Profit and Loss

Cost Price (CP)

The amount paid to purchase an article or the price at which an article is made is known as its cost price.

Selling Price (SP)

The price at which an article is sold is known as its selling price.

Profit

If the Selling Price (SP) of an article is greater than the Cost Price (CP), the difference between the selling price and cost price is called profit.

Thus, if SP > CP, then

Profit = SP – CP

Example 1 An article was bought for ₹ 2000 and sold for ₹ 2200. Find the gain.

(a) ₹ 200 (b) ₹ 400
(c) ₹ 300 (d) ₹ 250

Sol. *(a)* We have,

CP of the article = ₹ 2000

SP of the article = ₹ 2200

∴ Gain = SP – CP

= ₹ 2200 – ₹ 2000 = ₹ 200

Loss

If the Selling Price (SP) of an article is lesser than Cost Price (CP), the difference between the selling price and cost price is called loss.

Thus, if SP < CP, then

Loss = CP – SP

Example 2 A cycle was purchased for ₹ 1600 and sold for ₹ 1400. Find the loss.

(a) ₹ 400
(b) ₹ 300
(c) ₹ 200
(d) Cannot be determined

Sol. *(c)* We have,

CP of the cycle = ₹ 1600

SP of the cycle = ₹ 1400

Loss = CP – SP = ₹ 1600 – ₹ 1400 = ₹ 200

Profit and Loss Percentage

The profit per cent is the profit that would be obtained for a CP of ₹ 100.

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

or we can say, $\text{CP} = \dfrac{\text{SP}}{\left(1 + \dfrac{\text{Profit percentage}}{100}\right)}$

Example 3 Books were bought for ₹ 2000 and sold for ₹ 2500. Find the gain per cent.

(a) 20 (b) 25 (c) 30 (d) 15

Sol. *(b)* We have, CP of the books = ₹ 2000

SP of the books = ₹ 2500

∴ Gain = SP – CP = ₹ 2500 – ₹ 2000 = ₹ 500

Now, gain per cent $= \left(\dfrac{\text{Gain}}{\text{CP}} \times 100\right)$

$= \left(\dfrac{500}{2000} \times 100\right) = 25\%$

Hence, gain per cent = 25%

Example 4 If SP = ₹ 77 and gain = 10%, then find the Cost Price (CP).

(a) ₹ 50 (b) ₹ 80 (c) ₹ 70 (d) ₹ 100

Sol. *(c)* $CP = \dfrac{SP}{\left(1+\dfrac{Rate}{100}\right)}$

$$\Rightarrow \quad CP = \frac{77}{\left(1+\frac{10}{100}\right)} = \frac{77}{\frac{110}{100}}$$

$$= \frac{77\times 100}{110} = ₹\ 70$$

Similarly, the loss per cent is the loss that would be made for a CP of ₹ 100.

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

$$\text{or we can say, } CP = \frac{SP}{\left(1-\dfrac{\text{Loss percentage}}{100}\right)}$$

Example 5 A scooter was purchased for ₹ 30000 and sold for ₹ 25000. Find the loss per cent.

(a) $7\frac{1}{7}$ (b) $33\frac{1}{3}$ (c) $11\frac{1}{3}$ (d) $16\frac{2}{3}$

Sol. *(d)* We have,

CP of the scooter = ₹ 30000

SP of the scooter = ₹ 25000

∴ Loss = CP – SP = ₹ 30000 – ₹ 25000 = ₹ 5000

$$\text{Now, loss per cent} = \left(\frac{\text{Loss}}{CP}\times 100\right)$$

$$= \left(\frac{5000}{30000}\times 100\right) = \frac{50}{3}\% = 16\frac{2}{3}\%$$

Hence, loss per cent $= 16\frac{2}{3}\%$

Example 6 If CP = ₹ 37.50 and loss = 12%, then find the selling price (SP).

(a) ₹ 33 (b) ₹ 35
(c) ₹ 30 (d) ₹ 25

Sol. *(a)* $SP = CP\left(1-\dfrac{Rate}{100}\right)$

$$= 37.50\left(1-\frac{12}{100}\right)$$

$$= 37.50\times\frac{88}{100} = ₹\ 33$$

Profit and loss percentage are always calculated on Cost Price (CP).

Practice Exercise

1. If CP = ₹ 9.50 and SP = ₹ 11.40, then find the profit.
   (a) ₹ 1.90 (b) ₹ 2 (c) ₹ 10 (d) ₹ 5
2. If CP = ₹ 10.20 and SP = ₹ 8.50, then find the loss.
   (a) ₹ 2 (b) ₹ 1.90 (c) ₹ 1.70 (d) ₹ 3
3. If CP = ₹ 112, SP = ₹ 132, then find gain.
   (a) ₹ 80 (b) ₹ 78
   (c) ₹ 100 (d) ₹ 20
4. If CP = ₹ 120, SP = ₹ 90, then find loss per cent.
   (a) 20 (b) 25
   (c) 21 (d) 23
5. An article was bought for ₹ 650 and sold for ₹ 728. Find the gain per cent.
   (a) 12 (b) 15 (c) 5 (d) 20
6. Raj bought a cycle for ₹ 690 and sold it for ₹ 655.50 after 1 yr. Find the loss per cent.
   (a) 15 (b) 10
   (c) 5 (d) 20
7. Find SP, when CP = ₹ 500, gain = 7%.
   (a) ₹ 335 (b) ₹ 400
   (c) ₹ 500 (d) ₹ 535
8. A man sold his cow for ₹ 7920 and gained 10%. What will be the cost price of cow?
   (a) ₹ 8000 (b) ₹ 7200
   (c) ₹ 8500 (d) ₹ 9000
9. A watch is sold for ₹ 1080 at a loss of 10%. Find the cost price of the watch.
   (a) ₹ 2000
   (b) ₹ 1500
   (c) ₹ 1200
   (d) ₹ 1700

10. By selling a stool for ₹ 67.50, a carpenter loses 10%. How much per cent would be gain or lose by selling it for ₹ 82.50?
(a) Gain, 10%
(b) Loss, 12%
(c) Gain, 20%
(d) Loss, 25%

11. If by selling a bed sheet for ₹ 75 a man loses 4%, for what amount should he sell it, so as to gain 20%?
(a) ₹ 90 (b) ₹ 75.95
(c) ₹ 95.25 (d) ₹ 93.75

12. A person purchased an old mobile phone for ₹ 700 and spends ₹ 50 on its replaring. If he sold that mobile phone for ₹ 1000, then his profit percentage is
(a) 20% (b) 25%
(c) 50% (d) 33.33%

13. If the cost price of 15 tables be equal to selling price of 20 tables. Find the loss per cent.
(a) 30 (b) 28
(c) 25 (d) 20

14. Selling price of 6 pens is equal to the cost price of 7 pens. Find the gain per cent or loss per cent.
(a) Gain, $14\frac{2}{7}\%$
(b) Loss, $33\frac{1}{3}\%$
(c) Gain, $16\frac{2}{3}\%$
(d) Loss, $7\frac{1}{7}\%$

15. Tanuja bought two house for ₹ 239500. She sold one of them for ₹ 85000 and the other one for ₹ 175000. How much money did she gain?
(a) ₹ 25500 (b) ₹ 15500
(c) ₹ 20500 (d) ₹ 15555

16. Piyush purchased an old mobile for ₹ 1150 and spends ₹ 150 on its maintenance. If he sold the old mobile for ₹ 1500, then his profit percentage is
(a) 15.38% (b) 18.19%
(c) 20.13% (d) 25.2%

Answers

1	(a)	2	(c)	3	(d)	4	(b)	5	(a)	6	(c)	7	(d)	8	(b)	9	(c)	10	(a)
11	(d)	12	(d)	13	(c)	14	(c)	15	(c)	16	(a)								

Hints & Solutions

1. Gain = SP – CP = ₹ 11.40 – ₹ 9.50 = ₹ 1.90

2. Loss = CP – SP = ₹ 10.20 – ₹ 8.50 = ₹ 1.70

3. Gain = SP – CP = 132 – 112 = ₹ 20

4. Loss = CP – SP = 120 – 90 = ₹ 30

$\therefore$ Loss per cent $= \left(\frac{30}{120}\times 100\right) = 25\%$

5. We have,
CP of the article = ₹ 650
SP of the article = ₹ 728
$\therefore$ Gain = SP – CP = 728 – 650 = ₹ 78

Now, gain per cent $= \left(\frac{\text{Gain}}{\text{CP}}\times 100\right)$

$= \left(\frac{78}{650}\times 100\right) = 12\%$

6. We have,
CP of the cycle = ₹ 690
SP of the cycle = ₹ 655.50

$\therefore$ Loss = CP – SP
= 690 – 655.50 = ₹ 34.50

Now, loss per cent $= \left(\frac{\text{Loss}}{\text{CP}}\times 100\right)$

$= \left(\frac{34.50}{690}\times 100\right) = 5\%$

7. $\text{SP} = \text{CP}\left(1+\frac{\text{Rate}}{100}\right)$

$= 500\left(1+\frac{7}{100}\right) = 500\times\frac{107}{100} = ₹\ 535$

8. SP of the cow is ₹ 7920.

Gain per cent = 10%

$$CP = \frac{SP}{\left(1+\frac{Rate}{100}\right)} = \frac{7920}{\left(1+\frac{10}{100}\right)}$$

$$= \frac{7920}{110/100} = \frac{7920}{110} \times 100$$

$$= ₹\ 7200$$

9. SP of the watch = ₹ 1080

Loss per cent = 10%

$$CP = \frac{SP}{\left(1-\frac{Rate}{100}\right)} = \frac{1080}{\left(1-\frac{10}{100}\right)}$$

$$= \frac{1080}{90/100} = \frac{1080}{90} \times 100 = ₹\ 1200$$

10. We have, SP = ₹ 67.50 and loss per cent = 10%

$$\therefore \quad CP = \frac{SP}{\left(1-\frac{Rate}{100}\right)} = \frac{67.50}{1-\frac{10}{100}}$$

$$= \frac{67.50}{90/100} = \frac{67.5}{90} \times 100 = ₹\ 75$$

If SP = ₹ 82.50

$\therefore$ Gain = SP − CP = 82. 50 − 75 = ₹ 7. 50

$$\text{Gain per cent} = \left(\frac{\text{Gain}}{CP} \times 100\right) = \frac{7.50}{75} \times 100 = 10\%$$

11. We have, SP = ₹ 75 and loss per cent = 4%

$$\therefore \quad CP = \frac{SP}{\left(1-\frac{Rate}{100}\right)} = \frac{75}{\left(1-\frac{4}{100}\right)}$$

$$= \frac{75}{96} \times 100 = ₹\ \frac{625}{8}$$

If gain per cent = 20%, then

$$SP = CP\left(1+\frac{\text{Gain per cent}}{100}\right)$$

$$= ₹\left[\frac{625}{8}\left(1+\frac{20}{100}\right)\right]$$

$$= ₹\left(\frac{625}{8} \times \frac{120}{100}\right) = ₹\ 93.75$$

12. Total cost price of mobile phone = ₹ (700 + 50)

= ₹ 750

Selling price of mobile phone = ₹ 1000

$\therefore$ Profit percentage $= \frac{1000-750}{750} \times 100$

$$= \frac{1}{3} \times 100 = 33.33\%$$

13. Let the CP of each table be ₹ 1.

CP of 20 tables = ₹ 20, SP of 20 tables = ₹ 15

$\therefore$ Loss per cent $= \left(\frac{5}{20} \times 100\right) = 25\%$

14. Let the CP of each pen be ₹ 1.

CP of 7 pens be ₹ 7 and SP of 6 pens be ₹ 7.

$\therefore$ Gain per cent $= \left(\frac{1}{6} \times 100\right) = \frac{100}{6} = 16\frac{2}{3}\%$

15. CP of two houses = ₹ 239500

SP of two houses = 85000 + 175000 = ₹ 260000

$\therefore$ Total gain = SP − CP

= 260000 − 239500 = ₹ 20500

16. CP of old mobile = 1150 + 150 = ₹ 1300

SP of old mobile = ₹ 1500

$\therefore$ Required profit percentage $= \frac{\text{Profit}}{CP} \times 100$

$$= \frac{1500-1300}{1300} \times 100 = 15.38\%$$

Try Yourself

1) Find the gain or loss, if SP = ₹ 585 and CP = ₹ 485.
(a) ₹ 95, gain (b) ₹ 120, gain
(c) ₹ 105, gain (d) ₹ 100, gain

2) Find gain per cent, if SP = ₹ 140 and CP = ₹ 125.
(a) 10 (b) 12
(c) 15 (d) 18

3) Find loss per cent, if SP = ₹ 288 and CP = ₹ 384.
(a) 25 (b) 20
(c) 27 (d) 22

4) A man purchased a table for ₹ 653. At what price should he sell it to gain ₹ 57?
(a) ₹ 700 (b) ₹ 725
(c) ₹ 710 (d) ₹ 705

5) A bookseller buys a book for ₹ 165 and sells it for ₹ 176. Find his gain and gain per cent.
(a) ₹ 10, $6\frac{2}{3}\%$ (b) ₹ 12, $6\frac{2}{3}\%$
(c) ₹ 12, $7\frac{2}{3}\%$ (d) ₹ 11, $6\frac{2}{3}\%$

6) A vendor buys oranges at 9 for ₹ 10 and sells them at 12 for ₹ 16. Find his gain per cent.
(a) 15 (b) 20 (c) 18 (d) 25

7) Geeta bought a purse. She sold it to Sita for ₹ 85 at a profit of ₹ 10.25. For how much did she buy the purse?
(a) ₹ 74.75 (b) ₹ 70.50
(c) ₹ 73.50 (d) ₹ 78.50

8) Sunita purchased a saree. She sold it for ₹ 328 and lost ₹ 25 on it. At what price did Sunita purchase the saree?
(a) ₹ 300 (b) ₹ 253
(c) ₹ 355 (d) ₹ 353

9) At trader buys an electric heater for ₹ 350. He sells it at a gain of 8%. What is the selling price of the heater?
(a) ₹ 375 (b) ₹ 360
(c) ₹ 378 (d) ₹ 370

10) A man buys a radio for ₹ 640. He sells it at a loss of $7\frac{1}{2}\%$. Find the selling price of the ratio.
(a) ₹ 592 (b) ₹ 580
(c) ₹ 492 (d) ₹ 400

Answers

1	*(d)*	2	*(b)*	3	*(a)*	4	*(c)*	5	*(d)*
6	*(b)*	7	*(a)*	8	*(d)*	9	*(c)*	10	*(a)*