

# Profit Loss and Discount

1. Jack purchased 400 calculators at \$200 each. He spent \$5 on packing each calculator, paid \$100 to the carrying for loading and \$400 on transportation. He sold 300 at a rate of \$280 each and 100 at the rate of \$180 each. Find his profit or loss per cent in the whole transportation.

**Ans.** C. P. of 1 calculator = \$200

$$\begin{aligned}\text{C. P. of 400 calculators} &= \$200 \times 400 \\ &= \$80000\end{aligned}$$

$$\text{Money spent on packing 1 calculator} = \$5$$

$$\text{Money spent on packing 400 calculators} = \$400 \times 5 = \$2000$$

$$\begin{aligned}\text{Overhead expenses} &= \$(2000 + 100 + 400) \\ &= \$2500\end{aligned}$$

$$\begin{aligned}\text{C. P. of 400 calculators} &= \text{Actual C. P.} + \text{Overhead expenses} \\ &= \$80000 + \$2500 \\ &= \$82500\end{aligned}$$

$$\text{S. P. of 400 calculators} = \text{S. P. of 300 calculators} + \text{S. P. of 100 calculators}$$

$$\text{S. P. of 1 calculator} = \$280$$

$$\text{S. P. of 300 calculators} = \$280 \times 300 = \$84000$$

$$\text{S. P. of 1 calculator} = \$180$$

$$\text{S. P. of 100 calculators} = \$180 \times 100 = \$18000$$

$$\text{S. P. of 400 calculators} = \$84000 + \$18000 = \$102000$$

S. P. > C. P., there is profit, therefore, profit = S. P. - C. P.

$$\text{Profit} = \$(102000 - 82500) = \$19500$$

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

$$= \frac{19500}{82500} \times 100\%$$

$$= 23.6\%$$

2. A dress was bought for \$400 and sold \$350. Find the loss and loss percent.

**Ans.** Cost price = \$400

$$\text{Selling price} = \$350$$

Since, S. P. < C. P., there is loss

$$\text{Therefore, loss} = \text{cost price} - \text{selling price}$$

$$\begin{aligned}
 &= \$450 - \$350 = \$50 \\
 \text{So, loss\%} &= \frac{\text{loss}}{\text{cost price}} \times 100\% \\
 &= \frac{50}{400} \times 100\% \\
 &= \frac{25}{2} \\
 &= 12.5\%
 \end{aligned}$$

3. If the cost price of 20 electric goods is equal to the selling price of 25 electric goods, find loss per cent.

**Ans.** Let cost price of 1 electric good = \$1

Then cost price of 20 electric goods = \$20

Also, cost price of 25 electric goods = \$25

Since, selling price of 25 electric goods = cost price of 20 electric goods

Therefore, selling price of 25 electric goods = \$20

Therefore, loss = cost price – selling price

$$\begin{aligned}
 &= \$25 - \$20 \\
 &= \$5
 \end{aligned}$$

$$\begin{aligned}
 \text{Therefore, loss\%} &= \frac{\text{loss}}{\text{cost price}} \times 100 \\
 &= \frac{5}{25} \times 100 \\
 &= 20\%
 \end{aligned}$$

4. By selling a bicycle for \$135, a shopkeeper loses 10%. How much percent would he gain or lose by selling it for \$165?

**Ans.** Given selling price = \$135

Loss % = 10%

$$\begin{aligned}
 \text{We know, cost price} &= \text{selling price} \times \frac{100}{100} - \text{loss\%} \\
 &= 135 \times \frac{100}{100} - 10 \\
 &= 135 \times \frac{100}{90} \\
 &= \frac{13500}{90} \\
 &= 150
 \end{aligned}$$

Therefore, cost price of the bicycle = \$150

Now, if the selling price = \$165, then gain = \$165 - \$150 = \$15

$$\begin{aligned}\text{Therefore, gain\%} &= \frac{\text{gain}}{\text{cost price}} \times 100 \\ &= \frac{15}{150} \times 100 \\ &= \frac{1500}{150} = 10\%\end{aligned}$$

Therefore, he would have gained 10%.

5. A bag was sold for \$324 thereby gaining 8%. Find the cost price of the bag.

**Ans.** Given selling price = \$324

$$\text{Gain\%} = 8\%$$

$$\text{We know, cost price} = \text{selling price} \times \frac{100}{100} + \text{gain\%}$$

$$\begin{aligned}\text{Therefore, cost price} &= 324 \times \frac{100}{100} + 8 \\ &= 324 \times \frac{100}{108} \\ &= 12 \times 25 = \$300\end{aligned}$$

Therefore, the cost price of the bag is \$300.

6. A book was sold for \$575 thereby gaining 15%. Find the cost price of the book.

**Ans.** Given selling price = \$575

$$\text{Gain\%} = 15\%$$

$$\text{We know, cost price} = \text{selling price} \times \frac{100}{100} + \text{gain\%}$$

$$\begin{aligned}\text{Therefore, cost price} &= 575 \times \frac{100}{100} + 15 \\ &= 575 \times \frac{100}{115} \\ &= 57500/11 = \$500\end{aligned}$$

Therefore, the cost price of the book is \$500.

7. Shelly bought a dress for \$150 and sold it to Jenny there by suffering a loss of 10%. Find the selling price of the dress.

**Ans.** Given cost price = \$150

$$\text{Loss\%} = 10\%$$

$$\begin{aligned}\text{We know, selling price} &= \frac{(100 - \text{loss\%})\text{cost price}}{100} \\ &= \frac{(100 - 10)150}{100}\end{aligned}$$

$$= 90 \times \frac{150}{100}$$

$$= 9 \times 15$$

$$= \$135$$

Therefore, selling price of the dress is \$135.

8. Mike bought a laptop for \$800 and sold it to Jack there by suffering a loss of 12%. Find the selling price of the laptop.

**Ans.** Given cost price = \$800

Loss% = 12%

$$\text{We know, selling price} = \frac{(100 - \text{loss\%})\text{cost price}}{100}$$

$$= \frac{(100 - 12)800}{100}$$

$$= \frac{88 \times 800}{100}$$

$$= 88 \times 8 = \$724$$

Therefore, selling price of the laptop is \$724.

9. By selling a chair for \$372, Daisy loses 7%. At what price must she sell it to gain 10%.

**Ans.** Given selling price = \$ 372

Loss % = 7%

We know, cost price = selling price  $\times \frac{100}{100 - \text{loss\%}}$

Therefore, cost price =  $372 \times \frac{100}{100 - 7}$

$$= 372 \times \frac{100}{93}$$

$$= \$400$$

Now cost price = \$400

Gain% = 10%

Therefore, selling price =  $\frac{(100 + \text{gain\%})\text{cost price}}{100}$

$$= \frac{(100 + 10)400}{100}$$

$$= 110 \times 4$$

$$= \$440$$

10. Ryan bought a book for \$100 and sold it at a profit of 10%. Find the selling price of the book.

**Ans.** Given cost price of the book = \$100

Profit% = 10%

We know, selling price =  $\frac{(100 + \text{profit\%})\text{cost price}}{100}$

$$= \frac{(100 + 10)100}{100}$$

$$= \frac{(110)100}{100}$$

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

$$= \$110$$

Therefore, the selling price of the book is \$110.

11. Mike bought a DVD for \$ 750 and sold it for \$ 875. Find Mike's gain per cent.

**Ans.** CP = \$ 750 and SP = \$ 875.

Since (SP) > (CP), Mike makes a gain.

Gain = \$ (875 - 750)

$$= \$ 125.$$

$$\text{Gain\%} = \left\{ \left( \frac{\text{gain}}{\text{CP}} \right) \times 100 \right\} \%$$

$$= \left\{ \left( \frac{125}{750} \right) \times 100 \right\} \%$$

$$= \left( \frac{50}{3} \right) \%$$

$$= 16 \left( \frac{2}{3} \right) \%$$

12. By selling 33 m of carpet, a man loses an amount equal to the selling price of 3 m of carpet. Find his gain or loss per cent.

**Ans.** Loss = (CP of 33 m) - (SP of 33 m)

$$\Rightarrow (\text{SP of 3 m}) = (\text{CP of 33 m}) - (\text{SP of 33 m})$$

$$\Rightarrow (\text{SP of 33 m}) + (\text{SP of 3 m}) = (\text{CP of 33 m})$$

$$\Rightarrow (\text{SP of 36 m}) = (\text{CP of 33 m}).$$

Let the CP of 1 m be \$ x.

Then, CP of 36 m = \$ 36x

$$\text{SP of 36m} = (\text{CP of 33m}) = \$ 33x.$$

Thus, CP = \$ 36x and SP = \$ 33x.

Since, (CP) > (SP), there is a loss.

$$\text{Loss} = \$ (36x - 33x) = \$ 3x.$$

$$\begin{aligned}\text{Loss\%} &= \left[ \left( \frac{\text{loss}}{\text{CP}} \right) \times 100 \right] \% \\ &= \left[ \left( \frac{3x}{36x} \right) \times 100 \right] \% \\ &= \frac{25}{3} \% \\ &= 8\frac{1}{3} \%\end{aligned}$$

13. Ronald buys a geyser for \$ 3680 and sells it at a gain of  $7\frac{1}{2}\%$ . For how much does he sell it?

Ans. CP of the geyser = \$ 3680.

$$\text{Gain \%} = 7\frac{1}{2}\% = \frac{15}{2}\%.$$

$$\begin{aligned}\text{Therefore, SP of the geyser} &= \left[ \left\{ \frac{100 + \text{gain \%}}{100} \right\} \times \text{CP} \right] \\ &= \$ \left[ \left\{ \frac{100 + \frac{15}{2}}{100} \right\} \times 3680 \right] \\ &= \$ \left\{ \left( \frac{215}{200} \right) \times 3680 \right\} \\ &= \$ 3956\end{aligned}$$

Hence, Ronald sells the geyser for \$ 3956.

14. Henry sold a bicycle at 8% gain. Had it been sold for \$ 75 more, the gain would have been 14%. Find the cost price of the bicycle.

Ans. Let the cost price of the bicycle be \$ x.

$$\begin{aligned}\text{SP of the bicycle at 8\% gain} &= \$ \left[ \left\{ \frac{(100 + \text{gain \%})}{100} \right\} \times \text{CP} \right] \\ &= \$ \left[ \left\{ \frac{100 + 8}{100} \right\} \times x \right] \\ &= \$ \left\{ \left( \frac{108}{100} \right) \times x \right\} \\ &= \$ \left( \frac{27x}{25} \right)\end{aligned}$$

$$\begin{aligned}\text{SP of the bicycle at 14\% gain} &= \$ \left[ \left\{ \frac{100 + 14}{100} \right\} \times x \right] \\ &= \$ \left\{ \left( \frac{114}{100} \right) \times x \right\}\end{aligned}$$

$$= \$ \left( \frac{57x}{50} \right)$$

$$\text{Therefore, } \left( \frac{57x}{50} \right) - \left( \frac{27x}{25} \right) = 75$$

$$\Leftrightarrow \frac{57x - 54x}{50} = 75$$

$$\Leftrightarrow 3x = (50 \times 75)$$

$$\Leftrightarrow x = (50 \times 25)$$

$$\Leftrightarrow x = 1250$$

Hence the CP of the bicycle is \$ 1250.

15. Mike sold a watch at 5% loss. Had he sold it for \$ 104 more, he would have gained 8%. Find the selling price of the watch.

**Ans.** Let the selling price of the watch be \$ x.

$$\text{Loss\%} = 5\%.$$

$$\text{Therefore, CP of the watch} = \left\{ \frac{100}{100 - \text{loss\%}} \times \text{SP} \right\}$$

$$= \$ \left\{ \frac{100}{100 - 5} \times x \right\}$$

$$= \$ \left\{ \left( \frac{100}{95} \right) \times x \right\}$$

$$= \$ \left( \frac{20x}{19} \right)$$

Now, CP = \$  $\left( \frac{20x}{19} \right)$  and gain % = 8%.

$$\text{Then, SP} = \left[ \left\{ \frac{100 + \text{gain\%}}{100} \right\} \times \text{CP} \right]$$

$$= \$ \left[ \left\{ \frac{100 + 8}{100} \right\} \times \left( \frac{20x}{19} \right) \right]$$

$$= \$ \left\{ \left( \frac{108}{100} \right) \times \left( \frac{20x}{19} \right) \right\}$$

$$= \$ \left( \frac{(108x)}{95} \right)$$

$$\text{Therefore, } \left( \frac{108x}{95} \right) - x = 104$$

$$\Leftrightarrow 13x = (104 \times 95)$$

$$\Leftrightarrow x = \frac{104 \times 95}{13}$$

$$\Leftrightarrow x = 760.$$

Hence, the selling price of the watch is \$ 760.

16. The marked price of a ceiling fan is \$ 1250 and the shopkeeper allows a discount of 6% on it. Find the selling price of the fan.

**Ans.** Marked price = \$ 1250 and discount = 6%.

Discount = 6% of Marked Price

= (6% of \$ 1250)

= \$  $\left\{1250 \times \left(\frac{6}{100}\right)\right\}$

= \$ 75

Selling price = (Marked Price) - (discount)

= \$ (1250 - 75)

= \$ 1175.

Hence, the selling price of the fan is \$ 1175.

17. A trader marks his goods at 40% above the cost price and allows a discount of 25%. What is his gain percent?

**Ans.** Let the cost price be \$ 100.

Then, marked price = \$ 140.

Discount = 25% of Marked Price

= (25% of \$ 140)

= \$  $\left\{140 \times \left(\frac{25}{100}\right)\right\}$

= \$ 35.

Selling price = (marked price) - (discount)

= \$ (140 - 35)

= \$ 105.

Gain% = (105 - 100) % = 5%.

Hence, the trader gains 5%.

18. John bought a music system for \$260. For how much should he sell the music system to gain 10%? (i)

**Ans.** Given cost price of the music system = \$260

Gain% = 10%

We know, selling price =  $\frac{(100 + \text{gain\%})\text{cost price}}{100}$

=  $\frac{(100 + 10)260}{100}$

=  $\frac{(110)260}{100}$

=  $110 \times \frac{260}{100}$



$$= \$286$$

Therefore, he should sell the music system for \$286.

**19.** Robert bought a machine for \$1200 and sold it at a profit of 15%. Find the selling price of the machine.

**Ans.** Given cost price of the machine = \$1200

Profit% = 15%

$$\text{We know, selling price} = \frac{(100 + \text{profit\%})\text{cost price}}{100}$$

$$= \frac{(100 + 15)1200}{100}$$

$$= \frac{(115)1200}{100}$$

$$= \frac{115 \times 1200}{100}$$

$$= \$1380$$

Therefore, the selling price of the machine is \$1380.

**20.** Ron purchased a table for \$ 1260 and due to some scratches on its top he had to sell it for \$ 1197. Find his loss per cent.

**Ans.** CP Rs.1260 and SP = \$ 1197.

Since (SP) < (CP), Ron makes a loss.

$$\text{Loss} = \$ (1260 - 1197)$$

$$= \$ 63.$$

$$\text{Loss \%} = \left[ \left( \frac{\text{loss}}{\text{CP}} \right) \times 100 \right] \%$$

$$= \left[ \left( \frac{63}{1260} \right) \times 100 \right] \%$$

$$= 5\%$$

In calculating profit percent and loss percent, sometimes after purchasing an article, we have to pay some more money for things like transportation, repairing charges, local taxes, These extra expenses are called overheads. For calculating the total cost price, we add overheads to the purchase price.

