Introduction

Profit and loss percentage are used to refer to the amount of profit or loss that has been incurred in terms of percentage.

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IMPORTANT FACTS

- **Cost Price:**
- The price, at which an article is purchased, is called its **cost price**, abbreviated as **C.P.**

- **Selling Price:**
- The price, at which an article is sold, is called its **selling prices**, abbreviated as **S.P.**

- **Profit or Gain:**
- If S.P. is greater than C.P., the seller is said to have a **profit** or **gain**.

- **Loss:**
- If S.P. is less than C.P., the seller is said to have incurred a **loss**

IMPORTANT FORMULAE

1. Gain = (S.P.) - (C.P.)

2. Loss = (C.P.) - (S.P.)

3. Loss or gain is always reckoned on C.P.

4. Gain Percentage: (Gain %)

$$\text{Gain \%} = \left(\frac{\text{Gain x } 100}{\text{C.P.}}\right)$$

5. Loss Percentage: (Loss %)

$$\text{Loss \%} = \left(\frac{\text{Loss x } 100}{\text{C.P.}}\right)$$

6. Selling Price: (S.P.).Profit

$$SP = \left[\frac{(100 + \text{Gain }\%)}{100} \text{ x C.P}\right]$$

7. Selling Price: (S.P.) Loss

$$SP = \left[\frac{(100 - \text{Loss }\%)}{100} \text{ x C.P.}\right]$$

8. Cost Price: (C.P.).Profit

$$\text{C.P.} = \left[\frac{100}{(100 \quad + \text{Gain }\%)} \text{ x S.P.}\right]$$

9. Cost Price: (C.P.).Loss

$$\text{C.P.} = \left[\frac{100}{(100 - \text{Loss }\%)} \text{ x S.P.}\right]$$

10. When a person sells two similar items, one at a gain of say x%, and the other at a loss of x%, then the seller always incurs a loss given by:

$$\text{Loss \%} = \left(\frac{\text{Common Loss and Gain \%}}{10}\right)^2 = \left(\frac{x}{10}\right)^2.$$

11. If a trader professes to sell his goods at cost price, but uses false weights, then

$$\text{Gain \%} = \left[\frac{\text{Error}}{(\text{True Value}) - (\text{Error})} \times 100\right]\%.$$

12. The reduction made on the 'marked price' of an article is called the discount. When no discount is given, ' selling price' is the same as 'marked price'.

* Discount=Marked price * Rate of discount
* S.P=M.P – Discount
* Discount%=(Discount/M.P)*100

1. A person purchased an article for ₹ 100. If he sells it at a 15% profit then find his selling price.

a)Rs.100 b)Rs.125 c)Rs.115 d)Rs.120

Answer: C

Solution: SP = CP [1 + (Gain % x 100)]

SP = 100 [1 + (15/100)]

= 100 x 1.15

= 115.

The article selling price is ₹ 115.

2. If the selling price of 10 articles is same as the cost price of 11 articles, find the profit or loss percent.

a)11% b)16% c)6% d)10%

Answer: D

Let the cost price of 1 article be Re. 1

Therefore, the C.P. of 10 article = Rs. 10

Also, the C.P. of 11 articles = Rs. 11

Hence, Selling price (S.P.) of 10 articles = Rs. 11

Here X= 10 and Y=11, therefore, profit percent = $\left(\frac{11-10}{10}\right)\times 100 = 10\%$

3. The cost price of 20 articles is the same as the selling price of x articles. If the profit is 25%, then the value of x is:

a)15 b)16 c)18 d)25

Answer: B

Let C.P. of each article be Re. 1

C.P. of x articles = Rs. x.

S.P. of x articles = Rs. 20.

Profit = Rs. (20 - x).

$$\therefore \left(\frac{20 - x}{X} \times 100 = 25\right)$$

$\Rightarrow$ $2000 - 100x = 25x$

$125x = 2000$

$x = 16$.

4. A man buys a cycle for Rs. 1400 and sells it at a loss of 15%. What is the selling price of the cycle?

a)Rs.1090 b)Rs.1160 c)Rs.1190 d)Rs.1202

Answer: C

C.P of cycle=1400

Loss%=15%

Therefore , SP of cycle$=\frac{(100-loss\%)}{100} * CP$

$=(85/100)*1400=Rs.\ 1190$

(Or)

S.P=85% of Rs.1400=Rs.(85*1400)/100=Rs.1190

5. 6% more is gained by selling a coat for Rs.1425 than by selling it for Rs.1353. the CP of the coat is:

a)Rs.1000 b)Rs.1250 c)Rs.1500 d)Rs.1200

Answer: D

6% of cost price (CP) = 1425 - 1353 = 72

6% of CP

$\therefore$ CP = (72 x 100) / 6 = 1200

6. A milkman purchases the milk at Rs.x per litre and sells it at Rs.2x per litre still he mixes 2 litres water with every 6litres of pure milk. What is the profit percentage?

a)116% b)166.66% c)60% d)100%

Answer:B

Let the cost price of 1litre pure milk be Re.1, then

6litres(milk)-> CP=Rs.6

2litres(water)->CP=Rs.0→ CP=Rs.6 only

And 8litres mixture-> SP->8*2=Rs.16, Profit=16-6/6 * 100 = 1000/6 = 166.66%

7. A table and 2 chairs together cost \$400. If by selling the chairs at 10% loss and the table at 10% profit, a total of 5% profit is made. What is the cost price of a chair?

(a) \$ 25 (b) \$ 75 (c) \$ 100 (d) \$ 50

Answer: D

Table = x

Chair = $400 - x$

$$x \times \frac{11\cancel{0}}{10\cancel{0}} + \frac{400 - x}{10\cancel{0}} \times 9\cancel{0} = 4\cancel{0}\cancel{0} \times \frac{105}{1\cancel{0}\cancel{0}}$$

$$\frac{11x}{10} + \frac{3600}{10} - \frac{9x}{10} = \$\,420$$

x = 300

2 chairs = \$ 100 $\therefore$ 1 chair = \$ 50.

8. A man bought 18oranges for a rupee and sold them at 12 oranges for a rupee. What is the profit percentage?
a)33.33% b)50% c)66.66% d)none of these

Answer: B

Easy way is to make number of oranges purchased and sold equal.

Let Number of oranges bought & sold = LCM(18,12) = 36

CP = 36/18 =2

SP = 36/12 =3

Profit % = (3 - 2)/2 x 100 = 50%

(Or)

He recovers cost of 18 oranges by selling 12 oranges.

Remaining 6 oranges reflect profit.

Profit = 6/12 x 100 = 50%

9. Ram buys a watch for Rs. 500 and sells it to Shyam at 10% loss. Shyam then sells it to Ravi at 20% profit and Ravi sells it to Rakesh at 10% profit. How much did Rakesh pay for the watch?

A. Rs. 600 B. Rs. 594 C. Rs. 495 D. Rs. 675

Answer: B

Let us consider that Ram spends 100 to buy the watch.
Ram buys watch at 100 and sells it to Shyam at 10% loss. 10% of 100 is 10.
Therefore,

*Cost Price for Ram = 100
Selling Price for Ram = 100 – (10% of 100 = 10) = 100 - 10 = 90

*Cost Price for Shyam = 90
Selling Price for Shyam = 90 + (20% of 90 = 18) = 90 + 18 = 108

*Cost Price for Ravi = 108
Selling Price for Ravi = 108 + (10% of 108 = 10.8) = 108 + 10.8 = 118.8

* Cost Price for Rakesh = 118.8
The initial amount was Rs. 500 and the percentage we considered 100. So for final calculation, the equation becomes,

(500/100)*118.8=594

So, the amount Rakesh spent to buy the watch is Rs. 594.

10. A man purchases 8 pens for Rs. 9 and sells 9 pens for Rs. 8. How much profit or loss does he make?

a)20% b)14% c)21%

d)18%

Answer: C

	Quantity	Price
Buying	8	9
Selling	9	8

es equal,

	Quantity	Price
Buying	8 x 9	9 x 9
Selling	9 x 8	8 x 8

After the calculations,

	Quantity	Price
Buying	72	81
Selling	72	64

➡ When the data is observed, we can see that 72 oranges are bought in Rs. 81 while 72 oranges are sold in Rs. 64. Ultimately, the person is having LOSS in the entire transaction.

$$\text{Loss Percentage} = \frac{\textit{Cost Price} - \textit{Selling Price}}{\textit{Cost Price}} \times 100$$

$$= \frac{81-64}{81} \times 100$$

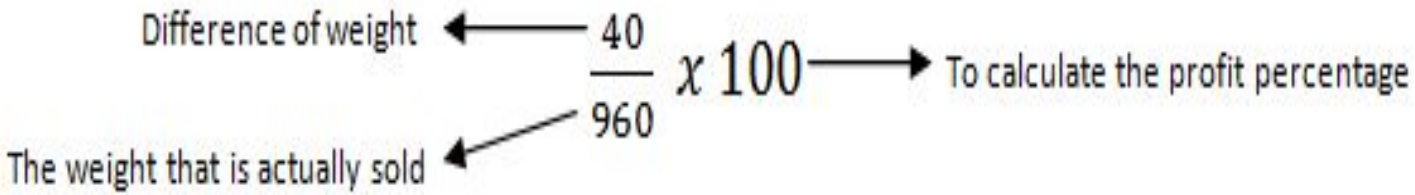
$$= \frac{17}{81} \times 100 = \frac{1700}{81} = 20.98\% \text{ (final answer)}$$

11. A dishonest dealer professes to sell his goods at Cost Price, but he uses a weight of 960 gm for the kg weight. Find his gain percentage.
a)5 1/6% b)4 1/6% c)6 1/6% d)3 1/6%

Answer: B

Since the kg weight is of 1000 gm but the dealer uses only the 960 gm weight. Thus giving himself the profit of 1000 – 960 = 40 gm

On the sale of 960 gm, Thus the profit percentage can be calculated as



$\frac{40}{960} \times 100 = 4\frac{1}{6}\%$ (Profit percentage)

12. A bicycle marked at Rs 1,500 is sold for Rs 1,350. What is the percentage of the discount?

a) 8% b) 10% c) 12% d) 14.3%

Answer:B

Given : Marked Price = Rs 1500, and Selling Price = Rs 1350.

Amount of discount is = Marked Price – Selling Price.

In other words we can say that = (1500 – 1350) = Rs 150.

Discount for Rs. 1500 =Rs 150

Therefore, the Discount for Rs 100 = (150/1500) × 100 = 10%
Thus, the Percentage of discount = 10%

13. A shopkeeper allows a discount of 10% to his customers and still gains 20%. Find the marked price of an article which costs Rs 450 to the shopkeeper.

A) Rs. 800 B) Rs 400 C) Rs 600 D) Rs 379

Answer: C

Let us use the formula method first:

Discount = 10%, Gain = 20%, C.P. = Rs. 450, M.P. = ?

M.P. = [(100 + Gain%)/(100 – Discount%)] × C.P.

Thus we have = [(100 + 20)/(100 – 10)]×450 = Rs. 600

14. The MRP of the product is given as Rs. 2000 and the merchant decides to provide successive discounts of 30% and 20% on the product. Find the selling price.

A. Rs. 1100 B. Rs. 1120 C. Rs. 1150 D. Rs. 1200

Answer: B

1st discount will be, 30% of 2000 = Rs. 600.

So, the discounted price will be 2000 – 600 = Rs. 1400.

Final discounted price will be 1400 – 20% of 1400 => 1400 – 280 = Rs. 1120.

So, the final SP of the product will be Rs. 1120.

15. What will be more profitable from a customer's point of view? Two successive discounts of 30% and 20% respectively or a single discount of 50%?

A. A single discount
B. Two successive discounts
C. Either of the two
D. Cannot be possible

Answer: A

Suppose that the market price of a product is Rs. 100.

For Case I two successive discounts of 30% and 20% are given respectively. So, the price after the first discount will be, 100 – 30% of 100 = 100 – 30 = Rs. 70.

Now, the price after the second discount will be, 70 – 20% of 70 = 70 – 14 = Rs. 56. So, the customer has to pay Rs. 56

For case II there is a single discount of 50% given. So, final price after the single discount will be, 100 – 50% of 100 => 100 – 50 = Rs. 50.

16. The difference between a discount of 35% and two successive discounts of 20% and 20% on a certain bill was Rs.22. Find the bill amount.
(a) Rs.1100 (b) Rs.200 (c) Rs.2200 (d) data inadequate

Answer : C

Equivalent discount 20%, 20% =

$$x + y - \frac{xy}{100}$$

$$40 - \frac{400}{100} = 36\%$$

$$36\% - 35\% = 1\% \text{ value} = 22$$

$$100\% \text{ value} = ? = 2200$$

17. A golf shop pays its wholesaler Rs.40 for a club and then sells it for Rs.75. What is the markup rate?
(a) 12.5% (b) 87.5% (c) 33.33% (d) 63.77%

Answer : B

75 – 40 = 35

The mark up rate = 35 = x(40)

35/40= x = 0.875 = 87.5%

18. A retailer buys a machine at a discount of 20% and sells it for $ 1955. Thus he makes a profit of 10%. The discount is
(a) $ 520 (b) $ 300 (c) $ 620 (d) $ 600

Answer: A

SP = 1955 = 1.20CP

Let MP be x. After discount of 20% it was sold for 10% profit at Rs.1955

$1.20(0.90)x = 1955$

$$x = \frac{1955 \times 1.20}{0.90} = 2606$$

Discount = 20% of 2606 = 520

19. A shop keeper fixes the marked price of an item 35% above the cost price. The percentage of discount allowed to gain 12% is.
(a) 14% (b) 15% (c) 16% (d) 17%

Answer: D

Let CP = 100

Marked price = 100 + 35 = 135

SP = 112

Discount percentage = $\frac{23}{135} \times 100 = 17\%$

20. A shop is offering discount on shirts costing $ 20 each. If someone buys 2 shirts, he will be offered 15% discount on the first shirt and another 10% on the already reduced price for the second shirt. How much would one pay for 2 shirts at this shop?

(a) $ 15.3 (b) $ 17 (c) $ 32.3 (d) $ 16.4

Answer: C

The reduced price for the 1st shirt

$$20 - \frac{15}{100} \times 20 = \$\ 17$$

The reduced price for the 2nd shirt. The 10% discount will be on the already reduced price, hence the price of the second shirt is given by

17 – 10% of 17 = $ 15.3

Total cost for 2 shirts is 17 + 15.3 = $32.3.