



Profit and Loss

Cost Price (CP)

The price at which an article is bought purchase, is called its cost price. It is denoted by CP.

Selling Price (SP)

The price at which an article is sold, is called its selling price. It is denoted by SP.

Marked Price (MP)

The price which is printed on an item is called marked list or price. It is denoted by MP.

Profit

If the selling price of an article is greater than the cost price of the article, then there is profit or gain.

i.e., If $SP > CP$

Then Profit = $SP - CP$

Loss

If the selling price of an article is less than the cost price of the article, then there is loss.

i.e., If $SP < CP$

∴ Loss = $CP - SP$

Important Points/Formulae

1. Profit and loss is always calculated on the cost price.
2. Sometimes, some additional expenses are made on the article while buying or before selling it. These expenses are included in the cost price and referred to as overhead charges. These may include expenses like amount spent on repairs, labour charges, transportation etc.

Example 1 A shopkeeper buy an article of ₹ 550 with ₹ 50 overhead charges and He sell it ₹ 650. Then their is profit or loss

- (a) ₹ 50 profit (b) ₹ 50 loss
(c) ₹ 100 profit (d) ₹ 100 loss

Sol. (a) CP of article = ₹ 550

and overhead charges = ₹ 50

So, total CP = $550 + 50 = ₹ 600$ and SP = ₹ 650

∴ $CP < SP$, there is profit.

∴ Profit = $SP - CP = 650 - 600 = ₹ 50$

☑ Profit percentage

$$= \frac{\text{Profit}}{CP} \times 100\% = \frac{(SP - CP)}{CP} \times 100\%$$

☑ Loss percentage

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

Example 2 A person buys a cycle for ₹ 450 but because of certain urgency, he sells it for ₹ 350. His loss per cent is

- (a) 20% (b) $18\frac{1}{2}\%$ (c) $22\frac{2}{9}\%$ (d) 25%

Sol. (c) Given that, CP = ₹ 450 and SP = ₹ 350

Here, SP < CP

$$\therefore \text{Loss} = \text{CP} - \text{SP} = 450 - 350 = ₹ 100$$

According to the formula,

$$\begin{aligned} \text{Loss\%} &= \frac{\text{Loss}}{\text{CP}} \times 100\% = \frac{100}{450} \times 100\% \\ &= \frac{200}{9}\% = 22\frac{2}{9}\% \end{aligned}$$

$$3. \text{CP} = \frac{100 \times \text{SP}}{(100 + \text{Profit\%})}$$

$$4. \text{CP} = \frac{100 \times \text{SP}}{(100 - \text{Loss\%})}$$

$$5. \text{SP} = \text{CP} \left(\frac{100 + \text{Profit\%}}{100} \right)$$

$$6. \text{SP} = \text{CP} \left(\frac{100 - \text{Loss\%}}{100} \right)$$

Example 3 A shopkeeper sells an item for ₹ 1760 and gain 10%, the cost price of the item is

- (a) ₹ 160 (b) ₹ 1600 (c) ₹ 1700 (d) ₹ 7600

Sol. (b) \therefore SP = ₹ 1760 and Gain = 10%

$$\begin{aligned} \therefore \text{CP} &= \frac{100 \times \text{SP}}{100 + \text{Profit\%}} \\ &= \frac{100 \times 1760}{100 + 10} = \frac{100 \times 1760}{110} = ₹ 1600 \end{aligned}$$

Example 4 A toy is bought for ₹ 150 and sold at a gain of 8%. Its selling price is

- (a) ₹ 162 (b) ₹ 170 (c) ₹ 155 (d) ₹ 145

Sol. (a) \therefore CP = ₹ 150, Gain = 8%

$$\begin{aligned} \therefore \text{SP} &= \left(\frac{100 + \text{Gain\%}}{100} \times \text{CP} \right) \\ &= \frac{108}{100} \times 150 = ₹ 54 \times 3 = ₹ 162 \end{aligned}$$

☑ When there are two successive profits of $r_1\%$ and $r_2\%$, then the resultant profit percent is given by $\left(r_1 + r_2 + \frac{r_1 r_2}{100} \right)\%$.

☑ When there is a profit of $r_1\%$ and loss of $r_2\%$, then the resultant profit or loss percent is given by

$$\left(r_1 - r_2 - \frac{r_1 r_2}{100} \right)\%$$

☑ If the resultant is positive, then it is a profit. And if the resultant is negative, then it is a loss.

Example 5 A sold a watch to B at a gain of 10% and B sold it to C at a loss of 10%. If C paid ₹ 1980 for it, then find the amount paid by A.

- (a) ₹ 2000 (b) ₹ 1500 (c) ₹ 2200 (d) ₹ 2500

Sol. (a) We know that, if there is a profit of $r_1\%$ and loss of $r_2\%$, then the resultant profit or loss is given by $\left(r_1 - r_2 - \frac{r_1 r_2}{100} \right)\%$

Here, $r_1 = 10\%$, $r_2 = 10\%$

\therefore The resultant profit or loss

$$= 10 - 10 - \frac{10 \times 10}{100} = -1$$

As sign is negative, there is a loss of 1%.

Selling price of watch = ₹ 1980

$$\begin{aligned} \text{Amount paid by A} &= \frac{1980 \times 100}{(100 - 1)} = \frac{1980 \times 100}{99} \\ &= ₹ 2000 \end{aligned}$$

☑ If cost price of 'a' articles is equal to the selling price of 'b' articles, then

$$\text{Profit percentage} = \left(\frac{a - b}{b} \right) \times 100\% \quad (a > b)$$

$$\text{and loss percentage} = \left(\frac{b - a}{b} \right) \times 100\% \quad (a < b)$$

Example 6 If the cost of 10 watches is equal to selling price of 12 watches, then profit or loss percentage is

- (a) 16.66%, profit (b) 20%, profit
(c) 16.66%, loss (d) 20%, loss

Sol. (c) Here, we have $a = 10$ and $b = 12$

$$\therefore a < b$$

\therefore It will be a loss.

$$\begin{aligned} \therefore \text{Loss\%} &= \frac{b - a}{b} = \frac{12 - 10}{12} = \frac{2}{12} \times 100 = \frac{100}{6} \\ &= 16.66\% \end{aligned}$$

- ☑ If a person sells two similar articles, one at a gain of $a\%$ and another at a loss of $a\%$, then the seller always incurs a loss which is given by

$$\text{Loss\%} = \left(\frac{a}{10}\right)^2 \%$$

Example 7 A man sells two houses for ₹ 536850 each. On one he gains 5% and on the other he loses 5%. Find his gain or loss per cent on the whole transaction.

- (a) 0.15% (b) 0.25%
(c) 0.35% (d) 0.28%

Sol. (b) In such a transaction, there is always a loss.

$$\begin{aligned} \text{Loss \%} &= \left(\frac{\text{Common gain or loss per cent}}{10} \right)^2 \\ &= \left(\frac{5}{10} \right)^2 = 0.25\% \end{aligned}$$

Discount

If the shopkeeper gives a some rebate on an article is called discount.

(i) Discount = Marked Price – Sale Price

(ii) Rate of discount = $\frac{\text{Discount}}{\text{MP}} \times 100\%$

☑ Discount is always gives on a marked price.

If marked price of an article be $^6\text{MP}^r$ and rate of discount is $r\%$, then selling price of an item is given

$$\begin{aligned} \text{SP} &= \text{MP} \left(\frac{100 - r\%}{100} \right) \\ \text{or} \quad \text{MP} &= \frac{\text{SP} \times 100}{(100 - r\%)} \end{aligned}$$

Example 8 An item is sold for ₹ 680 by allowing a discount of 15% on its marked price. The marked price of item is

- (a) ₹ 800 (b) ₹ 820
(c) ₹ 750 (d) None of these

Sol. (a) Given SP = ₹ 680, discount, $r\% = 15\%$

$$\begin{aligned} \text{MP} &= \frac{\text{SP} \times 100}{100 - r\%} = \frac{680 \times 100}{100 - 15} \\ &= \frac{68000}{85} = ₹ 800 \end{aligned}$$

Successive Discount

If the shopkeeper gives $r_1\%$ rebate on print rate, $r_2\%$ on the remaining amount and $r_3\%$ rebate on the amount after two successive discount, then all rebate $r_1\%$, $r_2\%$ and $r_3\%$ are termed as successive discount due to occurrence in successive (i.e. one after other) and obtained as follows

(i) Wholesome discount of first two rebates is given by

$$\left(r_1 + r_2 - \frac{r_1 \times r_2}{100} \right) \% = R \text{ (Say)}$$

(ii) Again wholesome discount of all three rebates is given by

$$\left(R + r_3 - \frac{R \times r_3}{100} \right) \%$$

Example 9 A shopkeeper sells a TV set on discount of 8% of print price and gains 25%. If print price was ₹ 20000, then what was the cost price?

- (a) ₹ 15000 (b) ₹ 16000 (c) ₹ 14000 (d) ₹ 14720

Sol. (d) Given marked price = printed price
= ₹ 20000,

$$\begin{aligned} \text{Discount} &= 8\% \text{ of printed price} \\ &= \frac{8 \times 20000}{100} = ₹ 1600 \end{aligned}$$

$$\therefore \text{SP} = \text{MP} - \text{Discount} = (20000 - 1600) = ₹ 18400$$

Gain per cent = 25%

$$\therefore \text{Cost price} = \left(\frac{100}{125} \times 18400 \right) = ₹ 14720$$

If a shopkeeper marks his items at $a\%$ above the cost price and allows customers a discount of $b\%$ for cash, then there is $\left(a - b - \frac{ab}{100} \right) \%$ profit or loss according to positive or negative sign respectively.

Example 10 A shopkeeper marks his goods 20% higher than the cost price and allows a discount of 5%. Then, the profit percentage is

- (a) 14% (b) 15% (c) 13% (d) 12%

Sol. (a) Let the cost price of goods = ₹ 100

$$\therefore \text{Marked price of goods} = \frac{120}{100} \times 100 = ₹ 120$$

$$\begin{aligned}\text{Selling price of goods} &= 120 - \frac{5}{100} \times 120 \\ &= ₹ 114\end{aligned}$$

$$\therefore \text{Profit percentage} = (114 - 100) = 14\%$$

By formula, here $a = 20\%$ and $b = 5\%$

$$\begin{aligned}\text{then profit \%} &= \left(a - b - \frac{ab}{100} \right) \% \\ &= \left(20 - 5 - \frac{20 \times 5}{100} \right) \% = 14\%\end{aligned}$$

Sales Tax/Value Added Tax

While purchasing an item, we pay some Sales Tax (ST). This sales tax is charged by the government on the sale of an item. Sales tax is applicable on

selling price of an item and is added to the value of the bill.

$$\therefore \text{Sales Tax} = \text{Tax \% of bill amount}$$

Example 11 Rahul bought an air cooler for ₹ 3300 including a tax of 10%. The price of the air cooler before VAT was added is
(a) ₹ 3000 (b) ₹ 3300 (c) ₹ 3100 (d) ₹ 3400

Sol. (a) The price includes the VAT (The Value Added Tax). A 10% VAT means, if the price without VAT is ₹ 100, then price including VAT is ₹ 110.

Now, when price including VAT is ₹ 110, original price is ₹ 100.

Hence, when price including tax is 3300, the original price = ₹ $\frac{100}{110} \times 3300 = ₹ 3000$

Practice Exercise

- A person buys a toy for ₹ 50 and sells it for ₹ 75. His profit is
(a) ₹ 50 (b) ₹ 25
(c) ₹ 100 (d) ₹ 75
- By selling a car ₹ 75000 a man losses ₹ 15000. The cost price of the car is
(a) ₹ 90000 (b) ₹ 70000
(c) ₹ 60000 (d) ₹ 75000
- By selling a cellphone for ₹ 2400, a shopkeeper make a profit of 25%. The CP of the cellphone is
(a) ₹ 1450 (b) ₹ 1920
(c) ₹ 2030 (d) ₹ 1550
- A man selling a cycle losses of 19%, if cost price is ₹ 3000, then SP is
(a) ₹ 2345 (b) ₹ 2523
(c) ₹ 2500 (d) ₹ 2430
- A bat is bought for ₹ 75 and sold at a gain of 8%, its selling price is
(a) ₹ 80 (b) ₹ 83
(c) ₹ 81 (d) ₹ 82
- If selling price of 8 articles is equal to the cost price of 10 articles, then per cent gain is
(a) 20 (b) 25
(c) 30 (d) 35
- A shopkeeper buys 80 articles for ₹ 2400 and sells them for a profit of 16%, the selling price of one article
(a) ₹ 34.80 (b) ₹ 32.80
(c) ₹ 35.80 (d) ₹ 36.80
- The cost of an article was ₹ 15500, ₹ 450 were spent on its repairs. If it is sold for a profit of 15%, the selling price of the article is
(a) 13452.50 (b) 14525.50
(c) 18342.50 (d) 13251.50
- Niraj incurred a loss of 55% on selling an article for ₹ 9549. What was the cost price of the article?
(a) ₹ 27700 (b) ₹ 25600
(c) ₹ 21220 (d) ₹ 29000

10. Ravish lost 20% by selling a radio set for ₹ 3072. What per cent will he gain by selling it for ₹ 4080?
 (a) 5.5% (b) 4.30%
 (c) 6.25% (d) 7%
11. A radio is sold at a gain of 16%. If it had been sold for ₹ 20 more, 20% would have been gained. The cost price of the radio is
 (a) ₹ 420 (b) ₹ 410
 (c) ₹ 485 (d) ₹ 500
12. A sold a watch to B at a gain of 5% and B sold it to C at a gain of 4%. If C paid ₹ 1092 for it, the price paid by A is
 (a) ₹ 995 (b) ₹ 1000
 (c) ₹ 950 (d) ₹ 999.60
13. A house worth ₹ 150000 is sold by X at a 5% profit to Y. Y sells the house back to X at a 2% loss. Then in the entire transaction
 (a) X gain ₹ 4350 (b) X loses ₹ 4350
 (c) X gain ₹ 3150 (d) X loses ₹ 3150
14. A sweet seller declares that he sells sweet at the cost price. However, he uses a weight of 450 g instead of 500 g. His percentage profit is
 (a) 10% (b) 12%
 (c) $11\frac{1}{9}\%$ (d) $12\frac{2}{9}\%$
15. A man sells 320 mangoes at the cost price of 400 mangoes. His gain per cent is
 (a) 10% (b) 15%
 (c) 20% (d) 25%
16. The cost price of 9 articles is equal to the selling price of 11 articles. Find the loss percentage.
 (a) $18\frac{2}{11}\%$ (b) $2\frac{9}{11}\%$
 (c) $15\frac{1}{2}\%$ (d) $16\frac{1}{2}\%$
17. Profit after selling an article for ₹ 425 is the same as loss after selling it for ₹ 355. The cost of the article is
 (a) ₹ 390 (b) ₹ 405
 (c) ₹ 380 (d) None of these
18. By selling 8 dozen of pencils, a shopkeeper gains the selling price of 1 dozen pencils. His gain per cent is
 (a) $14\frac{2}{7}\%$ (b) $13\frac{1}{7}\%$
 (c) 12.5% (d) 87.5%
19. Mohan sells 16 articles for the same money as he paid for 20 articles. His gain per cent is
 (a) 20% (b) 25%
 (c) 30% (d) 40%
20. A man buys 10 articles for ₹ 8 and sells them at the rate of ₹ 1.25 per article. His gain is
 (a) 50% (b) 51%
 (c) $56\frac{1}{2}\%$ (d) $56\frac{1}{4}\%$
21. A table marked at ₹ 15000 is available for ₹ 14400. The discount per cent is
 (a) 4% (b) 3% (c) 5% (d) 6%
22. A dishonest shopkeeper uses false weight. He gains 20% on purchasing and 20% on selling. His profit percentage is
 (a) 50% (b) 44%
 (c) 40% (d) 46%
23. The difference between a discount of 40% on ₹ 500 and two successive discounts of 36% and 4% on the same amount is
 (a) ₹ 0 (b) ₹ 2 (c) ₹ 5 (d) ₹ 7.20
24. An agent buys a TV set listed at ₹ 10000 and gets 10% and 20% successive discounts. He spends 10% of his CP on transport. At what price should he sell the TV set to earn a profit of 10%?
 (a) ₹ 8712 (b) ₹ 8710
 (c) ₹ 8720 (d) None of these
25. The marked price of an article is 10% higher than the cost price. A discount of 10% is given on the marked price. In this kind of sale, the seller
 (a) bears no loss, no gain
 (b) gain 1%
 (c) loss 1%
 (d) None of the above

26. The marked price of a radio is ₹ 480. The shopkeeper allows a discount of 10% and gains 8%. If no discount is allowed, his gain per cent is

- (a) 20% (b) 10%
(c) 15% (d) 25%

27. Kiran buys an article with 25% discount on the marked price. She makes a profit of 10% by selling it as ₹ 660. The marked price of an article is

- (a) ₹ 900 (b) ₹ 600
(c) ₹ 700 (d) ₹ 880

28. If a commission of 10% is given to the marked price of a book, the publisher gains 20%. If the commission is increased to 15%, the gain is

- (a) $16\frac{2}{3}\%$ (b) $13\frac{1}{3}\%$ (c) $15\frac{1}{6}\%$ (d) 15%

29. If 8% VAT is included in the prices, the original price of a TV brought for ₹ 13500 is

- (a) ₹ 12500 (b) ₹ 13500
(c) ₹ 14500 (d) ₹ 11500

Answers

1	(b)	2	(a)	3	(b)	4	(d)	5	(c)	6	(b)	7	(a)	8	(c)	9	(c)	10	(c)
11	(d)	12	(b)	13	(a)	14	(c)	15	(d)	16	(a)	17	(a)	18	(a)	19	(b)	20	(d)
21	(a)	22	(b)	23	(d)	24	(a)	25	(c)	26	(a)	27	(d)	28	(b)	29	(a)		

Hints & Solution

1. (b) CP = ₹ 50, SP = ₹ 75

$$\therefore \text{CP} < \text{SP}$$

$$\therefore \text{Profit} = \text{SP} - \text{CP} = 75 - 50 = ₹ 25$$

2. (a) SP = ₹ 75000, Loss = ₹ 15000, CP = ?

$$\text{We know that, Loss} = \text{CP} - \text{SP}$$

$$\Rightarrow 15000 = \text{CP} - 75000$$

$$\Rightarrow \text{CP} = 75000 + 15000 = ₹ 90000$$

3. (b) SP = ₹ 2400, Profit % = 25%

$$\therefore \text{CP} = \frac{100 \times \text{SP}}{(100 + \text{Profit}\%)} = \frac{100 \times 2400}{100 + 25}$$

$$= \frac{240000}{125} = ₹ 1920$$

4. (d) Here, CP = ₹ 3000, Loss % = 19%

$$\text{SP} = \text{CP} \left(\frac{100 - \text{Loss}\%}{100} \right)$$

$$= 3000 \times \frac{81}{100} = ₹ 2430$$

5. (c) CP = ₹ 75, profit% = 8%

$$\therefore \text{SP} = \text{CP} \left(\frac{100 + \text{Profit}\%}{100} \right) = 75 \left(\frac{108}{100} \right) = ₹ 81$$

6. (b) Here, selling price of 8 articles

$$= \text{cost price of 10 articles}$$

$$\therefore \text{Gain per cent} = \frac{10 - 8}{8} \times 100\% = \frac{2}{8} \times 100 = 25\%$$

$$[\therefore \text{Gain per cent} = \frac{b - a}{a} \times 100, \text{ where selling price of } a \text{ article} = \text{cost price of } b \text{ article}]$$

7. (a) Given, cost price of 80 articles = ₹ 2400 and profit per cent = 16%

$$\therefore \text{Profit} = 16\% \text{ of cost price of 80 articles}$$

$$= ₹ \left(\frac{16}{100} \times 2400 \right) = ₹ (16 \times 24) = ₹ 384$$

$$\text{Now, selling price of 80 articles} = \text{Cost price of 80 articles} + \text{Profit}$$

$$= ₹ (2400 + 384) = ₹ 2784$$

$$\therefore \text{Selling price of 1 article} = \frac{2784}{80} = ₹ 34.80$$

$$\text{Hence, selling price of one article is ₹ 34.80.}$$

8. (c) Given, cost price of an article = ₹ 15500
and repair cost (over head expenses) = ₹ 450
∴ Total cost price
= Cost price of an article + Repair cost
= ₹ (15500 + 450) = ₹ 15950
Also, profit per cent = 15%
Now, profit = 15% of total cost price of an article
= 15% of ₹ 15950
= ₹ $\left(\frac{15}{100} \times 15950\right)$ = ₹ $\left(\frac{23925}{10}\right)$ = ₹ 2392.50
∴ Selling price of the article
= Total cost price + Profit
= ₹ 15950 + ₹ 2392.50
= ₹ (15950 + 2392.50) = ₹ 18342.50
Hence, the selling price of an article is ₹ 18342.50.

9. (c) ∴ SP of an article = ₹ 9549
and loss per cent = 55%
∴ CP of an article = $\frac{9549 \times 100}{100 - 55}$
$$\left[\because \text{CP} = \frac{100 \times \text{SP}}{100 - \text{loss}\%} \right]$$
$$= \frac{954900}{45} = ₹ 21220$$

10. (c) ∴ SP = ₹ 3072, Loss = 20%
∴ CP = $\frac{100}{80} \times 3072$ = ₹ 3840
Now, new CP = ₹ 3840, SP = ₹ 4080
Gain = ₹ (4080 - 3840) = ₹ 240
[∴ gain = SP - CP]
Hence, Gain% = $\frac{240}{3840} \times 100\%$ = 6.25%
$$\left[\because \text{gain}\% = \frac{\text{gain}}{\text{CP}} \times 100\% \right]$$

11. (d) Let CP of radio be ₹ x. Then,
(100 + 20)% of x - (100 + 16)% of x = 20
⇒ 4% of x = 20
∴ $x = \frac{20 \times 100}{4} = ₹ 500$

12. (b) Let cost price of a watch be ₹ x.
Then, 104% of (105% of x) = 1092

$$\Rightarrow \frac{104}{100} \times \frac{105}{100} x = 1092$$

$$\therefore x = \frac{1092 \times 100 \times 100}{104 \times 105} = ₹ 1000$$

13. (a) Final cost of the house = $150000 \times \frac{105}{100} \times \frac{98}{100}$
= ₹ 154350

$$\therefore X \text{ gains} = ₹ (154350 - 150000) = ₹ 4350$$

14. (c) Let CP of each gram be ₹ 1.
Then, CP of 450 g = ₹ 450,
SP of 450 g = ₹ 500
∴ Profit percentage = $\left(\frac{\text{SP} - \text{CP}}{\text{CP}}\right) \times 100\%$
= $\left(\frac{50}{450} \times 100\right)\%$ = $11\frac{1}{9}\%$

15. (d) Here, b = 320, a = 400

$$\text{Gain percentage} = \frac{a - b}{b} = \left(\frac{400 - 320}{320}\right) \times 100\%$$
$$= \frac{80}{320} \times 100\% = 25\%$$

16. (a) CP of *a* article is equal to the SP of *b* articles,
then loss % is $\frac{b - a}{b} \times 100\%$
= $\frac{11 - 9}{11} \times 100\%$ = $18\frac{2}{11}\%$

17. (a) Let cost price of an article be ₹ x.
According to the given condition,
425 - x = x - 355
⇒ 2x = 780 ⇒ x = ₹ 390

18. (a) Given condition is
(SP of 8 dozen pencils) - (CP of 8 dozen pencils) = SP of 1 dozen pencils
∴ SP of 7 dozen pencils = CP of 8 dozen pencils
Let CP of per dozen pencils be ₹ 10.
Then, CP of 7 dozen pencils = ₹ 70 and SP of 7 dozen pencils = ₹ 80.

$$\therefore \text{Gain per cent} = \left(\frac{10}{70} \times 100\right)\% = 14\frac{2}{7}\%$$

19. (b) ∴ Gain per cent = $\frac{(20 - 16)}{16} \times 100\%$ = 25%

$$[\because \text{gain percentage} = \frac{a - b}{b} \times 100\%]$$

$$\text{Here, } a = 20, b = 16$$

20. (d) Cost price of 10 articles = ₹ 8

Selling price of 10 articles = $10 \times 1.25 = ₹ 12.5$

$$\begin{aligned}\therefore \text{Gain per cent} &= \frac{12.5 - 8}{8} \times 100\% \\ &= \frac{4.5}{8} \times 100\% = \frac{225}{4}\% = 56\frac{1}{4}\%\end{aligned}$$

21. (a) Given, marked price of a table = ₹ 15000

Sale price of a table = ₹ 14400

$$\begin{aligned}\therefore \text{Discount} &= \text{Marked price} - \text{Sale price} \\ &= ₹ (15000 - 14400) = ₹ 600\end{aligned}$$

$$\begin{aligned}\therefore \text{Discount per cent} &= \left(\frac{\text{Discount}}{\text{Marked price}} \times 100 \right)\% \\ &= \left(\frac{600}{15000} \times 100 \right)\% = \frac{60}{15}\% = 4\%\end{aligned}$$

22. (b) Here, $r_1 = 20\%$, $r_2 = 20\%$

\therefore Required profit percentage

$$\begin{aligned}&= \left(r_1 + r_2 + \frac{r_1 r_2}{100} \right)\% \\ &= 20 + 20 + \frac{20 \times 20}{100}\% = 44\%\end{aligned}$$

23. (d) SP at 40% discount = 60% of 500 = $\frac{60}{100} \times 500$
 $= 300 - 307.20 = ₹ 300$

$$\begin{aligned}\text{SP after two successive discounts of 36\% and 4\%} &= 96\% \text{ of } (64\% \text{ of } 500) \\ &= \frac{96}{100} \times \frac{64}{100} \times 500\end{aligned}$$

$$\therefore \text{Required difference} = 300 - 307.20 = ₹ 7.20$$

24. (a) Net price after two discounts

$$\begin{aligned}&= 80\% \text{ of } 90\% \text{ of } 10000 \\ &= \frac{80}{100} \times \frac{90}{100} \times 10000 = ₹ 7200\end{aligned}$$

$$\begin{aligned}\text{Net CP} &= 7200 + 10\% \text{ of } 7200 \\ &= 7200 + \frac{10}{100} \times 7200\end{aligned}$$

$$= 7200 + 720 = ₹ 7920$$

$$\therefore \text{SP} = 110\% \text{ of } 7920 = \frac{110}{100} \times 7920 = ₹ 8712$$

25. (c) Let CP of article be ₹ 100, then marked price be ₹ 110.

$$\therefore \text{SP} = 90\% \text{ of } 110 = \frac{90}{100} \times 110 = ₹ 99$$

$$\therefore \text{Loss per cent} = 100 - 99 = 1\%$$

$$26. (a) \text{SP} = 480 \left(\frac{100 - 10}{100} \right) = 480 \times \frac{9}{10} = ₹ 432$$

$$\left[\because \text{SP} = \text{MP} \frac{100 - r\%}{100} \right]$$

$$\text{Now, CP} = 432 \left(\frac{100}{100 + 8} \right) = 432 \times \frac{100}{108} = ₹ 400$$

$$\begin{aligned}\therefore \text{Per cent profit} &= \frac{480 - 400}{400} \times 100\% \\ &= 20\%\end{aligned}$$

27. (d) Given that SP = 660, profit = 10%,
discount = 25%

$$\begin{aligned}&= \frac{100 \times \text{SP}}{100 + \text{Profit \%}} = \frac{100 \times 660}{100 + 10} \\ &= \frac{66000}{110} \Rightarrow 600\end{aligned}$$

\therefore Marked price

$$= \frac{\text{SP} \times 100}{(100 - 25)} = \frac{660 \times 100}{75} = ₹ 880$$

28. (b) Let CP be ₹ 100, then SP be ₹ 120.

Now, SP = ₹ 120, Commission = 10%

$$\therefore \text{Marked price} = \frac{100}{90} \times 120 = ₹ \frac{400}{3}$$

Now, marked price = ₹ $\frac{400}{3}$, Commission = 15%

$$\therefore \text{SP} = 85\% \text{ of } \frac{400}{3} = \frac{85}{100} \times \frac{400}{3} = \frac{340}{3}$$

$$\begin{aligned}\therefore \text{Gain per cent} &= \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100\% \\ &= \frac{\frac{340}{3} - 100}{100} \times 100\% = 13\frac{1}{3}\%\end{aligned}$$

29. (a) Let the original price of a TV be ₹ 100.

$$\therefore \text{Price including VAT} = ₹ (100 + 8) = ₹ 108$$

If price including VAT is ₹ 108, then original price = ₹ 100

If price including VAT is ₹ 1, then original price = ₹ $\frac{100}{108}$

If price including VAT is ₹ 13500, then original price

$$= ₹ \left(\frac{100}{108} \times 13500 \right) = ₹ (100 \times 125)$$

$$= ₹ 12500$$

Hence, the original price of a TV is ₹ 12500.