells two machines at ` 396 each on one machine he gains 10% and on the other he loss 10%. His profit or loss in the whole transaction is

(a) no gain no loss

(b) 1% loss

(c) 1% profit

(d) 8% profit

Sol. Basic Method :-

According to question

First machine gain = 10%

\ S.P = 110% of C.P

$$396 = \frac{110}{100} \times C.P$$

$$C.P = \frac{396 \times 100}{110} = ` 360$$

For second machine = Loss = 10%

\ S.P = 90% of C.P

$$396 = \frac{90}{100} \times C.P$$

$$C.P = \frac{396 \times 100}{90} = ` 440$$

Total C.P = ` (360 + 440) Þ ` 800

Total S.P = ` (396 + 396) Þ ` 792

Loss = ` 8

$$\text{Loss\%} = \frac{8}{800} \times 100 = 1\% \text{ loss}$$

Alternate:

	Machine(1)		Machine(2)	
C.P	10	×9 = 90	10	×11 = 110
		10% Profit		10% loss
S.P	11	×9 = 99	9	×11 = 99

Total C.P = 90 + 110 = 200

Total S.P = 99 + 99 = 198

Loss = 2

$$\text{Loss\%} = \frac{2}{200} \times 100 = 1\% \text{ loss}$$

Exercise

1. A man buys a shirt and a trouser for `371. If the trouser costs 12% more than the shirt, find the cost of the shirt
   (a) ` 125 (b) ` 150
   (c) ` 175 (d) ` 250
2. A shopkeeper sells two items at the same price.If he sells one of them at a profit of 10% and the other at a loss of 10%,find the percentage profit/loss
   (a) 1% loss
   (b) 1% profit
   (c) 10% loss
   (d) None of these
3. By selling 15 mangoes, a fruit vendor recovers the cost price of 20 mangoes. Find the profit percentage.
   (a) $22\frac{1}{2}\%$ (b) $33\frac{1}{3}\%$
   (c) $11\frac{1}{2}\%$ (d) $12\frac{1}{2}\%$
4. A dishonest shopkeeper uses a 900 gram weight instead of 1 kilogram weight. Find his profit percent if he sells per kilogram at the same price as he buys a kilogram.
   (a) $11\frac{1}{9}\%$ (b) $11\frac{2}{9}\%$
   (c) $12\frac{1}{2}\%$ (d) None of these
5. A manufacturer makes a profit of 15% by selling a colour TV for ` 6900. If the cost of manufacturing increases by 30% and the price paid by the retailer is increasesd by 20% find the profit percent made by the manufacurer.
   (a) 6%
   (b) 6.43%
   (c) 6.15%
   (d) None of these
6. Find a single discount equal to three consecutive discounts of 10%, 12% and 5%.
   (a) 24.76%
   (b) 25.76%
   (c) 28.76%
   (d) None of these
7. Rakesh Yadav bought an article and spent `110 on its repairs. Then he sold it to Bhuvnesh at a profit of 20% Bhuvnesh sold it to Charan at a loss of 10%. Charan finally sold it for `1188 at a profit of 10%. How much did Rakesh Yadav pay for the article.
   (a) ` 890 (b) ` 1000
   (c) ` 780 (d) ` 840
8. A dishonest businessman professes to sell his articles at cost price but he uses false weights with which he cheats by 10% while buying and by 10% while selling. Find his percentage profit.
   (a) $22\frac{2}{9}\%$ (b) $12\frac{1}{2}\%$
   (c) $8\frac{1}{3}\%$ (d) None of these
9. Rakesh Yadav bought some oranges from Nagpur for Rs. 32. He has to sell it in Delhi. He is able to sell off all the oranges in Delhi and on reflection finds that he has made a profit equal to the cost price of 40 oranges. how many oranges did Rakesh Yadav buy ?
   (a) 32
   (b) 16
   (c) 64
   (d) Data Inadequate
10. By selling 5 articles for Rs. 15, a man makes a Profit of 20%. Find his gain or loss percentage if he sells 8 articles for Rs. 18.4 ?
    (a) 8% loss (b) 10% profit
    (c) 8% profit (d) None of these
11. A shopkeeper allows a rebate of 25% to the buyer. He sells only smuggled goods and as a bribe he pays 10% of the cost of the article. If his cost price is Rs. 2500, then find what should be the marked price if he desires to make a profit of 9.09%.
    (a) 2000 (b) 4000
    (c) 1000 (d) 5000
12. A man sells three articles, one at a loss of 10% another at a profit of 20% and the third one at a loss of 25%. If the selling price of all the three is the same, find by how much percent is their average CP lower than or higher than their average SP.
    (a) 9.256 higher
    (b) 8.256 higher
    (c) 9.256 lower
    (d) 8.256 lower
13. A shopkeeper sold goods for Rs. 2400 and made a profit of 25% in the process. Find his profit per cent if he had sold his goods for Rs.2040.
    (a) 6.25% (b) 7%
    (c) 6.20% (d) 6.5%
14. A digital diary is sold for Rs. 935 at a profit of 10%. What would have been the actual proft or loss on it, if it had been sold for Rs. 810?
    (a) Rs. 45 (b) Rs. 40
    (b) Rs. 48 (c) Rs. 50
15. A music system when sold for Rs. 4500 gives a loss of 16.66% to the merchant who sells it. Calculate his loss or gain per cent, if he sells it for Rs. 5703.75.
    (a) Loss of 5.625%
    (b) Profit of 8.33%
    (c) Loss of 7%
    (d) profit of 5.625%
16. By selling bouquets for Rs.63 a florist gains 5%. At what price should he sell the bouquets to gain 10% on the cost price?
    (a) Rs. 66 (b) Rs. 69
    (c) Rs. 72 (d) Rs. 72.50
17. A shopkeeper bought 240 chocolates at Rs.9 per dozen. if

he sold all of them at Rs. 1 each what was his profit per cent?

(a) 66(1/6)% (b) 33(1/3)%

(c) 24% (d) 27%

18. A feeding bottle is sold for Rs120. Sales tax accounts for one-fifth of this and profit one third of the remainder .Find the cost price of the feeding bottle.

(a) Rs. 64 (b) Rs. 72

(c) Rs. 68 (d) Rs. 76

19. The marked price of a table is Rs.1200, which is 20% above the cost price. It is sold at a discount of 10% on the marked price. Find the profit per cent.

(a) 10% (b) 8%

(c) 7.5% (d) 6%

20. 125 toffees cost Rs. 75. Find the cost of one million toffees if there is a discount of 40% on the selling price for this quantity.

(a) Rs. 300,000

(b) Rs. 3,20,000

(c) Rs. 3,60,000

(d) Rs. 4,00,000

21. A shopkeeper marks the price of an article at Rs. 80 Find the cost price if after allowing a discount of 10% he still gains 20% on the cost price.

(a) Rs. 53.33 (b) Rs. 70

(c) Rs. 75 (d) Rs. 60

22. In Question 21 what will be the selling price of the article if he allows two successive discount of 5% each?

(a) Rs. 72 (b) RS. 72.20

(c) Rs. 75 (d) Rs. 71.66

23. A dozen pairs. of gloves quoted at Rs. 80 are available at a discount of 10%. Find how many pairs. of gloves can be bought for Rs. 24.

(a) 4 (b) 5

(c) 6 (d) 8

24. The printed price of a calculator is Rs. 180. A retailer pays Rs. 137.7 for it by getting successive discount of 10% and another rate which is illegible. what is the second discount rate?

(a) 12% (b) 12.5%

(c) 15% (d) 20%

25. How much percent more than the cost price should a shopkeeper mark his goods, so that after allowing a discount of 12.5% he should have a gain of 5% on his outlay?

(a) 9.3675 (b) 16.66%

(c) 20% (d) 25%

26. In order to maintain the price line, a trader allows a discount of 10% on the marked price of goods in his shop. However, he still makes a gross profit of 17% on the cost price. Find the profit percent he would have made on the selling price had he sold at the marked price.

(a) 23.07% (b) 30%

(c) 21.21% (d) 25%

27. A wholeseller allows a discount of 20% on the list price to retailer. The retailer sells at 5% discount on the list price.If the customer paid Rs. 38 for an article, what profit is made by the retailer?

(a) Rs. 10 (b) Rs. 8

(c) Rs. 6 (d) Rs. 12

28. The cost of production of a cordless phone set in 2011 is Rs.900 , divided between material, labour and overtheads in the ratio 3:4:2. If the cordless phone set is marked at a price that gives a 20% profit on the component of price accounted for by labour, what is the marked price of the set?

(a) Rs.980 (b) Rs.1080

(c) Rs.960 (d) Rs.1020

29. A man sells 5 articles for Rs. 15 and makes a profit of 20% Find his gain or loss percent if he sells 8 such articles for Rs. 16.

(a) 2.22% loss (b) 2.22% profit

(c) 20% loss (d) 8% profit

30. A owns a house worth Rs.10,000. He sells it to B at a profit of 15%. After sometime, B sells it back to A at loss15%. Find A's loss or gain percent.

(a) 2.25% gain

(b) 6.25% gain

(c) 17.64% gain

(d) 17.25% gain

31. A make an article for Rs. 120 and sells it to B at a profit of 25%. B sells it to C who sells it for Rs. 198, making a profit of 10% what porfit percent did B make?

(a) 25% (b) 20%

(c) 16.66% (d) 15%

32. A man buys 50 kg of oil at Rs. 10 per kilogram and another 40kg of oil at Rs.12 kg. and mixes them. He sells the mixture at the rate of Rs. 11 per kilogram. What will be his gain percent if he is able to sell the whole lot ?

(a) $\frac{100}{98}$ %

(b) 100(10/49)%

(c) 10(1/49)%

(d) None of these

33. A shopkeeper sells sugar in such a way that the selling price of 950 gm is the same as the cost price of one kilogram. Find his gain percent.

(a) 100/17% (b) 150/17%

(c) 5(5/19)% (d) 1/19%

34. A dealer buys eggs at Rs.36 per gross. He sells the eggs at a profit of 12(1/2) % on the cost price what is the selling price per egg (apoximately)?

(a) 33 paise (b) 30 paise

(c) 29 paise (d) 28 paise

35. A sold a table to B at a profit of 20%. B sold the same table to C for Rs. 75 thereby making a profit of 25% Find the price at which A bought the table from *X* if it is known that *X* gained 25% in the transaction.

(a) Rs. 30 (b) Rs. 40

(c) Rs. 50 (d) Rs. 60

36. A sold a table to B at a profit of 15%. Later on, B sold it back to A at a profit of 20%, thereby gaining Rs. 69. How much did A pay for the table originally?

(a) Rs. 300 (b) Rs. 320

(c) Rs. 345 (d) Rs. 350

37. A man sells a TV set for Rs.3450 and makes a profit of 15%. He sells another TV at a loss of 10%. If on the whole, he neither gain nor losses, find the selling price of the second TV set.

(a) Rs. 4000 (b) Rs. 4400

(c) Rs. 4050 (d) Rs. 4500

38. A man sells an article at 5% above its cost price. If he had bought it at 5% less than what he paid for it and sold it for Rs. 2 less, he would have gained 10%. Find the cost price of the article.
(a) Rs. 500 (b) Rs. 360
(c) Rs. 425 (d) Rs. 400

39. A briefcase was sold at a profit of 10% . if its cost price was 5% less and it was sold for Rs.7 more the gain would have been 20%. Find the cost price of the briefcase.
(a) Rs. 175 (b) Rs. 200
(c) RS. 225 (d) Rs. 160

40. A man buys two cycles for a total cost of Rs. 900. By selling one for 4/5 of its cost and other for 5/4 of its cost, he makes a pofit of Rs. 90 on the whole transaction. Find the cost price of lower priced cycle.
(a) Rs. 360 (b) Rs. 250
(c) Rs. 300 (d) Rs. 420

41. A merchant bought two laptops, Which together cost him Rs.480. He sold one of them at a loss of 15% and other at a gain of 19%. If the selling price of both the laptops are equal, find he cost of the lower priced laptop.
(a) Rs. 300 (b) Rs. 180
(c) Rs. 200 (d) Rs. 280

42. A manufacturer makes a profit of 15% by selling a colour TV for Rs.5750. If the cost of manufacturing increases by 30% and the price paid by the retailer is increased by 20%, find the profit percent made by the manufacturer.
(a) 6(2/13)% (b) 4(8/13)%
(c) 6(1/13)% (d) 7(4/13)%

43. The cost of manufacturing an article is made up of materials, labour and overheads in the ratio 4 : 3 : 2. If the cost of labour is Rs. 45, find the profit percent if the article is sold for Rs. 180.
(a) 50% (b) 33.33%
(c) 25% (d) 20%

44. Two dealers. X and Y selling the same model of hp printer mark them under the same selling prices. X gives successive discounts of 25% and 5% and Y gives successive discounts of 16% and 12%. From whom is it more profitable to purchase the printer.
(a) From Y
(b) From X
(c) indiifferent between the two
(d) Cannot be determined

45. A sells a car priced at Rs. 36,000. He gives a discount of 8% on the first Rs. 20,000 and 5% on the remaining Rs.16,000. His competitor B sells a car of the same marked, price at Rs. 36,000. If he wants to be competitive what percent discount should B offer on the marked price.
(a) 5% (b) 5.5%
(c) 6.67% (d) 8.33%

46. An article cost Rs. 700 to a manufacturer who lists its price at Rs. 800. He sells it to a trader at a discount of 5%. The trader gets a further discount of 5% on his net payment for paying in cash. Calculate the amount that the trader pays to the manufacturer.
(a) Rs. 722
(b) Rs. 720
(c) Rs. 725
(d) None of these

47. A watch dealer pays 10% custom duty on a watch that cost Rs. 250 abroad. For how much should he mark it, if he desires to make a profit of 20% after giving a discount of 25% to the buyer?
(a) Rs. 400 (b) Rs. 440
(c) Rs. 275 (d) Rs. 330

48. A shopkeeper buys an article for Rs. 400 and marks it for sale at a price that gives him 80% profit on his cost. He, however allows a 15% discount on the marked price to his customer. Calculate the actual percentage profit made by the shopkeeper.
(a) 62% (b) 64%
(c) 53% (d) 54%

49. In the land of the famous milkman Bhuvnesh a milkman sells his buffalo for Rs. 720 at some profit. Had he sold his buffalo at Rs. 510,the quantum of the loss incurred would have been double that of the profit earned what is the cost price?
(a) Rs. 600 (b) Rs. 625
(b) Rs. 675 (d) Rs. 650

50. A trader purchases apples at Rs. 60 per hundred. He spends 15% on the transportation, what should be the selling price per 100 to earn a profit of 20%?
(a) Rs. 72 (b) Rs. 81.8
(c) Rs. 82.8 (d) Rs .83.8

Solution

1. **(c)** Cost price (Shirt + trouser) = Rs. 371

$12\% = \frac{12}{100} = \frac{3}{25}$

Let cost of Shirt = 25 units

$\therefore$ Cost of trousers = (25 + 3)
= 28 units

According to the question,
(25 + 28) units = Rs. 371

1 unit = $\frac{371}{53}$

25 units = $\frac{371}{53} \times 25$ = **Rs. 175**

2. **(a)** **Note** → A shopkeeper sells two items at the same price. If he sells one of them at a profit of x% and the other at a loss of x%.
The result will always be a loss of $\left(\frac{x}{10}\right)^2$ %

Hence, Required loss

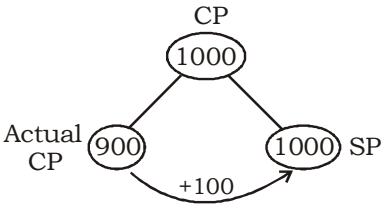
$= \left(\frac{10}{10}\right)^2$ % = **1%**

3. **(b)** According to the question,
15 SP = 20 CP

$\frac{CP}{SP} = \frac{15}{20} = \frac{3}{4}$

% profit = $\frac{1}{3} \times 100$ = $\mathbf{33\frac{1}{3}\%}$

4. **(a)** Let the cost price of 1 gm weight is Re. 1.



% profit = $\frac{100}{900} \times 100 = \mathbf{11\frac{1}{9}\%}$

5. **(c)** 15% = $\frac{3}{20}$ CP = 20, SP = 23

According to the question,
23 units = Rs. 6900
1 unit = 300
20 units = 300 × 20 = 6000
CP= Rs. 6000

	CP	SP
Old →	6000	6900
	↓+30%	↓+20%
New →	7800	8280

+480

% profit = $\frac{480}{7800} \times 100$ = **6.15%**

6. **(a)** 10% = $\frac{1}{10}$, 12% = $\frac{3}{25}$, 5% = $\frac{1}{20}$

Initial	Final
10	9
25	22
20	19
5000	3762

−1238

% Discount = $\frac{1238}{5000} \times 100$

= **24.76%**

Alternate → Let initial value = 100

100 $\xrightarrow{-10\%}$ 90 $\xrightarrow{-12\%}$ 79.2 $\xrightarrow{-5\%}$ 75.24

−24.76

Net discount = 100 – 75.24
= **24.76%**

7. **(a)** **Note** → In such type of questions start your calculation from the point at which the question can be solved easily.

20% = $\frac{1}{5}$, 10% = $\frac{1}{10}$

CP	SP
5	6
10	9
10	11
500	594
↓×2	↓×2
1000	1188

Money paid by Rakesh Yadav
= (1000 – 110) = **Rs. 890**

Alternate:

Note → We can also take help from options to save our valuable time.

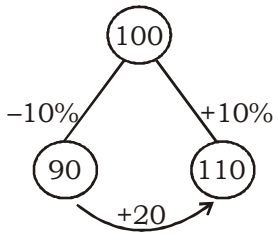
Option (a) → The cost price of the article= Rs.890
After repairing total cost
= Rs. 890 + 110 = Rs. 1000
The amount at which charan sold the article

$= 1000 \times \frac{120}{100} \times \frac{90}{100} \times \frac{110}{100}$

=Rs. 1188

Note → Now the same price is given in question so option (a) is correct.

8. **(a)** Let the initial quantity of article is 100 gm and the cost price of 1 gm is Re. 1.
According to the question,



% profit = $\frac{20}{90} \times 100 = \frac{200}{9}$

= $\mathbf{22\frac{2}{9}\%}$

9. **(d)** Let Rakesh Yadav bought x oranges.

Cost price per orange = $\frac{32}{x}$

profit = $40 \times \frac{32}{x}$ = Rs. $\frac{1280}{x}$

To solve further we need value of x, so data is inadequate.

10. **(a)** SP of 1 articles = $\frac{15}{5}$ = Rs.3

CP of 1 articles = $\frac{3}{120} \times 100$

= Rs. 2.5
CP of 8 articles = 2.5 × 8 = Rs. 20
SP of 8 articles = Rs. 18.4
Loss = (20 – 18.4) = Rs. 1.6

% Loss = $\frac{1.6}{20} \times 100$ = **8%**

11. **(b)** Cost price of the article = Rs. 2500

Bribe = $\frac{2500 \times 10}{100}$ = Rs. 250

Total Cost = 2500 + 250
= Rs. 2750
According to the question,

(We Know $9.09 = 9\frac{1}{11}$)

CP	:	MP
$(100 - 25)$	:	$\left(100 + 9\frac{1}{11}\right)$
75	:	$\frac{1200}{11}$
33	:	48
$\downarrow \times \frac{250}{3}$		$\downarrow \times \frac{250}{3}$
2750		4000

Marked price of the article
= **Rs. 4000**

12. **(a)** $10\% = \frac{1}{10}$, $20\% = \frac{1}{5}$, $25\% = \frac{1}{4}$

	I	II	III
CP	$10_{\times 2}$	$5_{\times 3}$	$4_{\times 6}$
SP	$9_{\times 2}$	$6_{\times 3}$	$3_{\times 6}$
P/L	$-1_{\times 2}$	$+1_{\times 3}$	$-1_{\times 2}$

According to the question,
SP is same in both cases.
So Average CP
$= \frac{(20 + 15 + 24)}{3} = \frac{59}{3}$
Average SP
$= \frac{(18 + 18 + 18)}{3} = \frac{54}{3}$
Required percentage
$= \frac{\left(\frac{59}{3} - \frac{54}{3}\right)}{\frac{54}{3}} \times 100 =$ **↑ 9.256%**

13. **(a)** CP $= \frac{2400}{(100 + 25)} \times 100$
= Rs.1920
SP = Rs. 2040
Profit = 2040 – 1920 = Rs. 120
% profit $= \frac{120}{1920} \times 100 =$ **6.25%**

14. **(b)** CP $= \frac{935}{(100 + 10)} \times 100$
= Rs. 850
SP = Rs. 810
Loss = 850 – 810 = **Rs. 40**

15. **(d)** $16.66\% = \frac{1}{6}$

CP	SP
6	5
$\downarrow \times 900$	$\downarrow \times 900$
5400	4500

New SP = 5703.75
Profit = 5703.75 – 5400
= Rs. 303.75
% profit $= \frac{303.75}{5400} \times 100$
= 5.625%

16. **(a)** Required selling price
$= \frac{63}{(100 + 5)} \times (100 + 10)$
$= \frac{63 \times 110}{105} =$ **Rs. 66**

17. **(b)** Cost price of chocolates
$= \frac{240}{12} \times 9 =$ Rs. 180
Selling price = 240 × 1= Rs. 240
% profit $= \frac{(240 - 180)}{180} \times 100$
$=$ **$33\frac{1}{3}$%**

18. **(a)** Sales tax $= \frac{120}{5} =$ Rs. 24
Remainder = (120 – 24) = Rs. 96
Profit = $96 \times \frac{1}{3} =$ Rs. 32
Cost price = (96 – 32) = **Rs. 64**

19. **(b)** According to the question,

CP	SP	MP
1000	1080	1200

$\therefore$ CP $= \frac{1200}{120} \times 100 =$ Rs.1000
SP = $1200 \times \frac{(100 - 10)}{100} =$ Rs. 1080
% Profit $= \frac{80}{1000} \times 100 =$ **8%**

20. **(c)** The cost price of 1 toffee
$= \frac{75}{125} =$ Rs. $\frac{3}{5}$
After discount cost of 1 million toffee
$= \frac{3}{5} \times 10,00,000 \times \frac{(100 - 40)}{100}$
= Rs. 3,60,000

21. **(d)** According to the question.

CP		MP
$(100 - 10)$	:	$(100 + 20)$
90	:	120
3		4
$\downarrow \times 20$		$\downarrow \times 20$
60		80

Cost price of the article = **Rs. 60**

22. **(b)** $5\% = \frac{1}{20}$

Initial	Final
20	19
20	19
400	361

400 units = Rs. 80
1 unit = $\frac{80}{400}$
361 units = $\frac{80}{400} \times 361 = \frac{361}{5}$
= **Rs. 72.20**

23. **(a)** Marked price = Rs. 80
Selling price
$= 80 \times \frac{(100 - 10)}{100} =$ Rs. 72
In Rs.72 he buys = 12
Rs. 1 = $\frac{12}{72}$
` 24 he buys = $\frac{12}{72} \times 24 =$ **4 pairs**

24. **(c)** printed price of a calculator
= Rs. 180
After first discount of 10% price
$= \frac{180 \times 90}{100} =$ Rs. 162
Another discount = (162 – 137.7)
= Rs. 24.3
% value of another discount
$= \frac{24.3}{162} \times 100 =$ **15%**

25. **(c)**

CP	:	SP
(100 – 12.5)	:	(100 + 5)
87.5	:	105
35	:	42

(+7)

Required percentage = $\frac{7}{35} \times 100$
= **20%**

26. **(a)** Let CP = Rs. 100

According to the question,

CP 100 → +17% → SP 117 → –10% → MP 130

Now SP = MP = 130

Required % profit

$= \frac{(130-100)}{130}\times 100 =$ **23.07%**

Alternate →

CP : SP

(100–10) : (100+17)

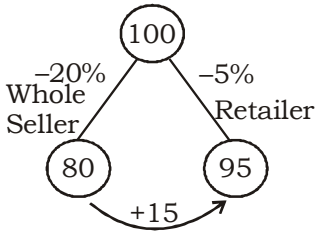
90 : 117

+27

Required % profit = $\frac{27}{117}\times 100$

= **23.07%**

27. (c) Let the marked price of the article = 100 units



According to the question,

95 units = Rs. 38

1 unit = $\frac{38}{95}$

15 units = $\frac{38}{95}\times 15 =$ **Rs. 6**

28. (a) Total Cost of cordless phone set = Rs. 900

Material : Labour: Overheads

$3x$: $4x$: $2x$

$(3x + 4x + 2x) = 900$

$9x = 900 \Rightarrow x = 100$

Labour Cost = 100 × 4 = 400

New Labour Cost = $400\times\frac{120}{100}$

= Rs. 480

New Total Cost = (300 + 480 + 200)

= **Rs. 980**

29. (c) Cost price of 1 article

$= \frac{15}{5}\times\frac{100}{120} =$ Rs. 2.5

Cost price of 8 article

= 2.5 × 8 = Rs. 20

Selling price of 8 articles = ` 16

% loss = $\frac{(20-16)}{20}\times 100 =$ **20%**

30. (d) worth of house for A

= Rs. 10,000

Cost price of house for B

$= \frac{10,000\times 115}{100} =$ Rs. 11,500

New cost price for A

$= \frac{11500\times 85}{100} =$ Rs. 9775

Total profit

= (11500–10000) + (10000 – 9775)

= 1500 + 225 = Rs. 1725

% gain= $\frac{1725}{10000}\times 100 =$ **17.25%**

Alternate → 15% = $\frac{3}{20}$,

I^{st} II^{nd}

CP ⟶ $20_{\times 20}$ $17_{\times 23}$

SP ⟶ $23_{\times 20}$ $20_{\times 23}$

Note → SP would be same because the selling price of A would be the cost price for B.

Total gain

= (400 – 391) + (460 – 400) = 69

Required gain%

$= \frac{69}{400}\times 100 =$ **17.25%**

31. (b) Cost price for B

$= 120\times\frac{125}{100} =$ Rs. 150

Cost price for C

$= \frac{198}{110}\times 100 =$ Rs. 180

Note → Cost price for C would be the selling price of B.

profit = (180 – 150) = Rs. 30

% profit = $\frac{30}{150}\times 100 =$ **20%**

32. (a) Total CP = 50 × 10 + 12 × 40 = Rs. 980

Total SP = (50 + 40)×11 = Rs. 990

% profit = $\frac{(990-980)}{980}\times 100$

$= \frac{100}{98}\%$

33. (c) Let the Cost price of 1 gm is `1

According to the question,

950 SP = 1000 CP

$\frac{CP}{SP} = \frac{950}{1000} = \frac{95}{100}$

% profit = $\frac{(100-95)}{95}\times 100$

$= \frac{100}{19} =$ **$5\frac{5}{19}$%**

34. (d) Note → Here the important point to remember is that one gross is equal to 12 dozens.

Cost price of per egg = $\frac{36}{144}$

= 25 paise

Selling price per egg

$= 25\times\frac{9}{8} = \frac{225}{8} = 28.125$; 28 paise (apprx)

35. (c) According to the question,

Cost price for B = $\frac{75}{125}\times 100 =$ `60

Cost price for A= $\frac{60}{120}\times 100 =$ ` 50

Note → We can also solve it from options and then we can satisfy the question condition.

36. (a) Let the amount paid by A originally= 100 units

A 100 → +15% → B 115

138 ← +20% ←

profit = (138 – 115) = 23 units

According to the question,

23 units = Rs. 69

1 unit = Rs. 3

100 units = Rs. 3 × 100 = **`300**

37. (c) Selling price of the I^{st} TV

= Rs. 3450

Cost price of the I^{st} TV

$= \frac{3450}{115}\times 100 =$ Rs. 3000

Profit = (3450 – 3000) = Rs. 450

According to the question,

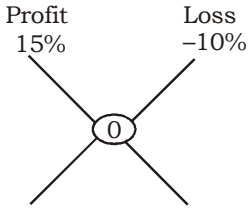
10% of CP = 450

$CP = \frac{450}{10} \times 100$ = **Rs. 4500**

Selling price of second TV

= (4500 – 450) = **Rs. 4050**

Alternate → To save our valuable time we can go through in this question by Alligation rule.



Ratio of Cost price → 10 : 15 = 2 : 3

Let CP of first TV = 200

Let CP of II[nd] TV = 300

SP of first TV = $200 \times \frac{115}{100}$ = ` 230

SP of II[nd] TV = $\frac{300 \times 90}{100}$ = ` 270

According to the question,

230 units = Rs. 3450

1 unit = $\frac{3450}{230}$

270 units = $\frac{3450}{230} \times 270$ = **` 4050**

Alternate → 10% = $\frac{1}{10}$, 15% = $\frac{3}{20}$

	I[st]	II[nd]
CP →	20	$10_{\times 3}$
SP →	23	$9_{\times 3}$
P/L →	+3	$-1_{\times 3}$

Note → On the whole the man gets no profit no loss.

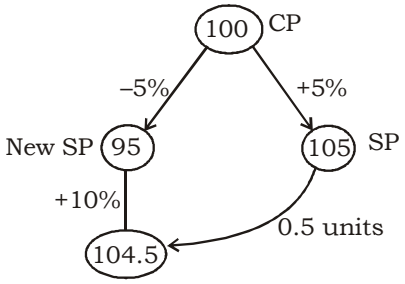
Ratio of SP's = 23 : 27

Selling price of second TV

$= \frac{3450}{23} \times 27$ = **Rs. 4050**

38. **(d)** Let the cost price of the article = 100 units

According to the question,



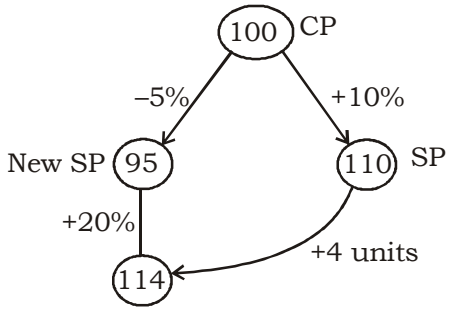
0.5 units = Rs. 2

100 units = $\frac{2}{0.5} \times 100$ = Rs. 400

∴ Cost price of the article = ` 400

39. **(a)** Let the cost price of the brief case = 100 units

According to the question,



4 units = Rs. 7

1 unit = $\frac{7}{4}$

100 units = $\frac{7}{4} \times 100$ = Rs. 175

Total cost price = **Rs. 175**

40. **(c)**

I[st] Cycle		II[nd] Cycle	
CP	SP	CP	SP
5	4	4	5

Loss % on I[st] cycle = $\frac{1}{5} \times 100$ = 20%

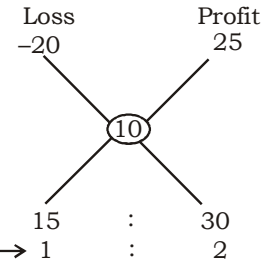
Profit % on II[nd] cycle = $\frac{1}{4} \times 100$

= 25%

Total profit on whole transaction

$= \frac{90}{900} \times 100$ = 10%

By alligation rule,



Ratio of Cost price → 15 : 30 = 1 : 2

According to the question,

3 units = 900

1 unit = 300

Cost of lowered price cycle = ` **300**

41. **(c)** Cost price of Laptops (L_1 + L_2) = Rs. 480

15% = $\frac{3}{20}$, 19% = $\frac{19}{100}$

CP	$20_{\times 7}$	100
SP	$17_{\times 7}$	119
P/L	$-3_{\times 7}$	19

Note → SP is same in both cases so multiply by 7 to equal the SP's of laptops.

Ratio of CP of Laptops

= 140 : 100

Cost of lowered price laptop

$= \frac{100}{(140+100)} \times 480$ = **Rs. 200**

42. **(a)** profit % = 15%, SP = Rs. 5750

Cost price of colour TV

$= \frac{5750}{115} \times 100$ = Rs. 5000

CP	SP
5000	5750
↓ +30%	↓ +20%
6500	6900

+400

% profit = $\frac{400}{6500} \times 100$

$= \frac{400}{65} = \frac{80}{13}$

% profit = $\mathbf{6\frac{2}{13}\%}$

43. **(b)** Ratio of Cost of Manufacturing

Material	:	Labour	:	Over heads	Total Cost
4	:	3	:	2	
↓ ×15		↓ ×15		↓ ×15	
60		45		30	= 135

Total cost = Rs. 135

$$\% \text{ profit} = \frac{(180-135)}{135}\times 100$$

$$= \frac{45}{135}\times 100 = \mathbf{33\frac{1}{3}\%}$$

44. **(b)** Discount offered by the Ist dealer (X)

$$= 25 + 5 - \frac{25\times 5}{100} = 28.75\%$$

Discount offered by the IInd dealer (Y)

$$= 16 + 12 - \frac{16\times 12}{100} = 26.08\%$$

Buying from 'X' is more preferable.

45. **(c)** Discount given by A

$$= 20{,}000\times\frac{8}{100} + 16{,}000\times\frac{5}{100}$$

= 1600 + 800 = Rs. 2400

$$\% \text{ discount} = \frac{2400}{36000}\times 100$$

= **6.67%**

46. **(a)** Marked price of the article = Rs. 800

$$\% \text{ Net discount} = 5 + 5 - \frac{5\times 5}{100}$$

= 9.75%

$$\text{Value of Discount} = 800\times\frac{9.75}{100}$$

= Rs. 78

Amount paid by the trader to manufacturer

= (800–78) = **Rs. 722**

Alternate → $5\% = \frac{1}{20}$

Initial	Final
20	19
20	19
400	361
↓×2	↓×2
800	722

Amount paid by manufacturer

= **Rs. 722**

47. **(b)** Cost price of the watch = ` 250

Cost price after custom duty

$$= 250 + \frac{250\times 10}{100} = \text{Rs. } 275$$

CP	MP
(100 – 25)	(100 + 20)
75	120
5	8
↓×55	↓×55
275	440

Marked price = **Rs. 440**

48. **(c)** Cost price of the article = ` 400

Marked price

$$= 400\times\frac{(100+80)}{100} = \text{Rs. } 720$$

After discount SP

$$= 720\times\frac{(100-15)}{100} = \frac{720\times 85}{100}$$

= **Rs. 612**

CP	:	SP
400	:	612
	+212	

$$\% \text{ profit} = \frac{212}{400}\times 100 = \mathbf{53\%}$$

Alternate:

Let CP = 100

MP = 180

$$\text{SP} = \frac{180'\ 85}{100} = 153$$

$$\text{Required \%} = \frac{153-100}{100}\times 100$$

= 53%

49. **(d)** Let the cost price of buffalo = ` x

Profit = $(720 - x)$

Loss = $(x - 510)$

According to the question,

$2(720 - x) = (x - 510)$

$1440 - 2x = x - 510$

$3x = 1950$

$x = 650$

CP of the buffalo = **Rs. 650**

Alternate:- Note → In such type of questions follow the given method to save your valuable time.

We will divide the difference of SP's in the ratio of their profit and loss.

(720 – 510) = 210

1 : 2

3 units = 210

1 unit = 70

Cost price = (720 – 70) = ` **650**

50. **(c)** Selling price

$$= 60\times\frac{115}{100}\times\frac{120}{100} = \mathbf{Rs.\ 82.8}$$

= 9562.5 – 4800 = Rs. 4762.5

$$\text{Ratio of profit} = \frac{\text{New}}{\text{Old}} = \frac{4762.5}{75}$$

= 63.5