d. Profit & Loss

Cost price (CP): The price at which the article has been purchased is called cost price (CP).

Selling price (SP): The price at which the article is sold is called Selling price (SP).

Profit: If Selling price (SP) > cost price (CP) then it is said to be profit.

i.e. profit = Selling price (SP) − cost price (CP).

Loss: If the cost price (CP) > Selling price (SP) then it is said to be loss.

i.e. loss = CP − SP.

$$\text{Profit \%} = \frac{\text{Profit}}{CP} \times 100.$$

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

$$\text{Selling price (SP)} = \frac{100 + \text{profit \%}}{100} \times CP \quad \text{or} \quad \frac{100 - \text{loss \%}}{100} \times CP.$$

$$\text{Cost price (CP)} = \frac{100 \times SP}{100 + \text{profit \%}} \quad \text{or} \quad \frac{100 \times SP}{100 - \text{loss \%}}.$$

1. Eg: An article was purchased for Rs. 850 and sold for Rs. 920. Find the profit percentage.

Cost price (CP) = 850.

Selling price (SP) = 920.

Profit = CP − SP

= 920 − 850 = 70

$$\text{Profit \%} = \frac{70}{850_{17}} \times 100^{20} = \frac{140}{17} = 8.23$$

2. Eg: An article was purchased for Rs. 740 & sold for 680. Find the loss percentage.

Cost Price (CP) = 740 Rs.

Selling Price (SP) = 680 Rs.

Loss = 740 − 680 = 60 Rs.

$$\text{Loss \%} = \frac{\text{Loss}}{CP} \times 100 = \frac{60}{740} \times 100 = \frac{300}{37} = 8.1\%$$

3. Eg: An article was purchased for Rs. 540 and the profit % is 7.5 %. What is the Selling price (SP).

Cost price (CP) = 540 Rs.

profit % = 7.5 %

$$\text{Selling price} = 540 + \left(\frac{7.5}{100} \times 540\right)$$

$$= 540 + \left(\frac{75}{100} \times 54\right)$$

$$= 540 + \left(\frac{3}{4} \times 54\right)$$

$$= 540 + \left(\frac{3}{2} \times 27\right)$$

$$= 580.5$$

Alternatively:

$$\text{Profit} = \frac{\text{profit \%} \times CP}{100} = \frac{7.5 \times 540}{100} = 40.50$$

S.P. = C.P + profit

= 540 + 40.5

= 580.5

4. Eg: An article was purchased for Rs. 375 which incurred a loss of 5% on selling. Calculate the Selling price.

C.P. = 375

loss % = 5%

~~Box, 375~~

$$S.P. = CP - \left(\frac{5}{100} \times 375\right)$$

$$= 375 - \frac{75}{4}$$

$$= 375 - 18.75$$

$$= \underline{356.25}$$

5. Eg: A merchant sold a chair & table at Rs. 900. each. He incurred a loss of 6% on the chair and 4% on the table. Calculate the cost price of chair & Table.

S.P. (Table) = 900.

loss = 4%.

C.P = SP − loss.

= 900 − (4% of CP)

$= 900 - \frac{4}{100} \times CP$.

= 900 − 0.04 CP.

1.04 CP = 900

$CP = \frac{900}{1.04} = \underline{865.38}$

S.P (chair) = 900

loss = 6%.

C.P. = SP − loss.

= 900 − (6% of CP)

1.06 CP = 900

$CP = \frac{900}{1.06} = 957.44$

$\frac{26 \times 9}{2304}$

$\frac{9}{1.04}$

$= \frac{900}{104}$

$= \frac{450}{52}$

$= \frac{225}{26}$

e. Discount :

Marked price : The price of the article without any rebate is called Marked Price.

If no rebate then marked price = Selling price.

Discount : The reduction of price on the article is called discount. Discount is applied on marked Price.

Discount = Marked Price - Selling price.

$$\text{Discount \%} = \frac{\text{Discount}}{\text{M.P.}} \times 100$$

$$\text{M.P.} = \frac{100 + \text{profit \%}}{(100 - \text{discount \%})} \times \text{cost price}$$

$$\text{C.P.} = \frac{100 - \text{Discount \%}}{100 + \text{profit \%}} \times \text{MP.}$$

1. Eg: A phone case was sold for Rs. 220 but the marked price was 300. calculate the discount & discount %. age.

Discount = Marked price - Selling price.

= 300 - 220.

= 80 Rs.

$$\text{Discount \%} = \frac{\text{Discount}}{\text{M.P}} \times 100$$

$$= \frac{80}{300} \times 100 = \underline{26.67}$$

2. Eg: In a book shop a novel series is marked 1999. on wednesdays the shop offers 19% discount on the purchase of the novel series. Calculate the price of the series on wednesdays.

M.P. = 1999.

Discount % = 19.

$$\text{discount} = \frac{19}{100} \times 1999 \qquad = \frac{\text{discount \%} \times MP}{100}$$

$$= \frac{37981}{100}$$

$$= 379.81$$

S.P. = Mp. − discount

= 1999 − 379.81.

= 1619.19

19

1999

90 81

(20−1) × 1999

39980 − 1999

37981

3. Eg: An agent sold a house for Rs. 7,50,000/- with a discount of 18% yet gained 30%. Find the cost of the house at which the agent has purchased.

Marked price → 7,50,000/-

discount % → 18 %.

profit % → 30.

$$C.P. = \frac{100 - \text{discount \%}}{100 + \text{profit \%}} \times MP.$$

$$= \frac{100 - 18}{100 + 30} \times 7,50,000$$

$$= \frac{82}{130} \times 7,50,000 = 47,30,761.54$$

S.P. = M.P − $\frac{18}{100}$ × 75,

=

4. Eg: A dealer gave discount of 5%. still gained 16%. Find the marked price of the article, if it costs Rs. 950 to the dealer.

$$M.P. = \frac{100 + \text{profit \%}}{100 - \text{discount \%}} \times C.P.$$

$$= \frac{100 + 16}{100 - 5} \times 950.$$

$$= \frac{116}{95} \times 950. = \underline{\underline{1160}}.$$

EXERCISE:

I. Solve the following equations by Vilokanam method.

a. $5x = 45$ b. $x + 9 = 51$ c. $\frac{x}{10} = 23$ d. $\frac{x}{3} = 4$.

e. $x + 24 = 76$ f. $x + 12 = 40$ g. $6 = 10 - x$

II. Solve the following

a. $18 = 3x$ b. $\frac{x}{7} = 1$ c. $5 + x = 85$

b. $\frac{x}{9} = 3$ e. $x + \frac{1}{x} = \frac{10}{3}$ f. $22 = 30 - x$

III Solve the following equations by transpose & Adjust.

a. $1 + 2x = 3$ b. $16 = 4 + 6x$ c. $67 = 12 + 5x$

d. $4x - 2 = 26$ e. $-5 = 7 + 3x$ f. $4 + 9x = 4$

IV Solve the following

a. $3x + 5 = 17$ b. $3x + 3 = 36$ c. $4x - 5 = -13$.

d. $3x + 8 = 2$ e. $7 = 3x - 5$

V Find the ratio of Numbers given below.

a. 85 & 135 b. 40 & 80 c. 75 & 175

d. 30, 60 & 90 e. 125, 100 & 150 f. 24, 12, 48.

VI Find the ratio of below.

a. In an auditorium, there are two levels A & B. Level A has 250 chairs & level B has 150 chairs.
What is the ratio of chairs at level A & level B have.

b. In an office, there are 800 male employees & 400 female empoloyees. What is the ratio of male to female employees working in that office.

c. A Vegetable vendor bought 40 Kgs. of onions, 20 Kgs of tomatoes & 10 Kgs. of potatoes.
What is the ratio of the vegetables respectively he bought.

d. Rahul bought three containers which can hold 150 lts, 250 lts & 500 lts respectively.
What is the ratio of the containers he bought.

VII Solve the following equations using Madyamadhyena Adyamantyena Sutra.

a. $36 : a :: 13 : 39$
b. $y : 25 :: 75 : 15$
c. $100 : 150 :: 480 : z$
d. $h : 4000 :: 800 : 400$.
e. $528 : 3168 :: b : 36$
f. $345 : 69 :: y : 138$.

VIII Convert the following percentages to fractions.

a. 15% b. 54% c. 66% d. 32% e. 8%
f. 79% g. 88% h. 28% i. 46%.

IX Convert the following fractions to percentages

a. $3/4$ b. $6/9$ c. $2/7$ d. $24/25$ e. $1/14$.
f. $33/100$ g. $13/19$ h. $18/50$ i. $15/75$

X Find the percentage of quantity for the following.

a. 17% of 5 b. 25% of 8 c. 49% of 80 d. 32% of 60.
e. 11% of 95 f. 15% of 75 g. 16% of 480 h. 21% of 950
i. 35% of 788

XI Solve the following

a. A boy purchased 10 pens for Rs. 99 from a shopkeeper, who bought them for Rs. 70. Calculate the profit & profit percentage.

b. A merchant incurred a loss of 20% by selling a leather jacket for Rs. 2800. Calculate the price at which the merchant purchased the jacket and the loss.

c. A car sold at 18% profit. Calculate the selling price, if the cost price is Rs. 5,40,000/- & profit.

d. A boy bought 2 shirts at Rs. 400 each & sold them for Rs. 500. Calculate the profit or loss & Also the percentage of profit or loss.

e. A man bought a phone for Rs. 6090 with a profit of 8%. Calculate the Cost Price & profit.

f. A girl purchased 2 bicycles for Rs. 1500 each. She sold one at 10% profit & another at 6% loss. Find the profit or loss in both cases & the price at which she sold the bicycles.

g. A Vendor bought 50 kg onions for Rs. 1000 & sold at Rs. 30 per kg. Calculate the profit or loss percentage.

h. A lady sold books for Rs 5430 with loss of 5%. Calculate at what price the lady should have sold the books to get 12% profit.

i. If cost price is 38% of selling price. Find the profit & profit percentage.

j. A trader uses 900 gm. weight instead of 1 kg weight. Calculate the profit or loss percentage.

XII Solve the following.

a. A quilt was sold for Rs. 1859 which was marked Rs 2999. Calculate the rate of discount.

b. A cake shop has offer of 30% if ordered online. If the cake you bought regularly costs Rs. 350. Calculate how much would you save on discount.

c. On discount of 25%, Shiny bought a sweater for Rs 891. Calculate the actual price of the sweater & discount in cash.

d. A merchant offers 9.5% discount on purchase of goods marked Rs. 3999 but still gains 10% profit. Calculate the price at which the merchants bought the goods.

e. A designer gave 11% discount on the jewellery which costs Rs. 8750 yet gained 15%. Find the marked price of the jewellery.