
PROFIT AND LOSS

Goods are sold to earn profit in term of money in trade and business. Whenever a purchased article is sold, then either **profit is earned or loss is incurred**.

COST PRICE (C.P)

This is the price at which an article is purchased or manufactured.

SELLING PRICE (S.P)

This is the price at which an article is sold.

PROFIT (SP>CP)

When an article is sold at a price more than its cost price, then profit is earned.

Ex. A man buys an article for Rs. 600 and sells it for Rs. 750. Find profit/loss.

Sol. Here, $SP > CP$.

Profit is earned. Formula of Profit = $SP - CP$

$$= 750 - 600 = \text{Rs } 150$$

LOSS (CP>SP)

A loss is incurred, when an article is sold at a price less than its cost price.

Ex. A man buys an article for Rs. 800 and sells it for Rs. 600. Find profit/loss.

Sol. Here, $CP > SP$.

Loss is incurred. Formula of Loss = $CP - SP$

$$= 800 - 600 = \text{Rs } 200$$

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:

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

5. Loss Percentage:

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

6. Selling Price: (S.P.)

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

7. Selling Price: (S.P.)

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

8. Cost Price: (C.P.)

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

9. Cost Price: (C.P.)

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

MARKED PRICE (LIST PRICE)

The **price on the label of an article/product** is called the marked price or list price. This is the **price at which product is intended to be sold**. However, there can be some discount given on this price and actual selling price of the product may be less than the marked price. It is generally denoted by MP.

When Discount is offered, M.P > S.P

When Discount is not offered, M.P < S.P

DISCOUNT

Discount is defined as the **amount of rebate given on the label price** (marked price) of an article. It is given by merchants/shopkeepers to attracting customers for increasing their sales.

Discount = Marked Price - Selling Price

$$\text{Discount\%} = \frac{\text{Discount}}{\text{Marked price}} \times 100$$

Ex: Marked price of a table is Rs 1200. It is sold at Rs. 1056 after allowing certain discount. Find the discount percentage?

Sol: Discount = MP - SP

$$1200 - 1056 = 144$$

$$\text{Discount\%} = \frac{144}{1200} \times 100 = 12\%$$

Ex. The marked price of an article is Rs 1200. A shopkeeper allows a discount of 20% and gets a profit of 20%. Find the cost price of the article?

$$\text{Sol: SP} = \frac{80}{100} \times 1200 = 960$$

$$\text{CP} = \frac{100}{120} \times 960 = 800$$

Successive Discount

When a **series of discounts (one after the other)** are allowed on **marked price** of an article, then these discounts are called successive discounts.

Let d1%, d2%, d3%.....be the series of discounts on an article

Ex: What will be a single equivalent discount for successive discounts of 10% and 5% on marked price of an article?

Sol: Let MP = 100

$$\text{SP} = 100 \times \frac{100-10}{100} \times \frac{100-5}{100} = 85.5$$

Total discount = 14.5%

FALSE WEIGHT

When a product is sold at cost price but seller uses less weight instead of actual weight to earn more profit.

$$\text{Gain \%} = \frac{\text{Error}}{\text{True value} - \text{error}} \times 100$$

Error = True value - false value.

Ex. A dishonest dealer sells his goods at cost price, but he uses a weight of 1600 grams for the 2Kg weight. Then the percentage of gain is?

Sol: Error = 2000 – 1600 = 400

$$\text{Gain \%} = \frac{400}{1600} \times 100 = 25\%$$

Ex. A dealer sells his goods at cost price. If by using false weights he gains $14\frac{2}{7}\%$, then find the weight he uses for 1 kg?

Sol: Let error = X

$$\text{Gain \%} = \frac{\text{Error}}{\text{True value} - \text{error}} \times 100$$

$$\frac{100}{7} = \frac{x}{1000-x} \times 100$$

$$7x = 1000 - x$$

$$8x = 1000$$

$$x = 125$$

$$\text{Weight use} = 1000 - 125 = 875$$

Ex. A person buys a toy for Rs 500 and sells it for Rs 750. What will be his gain per cent?

Sol. Given, CP = Rs 500 and SP = Rs 750

$$\text{Profit} = \text{SP} - \text{CP} = 750 - 500 = \text{Rs } 250$$

According to the formula,

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

$$= \frac{250}{500} \times 100 = 50\%$$

Ex. A person buys an article for Rs. 400 and sells it for Rs. 300. Find his loss per cent.

Sol. Given, CP = Rs 400 and SP = Rs 300

$$\text{Profit} = \text{CP} - \text{SP} = 400 - 300 = \text{Rs } 100$$

According to the formula,

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

$$= \frac{100}{400} \times 100 = 25\%$$

Ex. When SP is Rs. 165 and gain is 10%. Find the CP?

Sol. Given, SP = Rs 165 and gain = 10%

$$\text{CP} = \frac{100}{110} \times 165 = 150$$

Ex. When CP is Rs. 250 and gain is 20%. Find the SP?

Sol. Given, CP = Rs 250 and gain = 20%

$$\text{SP} = \frac{120}{100} \times 250 = \text{Rs. } 300$$

PRACTICE QUESTIONS

1. Varun, a showroom owner, purchases an Air conditioner and a LCD television for Rs. 40,000. He sells LCD at a profit of 15% and air conditioner at a gain 12%. After selling the both items, he made a profit of Rs. 5310. What is the difference between the original cost price of the LCD and the Air conditioner?
(A) Rs. 4000 (B) Rs. 5000 (C) Rs. 6000 (D) Rs. 7500 (E) Rs. 8000
2. Harish bought 900 bananas at Rs. 8 per dozen. He sold 400 of them at 2 for Rs 3, 60% of the remaining he sold at the cost price and the remaining are at 2 for Rs. 1. What is his gain per cent in the whole?
(A) 30% (B) 40% (C) 45% (D) 50% (E) None of these
3. On selling a chair at 7% loss and a table at 17% gain, a man gains Rs. 296. If he sells the chair at 7% gain and the table at 12% gain, then he gains Rs. 400. The actual price of the table is:
(A) Rs. 1400 (B) Rs. 1600 (C) Rs. 1800 (D) Rs. 2400 (E) None of these
4. Amit sells a commodity at 15% profit. If he had bought it at 10% less and sold it for Rs.3 less, then he would have gained $22\frac{2}{9}\%$. What is the cost price of the commodity?
(A) Rs. 60 (B) Rs. 75 (C) Rs. 80 (D) Rs. 120 (E) None of these
5. A manufacture fixes his selling price at $33\frac{1}{3}\%$ over the cost of production. If cost of production goes up by 20% and manufacture raises it's selling price by $12\frac{1}{2}\%$, his percentage profit is
(A) 20% (B) 25% (C) 30% (D) 35% (E) None of these
6. Cost Price of two mobile phones is same. One phone is sold at a profit of 15% and the other for Rs. 3600 more than the first. If the net profit is 30%, then find the cost price of each mobile?
(A) 10000 (B) 12000 (C) 15000 (D) 18000 (E) None of these
7. A reduction of 15% in the price of sugar enables a housewife to purchase 3 kg more for Rs. 680. What is original price per kg of sugar?
(A) Rs.30/Kg (B) Rs.34 /Kg (C) Rs.40 /Kg (D) Rs.42 /Kg (E) None of these
8. Amit makes a profit of Rs. 200 if he sells a certain number of chocolates he has at the price of Rs. 5 per chocolate and incurs a loss of Rs. 100 if he sells the same number of chocolates for Rs. 3.5 per chocolate. How many chocolates does Amit have?
(A) 200 (B) 220 (C) 225 (D) 240 (E) None of these
9. The income of a broker remains unchanged though the rate of commission is increased from 4 % to 5%. The percentage of slump in business is:
(A) 10 % (B) 15 % (C) 20 % (D) 25 % (E) None of these
10. There is a piece of cloth purchased by a person at Rs 160. If he will buy 4 meters more, it costs him Rs 2 less and the cost will remains unchanged. How long is the piece purchased initially?
(A) 8 m (B) 10 m (C) 12 m (D) 16 m (E) None of these

SOLUTIONS**1. Answer is option C****Explanation:**

Let C.P. of AC is Rs. x .

=> Then, C.P. of LCD = Rs. $(40,000 - x)$.

=> $(12\% \text{ of } x) + [15\% \text{ of } (40,000 - x)] = 5310$

=> $\frac{12}{100} \times x + \frac{15}{100} \times (40000 - x) = 5310$

=> $12x + 60000 - 15x = 53100$

=> $3x = 6900$

=> $x = 23000$

So, C.P. of Air Conditioner = Rs. 23000

C.P. of LCD = Rs. 17000

Difference = Rs. $(23000 - 17000)$ = Rs. 6000

2. Answer is option D**Explanation:**

C.P. of 12 bananas = Rs. 8

C.P. of 900 bananas = $\frac{8 \times 900}{12}$ = Rs. 600

S.P. of 400 eggs = $\frac{3}{2} \times 400$ = Rs. 600

S.P. of 60% of the Remaining = $300 \times \frac{8}{12}$ = 200

S.P. of remaining 200 eggs = $\frac{1}{2} \times 200$ = Rs. 100

Total S.P. = $600 + 200 + 100$ = Rs. 900

Gain = $900 - 600$ = Rs. 300

Gain per cent = $\frac{300}{600} \times 100$ = 50%

3. Answer is option B**Explanation:**

Let C.P. of the chair be Rs. x

And that of the table be Rs. y

Then, $17\% \text{ of } y - 7\% \text{ of } x = 296$

=> $17y - 7x = 29600$ (i)

And, $12\% \text{ of } y + 7\% \text{ of } x = 400$

=> $12y + 7x = 40000$ (ii)

Solving (i) and (ii), we get: $y = 2400$ and $x = 1600$.

C.P. of Chair = Rs. 1600.

4. Answer is option A**Explanation:**

Let C.P = $100X$

Case 1

Profit = 15%

S.P = $100x \times \frac{115}{100} = 115x$

Case 2

C.P = $90x$

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

S.P = $90x \times \frac{1100}{900} = 110x$

Difference = $5x$

$5x = 3$

$100x = 60$

C.P = 60

5. Answer is option B**Explanation:**

Let C.P = $300x$

S.P = $300x \times \frac{400}{300} = 400x$

If C.P goes up = $300x \times \frac{120}{100} = 360x$

S.P = $400x \times \frac{225}{200} = 450x$

Profit = $450x - 360x = 90x$

Profit % = $\frac{90x}{360x} \times 100 = 25\%$

6. Answer is option B**Explanation:**

Let Cost price of each = $100x$

SP of first mobile = $115x$

SP of second mobile = $115x + 3600$

$(100x + 100x) \times \frac{130}{100} = 115x + 115x + 3600$

$260x = 230x + 3600$

$30x = 3600$

$x = 120$

CP = $120 \times 100 = 12000$

7. Answer is option C**Explanation:**

15% reduction = 3 kg

100% reduction = 20 kg

Reduced price = $\frac{680}{20} = 34$

Original Quantity = $20 - 3 = 17$ kg

Original price = $\frac{680}{17} = 40$

8. Answer is option A**Explanation:**

Let the number of chocolates = x

As per question,

$5x - 3.5x = 200 + 100$

$1.5x = 300$

$x = 200$

9. Answer is option C**Explanation:**

Let the income of broker initially = x

Let the income of broker after reduction = y

4% of x = 5% of y

$$\frac{4}{100}x = \frac{5}{100}y$$

$$x = 5$$

$$y = 4$$

$$\text{Reduction} = 5 - 4 = 1$$

$$\text{Percentage of slump} = \frac{1}{5} \times 100$$

$$= 20\%$$

10. Answer is option D**Explanation:**

Let the length of the piece = x meters

Cost price = Rs. 160

$$\text{Price per meter} = \frac{160}{x}$$

As per question,

$$\left(\frac{160}{x} - 2\right)(x+4) = 160$$

$$(160 - 2x)(x+4) = 160x$$

$$160x + 640 - 2x^2 - 8x = 160x$$

$$2x^2 + 8x = 640$$

$$2(x^2 + 4x) = 640$$

$$x^2 + 4x - 320 = 0$$

$$x^2 + 20x - 16x - 320 = 0$$

$$\text{Value of } x = 16$$

