MATHEMATICS

Class-VII

Topic-17 PROFIT AND LOSS



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17/

PROFIT AND LOSS

TERMINOLOGIES

Cost price, Selling price, Gain Percent, Loss Percent, Effective cost price, Overhead charges, marked price or list price, Discount, Discount percentage.

INTRODUCTION

Practically it is not possible for every individual to produce whatever he or she wants, so because of this reason, we have to buy many things from others (shopkeepers).

We buy things from a nearby shopkeeper called a retailer. A shopkeeper buys items either from a manufacturer or through a big shopkeeper called a wholesaler. A shopkeeper can sell to us at a lower price, same price or higher price than his buying price. The profit or loss depends on C.P and S.P of items.

17.1 DEFINITIONS AND CONCEPTS

(a) Cost Price:

The money paid by the shopkeeper to buy the goods from a manufacturer or a wholesaler is called the **cost price** of the shopkeeper. The cost price is abbreviated as **C.P.**

(b) Selling Price:

The price at which a shopkeeper sells the goods is called the **selling price** of the shopkeeper. The selling price is abbreviated as **S. P.**

NOTE:

(i) If S.P. > C.P., then there is gain.

Gain = S.P. - C.P.

(ii) If S.P. < C.P., then there is loss.

Loss = C.P. - S.P.

Gain or loss is calculated on the cost price.

(iii) Gain percent = $\left(\frac{\text{Gain}}{\text{C.P.}} \times 100\right)$ and Loss percent = $\left(\frac{\text{Loss}}{\text{C.P.}} \times 100\right)$.

(iv) C.P. = $\frac{100}{(100 + \text{gain}\%)} \times \text{S.P.}$ & C.P. = $\frac{100}{(100 - \text{loss}\%)} \times \text{S.P.}$

Effective cost price: It includes the overhead charges incurred.

Effective cost price = Cost price + Overhead charges.





Illustration 17.1

Harish bought a second-hand typewriter for Rs. 1200 and spent Rs. 200 on its repairing. He sold it for Rs. 1680. Find his profit or loss. What was his profit or loss percent.

Sol. We have,

∴ Profit per cent =
$$\left(\frac{\text{Profit}}{\text{C.P.}} \times 100\right)$$
% = $\left(\frac{280}{1400} \times 100\right)$ % = 20 %.

Illustration 17.2

Subramaniam bought 100 eggs for Rs. 50. Out of these, 4 eggs were found to be broken. He sold the remaining eggs at the rate of Rs. 8.50 per dozen. Find his gain or loss percent.

Sol. We have C.P. of 100 eggs = Rs. 50.

It is given that 4 eggs were found to be broken.

 \therefore The number of remaining eggs which were sold in the market = 100 - 4 = 96.

It is given that the remaining eggs were sold at the rate of Rs. 8.50 per dozen.

$$\therefore$$
 S.P. of 12 eggs = Rs. 8.50 \Rightarrow S.P. of 1 egg = Rs. $\frac{8.50}{12}$

.: S.P. of 96 eggs = Rs. =
$$\left(\frac{8.50}{12} \times 96\right)$$
 = Rs. 68

Clearly, S.P. > C.P. So, there is gain given by

$$\therefore \qquad \text{Gain percent} = \left(\frac{\text{Profit}}{\text{C.P.}} \times 100\right) \% = \left(\frac{18}{50} \times 100\right) \% = 36\%.$$

Illustration 17.3

A box of mangoes was purchased by a fruit-seller for Rs. 300. However, he had to sell them for Rs. 255 because they began to get over ripe. What was the loss percentage?

Sol. We have, C.P. = Rs. 300 and S.P. = Rs. 255.

Since C.P. > S.P.

So, Loss = C.P. – S.P. = Rs.
$$(300 - 255)$$
 = Rs. 45

Now, Loss percent =
$$\left(\frac{\text{Loss}}{\text{C.P.}} \times 100\right) \% = \left(\frac{45}{300} \times 100\right) \% = 15\%.$$

Hence, there was 15% loss.

Illustration 17.4

The selling price of 10 articles is the same as the cost price 11 articles, find gain percent.

Sol. Let the cost price of each article be Rs. x.

We have,

C.P. of 10 articles =
$$10x$$

$$\therefore$$
 Gain on the purchase of articles = Rs.11x – Rs. 10x = Rs. x

Hence, Gain percent =
$$\left(\frac{\text{Gain}}{\text{C.P.}} \times 100\right)$$
 % = $\left(\frac{\text{x}}{10\text{x}} \times 100\right)$ % = 10 %.





Illustration 17.5

A man sells his scooter for Rs. 18000 making a profit of 20 %. How much did the scooter cost him?

Sol. Let the cost price of the scooter be Rs. 100.

Then, Profit = Rs. 20

Thus, if the S.P. is Rs. 120, then C.P. = Rs. 100

If the S.P. is Rs. 18000,

Then C.P. = Rs.
$$\left(\frac{100}{120} \times 18000\right)$$
 = Rs. 15000

Hence, the cost of the scooter = Rs. 15000.

Illustration 17.6

A farmer sells his product at a loss of 8%. If his S.P. was Rs. 27600, what was his actual loss? What was his cost price?

Let the cost price of the product be Rs. 100. Sol.

Then, Loss = 8%

$$\Rightarrow$$
 Loss 8% on Rs. 100 = Rs. 8

Thus, if S.P. is Rs. 92, then C.P. = Rs. 100

If S.P. is Rs. 27600, then C.P. = Rs.
$$\left(\frac{100}{92} \times 27600\right)$$
 = Rs. 30000

Hence, C.P. = Rs. 30000

Actual loss = C.P. - S.P.

Ask yourself____



- 1. Sushma sold her watch for Rs 3320 at a gain of Rs 320. For earning a gain of 10% she should have sold the watch for?
- A's salary is reduced by 10% then in order to bring his salary back to original position, it 2. must be raised by?
- 3. A man bought certain apples at the rate of Rs 15 for 4 and sold them at the rate of Rs 16 for 5. What will be his profit or loss percent?
- By selling a ball for Rs. 39, a shopkeeper gains 30%. At what price should he sell it to gain 4. 40%?
- By selling an article at $\frac{1}{4}$ of its actual selling price, a trader incurs a loss of 50% What will 5. be the profit per cent if the trader sells the article at its actual selling price?

Answers.

- 1. 3300 **2**.
- $11\frac{1}{9}\%$ 3. Loss, $\frac{44}{3}\%$ 4.
- 100%





Add your knowledge ____

Discount means reduction in the price. This reduction is always given on the **marked price** (M.P.) or List price (L.P.).

- ❖ When discount is offered on an article, then we calculate the selling price (S.P.) as:
 S.P. = Marked price − Discount.
- ❖ Discount = Marked price Selling price

♦ Discount % =
$$\frac{\text{Discount} \times 100}{\text{M.P.}}$$

S.P. = M.P. ×
$$\left(\frac{100 - \text{Discount}}{100}\right)$$

M.P. =
$$\frac{100 \times \text{S.P.}}{100 - \text{Discount}}$$
.

- If the S.P. of two objects are equal and one of them is sold at **x%** profit and other is at **x%** loss then there is always a loss of = $\left(\frac{\text{Common Loss or Gain\%}}{10}\right)^2 = \frac{x^2}{100}$ %.
- Two successive discounts of **x** % and **y** % allowed on an item are equivalent to a single discount of : $\left(x + y \frac{xy}{100}\right)$ %.

NOTE:

This discount is always less than the sum of individual discounts.

e.g. A radio is marked at Rs 1000. During Deepawali festival a 10% discount is allowed on it. What will be its selling price?

Discount = 10% of Rs 1000 =
$$\frac{10}{100}$$
 × 1000 = Rs 100

Selling price =
$$Rs 1000 - 100 = Rs. 900$$

e.g. What single discount will be equal to two successive discounts of 20 % and 10 %?

Sol. Single discount =
$$\left(x + y - \frac{xy}{100}\right)$$
 %

$$= \left(20 + 10 - \frac{20 \times 10}{100}\right) \% = (30 - 2) \% = 28 \%.$$



Profit & Loss

Gain if S.P. > C.P.
Gain = S.P. – C.P.
Gain % =
$$\frac{\text{Gain}}{\text{C.P.}} \times 100$$

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

Loss if C.P. > S.P.
Loss = C.P. – S.P.
Loss % =
$$\frac{\text{Loss}}{\text{C.P.}} \times 100$$

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

Summary.

- 1. The money paid by the shopkeeper to buy the goods from a manufacturer or a wholesaler is called the **cost price** of the shopkeeper. The cost price is abbreviated as **C.P.**
- The price at which a shopkeeper sells the goods is called the selling price of the shopkeeper. The selling price is abbreviated as S. P. Effective cost price = Cost price + Overhead charges.
- 3. Important Formulaes:
 - (a) If S.P. > C.P., then there is gain. Gain = S.P. – C.P.
 - (b) If S.P. < C.P., then there is loss. Loss = C.P. S.P.
 - (c) Gain or loss is calculated on the cost price.

(d) Gain percent =
$$\left(\frac{\text{Gain}}{\text{C.P.}} \times 100\right)$$
, and

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

(e) C.P. =
$$\frac{100}{(100 - loss\%)} \times S.P.$$
 & C.P. = $\frac{100}{(100 + gain\%)} \times S.P.$

4. If the S.P. of two objects are equal and one of them is sold at **x%** profit and other is at **x%** loss then there is always a loss of = $\left(\frac{\text{Common Loss or Gain\%}}{10}\right)^2 = \frac{x^2}{100}$ %.







SECTION -A (FIXED RESPONSE TYPE) MULTIPLE CHOICE QUESTIONS

1.	When S.P. is greater (A) a loss	(B) a gain	s always : (C) No loss no gain	(D) None of these
2.	Profit or loss percent (A) C.P.	are always calculated (B) S.P.	on : (C) M.P.	(D) None of these
3.	•	dozens of toys at the s. 33. What was his pe (B) 4.5	•	ozen. He sold each one of (D) None of these
4.	By selling a house for (A) Rs. 1800	r Rs. 1980, a man gain (B) Rs.1782	ned 10%. The house w (C) Rs.2178	as bought for : (D) Rs. 1728
5.		s. y at 10% loss. Cost p (B) Rs. $\frac{90 \times y}{100}$	orice of the watch is: (C) Rs. $\frac{100 \times y}{100}$	(D) Rs. $\frac{110 \times y}{100}$
6.	By selling a bicycle fo (A) Rs.1190	r Rs.1125, a dealer los (B) Rs.1290	es Rs. 65. What is the (C) Rs. 500	cost price of the bicycle? (D) Rs. 672
7.	Sonu got a profit of F the articles ? (A) Rs. 1820	Rs. 480 by selling some (B) Rs. 1500	e articles for Rs. 2300 (C) Rs. 1900	. What is the cost price of (D) Rs. 2010
8.	Kishore purchased a (A) 50	cycle for Rs. 1750 and (B) 10	I sold it for Rs. 1925. F (C) 25	lis profit percent is : (D) 110
9.	The C.P. of an article (A) 250	is 40% of the S.P. The (B) 240	e percent that the S.P. (C) 60	is of C.P. is : (D) 40
10.	percentage is :	·	ne cost price of 10 article (C) $\frac{10-8}{10} \times 100$ gain	cles, then the gain or loss $(D) \frac{10-8}{10} \times 100 \text{ loss}$
11.	The selling price of a than selling price by : (A) 20%		cost price by 25%. T	hen the cost price is less (D) 25%
12.	A sold an article to E	3 at 30% loss, B sold or Rs. 924, find the cos (B) 1050	it to C at 20% profit, a	and C sold it to D at 10% (D) 1000
13.	, ,	o B with 10% profit. If I	. ,	nmodity to A with a loss of (D) 11% profit



If the cost price of 20 articles is equal to the selling price of 15 articles, the find the profit or loss percentage.

(A) 20% loss

(B) 25% profit

(C) $33\frac{1}{3}\%$

(D) 25% loss

15. If an article is sold for Rs. p, there is a loss of 15%. If however, the same article is sold for Rs. q, there is a profit of 15% then the ratio (q - p): (q + p) is:

(A) 20:23

(B) 20:3

(C) 3:20

(D) 17:23

A girl buys 9 apples for Rs. 9.60 and sells that at 11 for Rs. 12. What does she gain or loss. 16.

(A) gain 2.4%

(B) gain $2\frac{3}{11}\%$ (C) loss 2.4%

(D) loss $2\frac{3}{11}$ %

17. A machine was sold at a profit of 10%. Had it been sold for Rs. 400 less, there would have been a loss of 10%. The cost price of machine is :

(A) Rs. 2000

(B) Rs. 20000

(C) Rs.1000

(D) Rs. 1800

FILL IN THE BLANKS

1. Gain or loss is calculated on the_____

2. List price is also known as _____

3. If a person is having profit then this selling price should be greater than his _____ price.

4. will occur when SP is more than CP

5. Extra expenses added to C.P of an item to get its actual cost price is known as

TRUE / FALSE

1. In case of profit, S.P. should be less then C.P.

2. Overhead is added in S.P.

3. S.P. of an article of C.P Rs1500 with profit 20% is Rs. 1800.

 $Gain\% = \frac{gain \times 100}{SP}$

5. By selling 24 pens, Kranthi lost an amount equal to the CP of 3 pens then his loss percentage is 12.5%

MATCH THE COLUMN

1. Column - I Column - II

> (A) Gain%

 $\frac{CP-SP}{CP}$ x100 (p)

(B) Loss% (q)

(C) Gain

 $\frac{(100 + gain\%)}{100}xCP$ (r)

(D) SP

 $\frac{\text{S.P.} - \text{C.P.}}{\text{C.P.}} \times 100$ (s)





SECTION -B (FREE RESPONSE TYPE)

VERY SHORT ANSWER TYPE

- 1. I bought a washing machine for Rs 8000 and was compelled by circumstances to sell it for Rs 6000, find my loss percent.
- 2. An article was bought for Rs 5000 and sold for Rs 6500. Find the loss or gain.
- **3.** Find the cost price of an article that is sold for Rs 1200 at a profit of 20 %.
- 4. On selling a sofa set for Rs. 21600, a dealer gains 8%. For how much did he purchase it?

SHORT ANSWER TYPE

- **5.** Rakesh bought a CD for Rs. 750 and sold it for Rs. 875. Find his gain percent.
- 6. Mala purchased a table for Rs.1260 and due to some scratches on its top, she had to sell it for Rs.1197. Find her loss percent.
- **7.** A fruit seller bought 160 dozen oranges for Rs 4800 and sold them at the rate of Rs 35 per dozen. Find his gain or loss percent.
- **8.** A trader suffered a loss of 15% by selling an article. Had he sold it for Rs. 10 more, he would have made a profit 5% Find the articles cost price.

LONG ANSWER TYPE

- **9.** A man sold each of two cows at Rs. 1955. As a result, he made a profit of 15% in one cow and a loss of 15% in the other. What was his total profit or loss percent?
- **10.** By selling a saree for Rs. 3800 . Vimla loses 5%. What percent will she gain or lose if she sell it for Rs. 4500 ?
- **11.** Albert buys 4 horses and 9 cows for Rs. 13400. If he sells the horse at 10% profit and the cows at 20% profit, then he earns a total profit of Rs. 1880. Find the cost of a horse.
- **12.** A man sell 320 mangoes at the cost price of 400 mangoes . Find his gain percent?
- 13. On selling an exhaust fan for Rs. 7350, a man gains $\frac{1}{6}$ of its cost price. Find the cost price of the fan.



SECTION -A (COMPETITIVE EXAMINATION QUESTION) MULTIPLE CHOICE QUESTIONS

- **1.** The profit made in selling 25 m of a cloth equals the selling price of 5 m of that cloth. Find the profit percentage.
 - (A) 25%
- (B) 20%
- (C) $33\frac{1}{3}\%$
- (D)15%

(IV CLASS	<u> </u> 			
PROFIT	AND LOSS			
2.	• •	oikes for Rs.40, 000 ea ofit or loss percentage		0% profit and the other at on.
	(A) 2% profit	(B) 3%loss	(C) 4% loss	(D) None profit, no loss
3.	transport and sold it	with 25% profit. At wha	t price did he sell the r	
	(A) Rs. 105100	(B) Rs. 106250	(C) Rs. 107500	(D) Rs. 117500
4.	The C.P of 21 articles	s is equal to S.P. of 18	articles. Find the gain	or loss percent.
	(A) $16\frac{1}{3}\%$	(B) $16\frac{2}{3}\%$	(C) 16 %	(D) None of these
5.		car rises by 30% while		come down by 20%. What
	(A) – 4	(B) – 2	(C) + 4	(D) + 2
6.	B. Miss B added 25%		aid sold the same auto	old the automobile to Missomobile to Mr. C who paid
	(A) Rs. 3300	(B) Rs. 3600	(C) Rs. 3800	(D) Rs. 4000
7.	Suresh purchased a price. Find his gain p		ng price and sold it at	8% more than its selling

(A) 5%

(B) 20%

(C) 30%

(D) 15%

8. A man purchased a bag of rice containing 70 kg for Rs. 175. He sold it at the rate of Rs. 2.75 per kg. Then the profit or loss in % is

(A) 12% loss

(B) 10% gain

(C) 12% gain

(D) 10% loss

9. If the cost price of 12 books is the same as the selling price of 16 books, the loss percentage is -

(A) 15%

(B) 20%

(C) 25%

(D) 30%

SECTION -B (TECHIE STUFF)

10. How much percent above the cost price should a shopkeeper mark his goods so that after allowing a discount of 25% on the marked price, he gains 20%?

(A) 40%

(B) 50%

(C) 60%

(D) 75%

11. Find the single discount equivalent to a series discount of 20%, 10% and 5%.

(A) 35

(B) 31.6

(C)30

(D) 38

12. While selling watch a shopkeeper gives a discount of 5%, if he gives a discount of 7%, he earns Rs. 15 less less as profit. The marked price of the watch is -

(A) Rs. 697. 50

(B) Rs.712.50

(C) Rs.787.50

(D) Rs. 750





(PREVIOUS YEAR EXAMINATION QUESTIONS)

1.	A man purchased two articles of Rs 3000 each , by selling those he gains 20% on the one
	and loses 20% on the other .Find the gain or loss percent on the whole transaction.

[NSTSE 2009]

-	Ά	۱ 4	%	loss
١	$\overline{}$, +	70	1033

2. 400 oranges were bought of Rs 125 per hunderd and were sold at a profit of Rs 100. Find [NSTSE 2010] the selling price per dozen.

(A) Rs. 20

(B) Rs. 12

(C) Rs.18

(D) Rs. 40

By selling a shirt for Rs.285 a shopkeeper loses 5%. At what price should he sell the shirt 3. so as to gain 15%? [IMO-2010]

(A) Rs.295

(B) Rs.325

(C) Rs. 300

(D) Rs. 345

The selling price of a watch is Rs. 3200 and the profit per cent is $33\frac{1}{2}\%$. Find the cost 4. price of the watch. [IMO-2011]

(A) Rs.200

(B) Rs.2000

(C) Rs.2400

(D) Rs.3000

A trader has purchased pens at the rate of Rs 42 per dozen . If he has earned a profit of 5. $14\frac{2}{7}$ %. What is his selling price ? [NSTSE 2011]

(A) Rs. 42

(B) Rs. 52

(C) Rs. 48

(D) Rs. 38

6. If the selling price of 10 pencils is equal to cost price of 12 pencils, then decide the gain percentage. [NSTSE 2012]

(A) $16\frac{2}{3}$ %

(B) 18 %

(C) 20 %

(D) 25 %

7. A shopkeeper bought 24 chairs at the rate of Rs. 450 per chair. He sold 16 of them at the rate of Rs. 600 per chair and the remaining at the rate of Rs. 400 per chair. Find his gain or loss percent. [IMO-2012]

(A) $18\frac{14}{27}\%$ gain (B) $20\frac{3}{4}\%$ Loss (C) $31\frac{5}{9}\%$ Gain (D) $14\frac{8}{9}\%$ Loss

By selling an article for Rs.660, Pradeep loses Rs.60. At what price must he sell the article 8. to gain 15%? [IMO-2012]

(A) Rs.728

(B) Rs.628

(C) Rs.828

(D) Rs.928

9. The students in seventh-grade had a dance party. They spent 500 for a local band. The equation below can be used to find the total profit y, if the students sold x tickets to the dance party.

$$y = 4x - 500$$
.

What does the number 4 represent in the equation?

[IMO-2012]

(A) The price per ticket

(B) The cost of the band

(C) The number of tickets sold

(D) The profit made from selling x tickets





PROFIT AND LOSS

10. A man sells a car to his friend at 10% loss. If the friend sells it for Rs.54000 and gains 20%, the original C.P. of the car was [IMO-2012]

(A) Rs.25000

(B) Rs.37500

(C) Rs.50000

(D) Rs.60000

11. By selling a watch for Rs.1275, Javed lost 15%. At what price should he sell to make profit of 10% [IMO-2013]

(A) Rs.1500

(B) Rs.1482

(C) Rs.1550

(D) Rs.1650

12. Select the incorrect match.

[IMO-2013]

	ltem	S.P. (Rs.)	Profit / loss	C.P. (Rs.)
(A)	Pen	96	20% profit	80
(B)	Sofa	7000	121/2% loss	8000
(C)	Wooden shelf	6786	13% loss	7812
(D)	Tea set	1526	9% gain	1400

13. A man sold 10 eggs for Rs 5 rupees and gained 20%. How many eggs did he buy for Rs 5 rupees? [NSTSE 2014]

(A) 12

(B)

(C) 25

(D) 20

14. In a furniture shop. 30 tables were bought at the rate of Rs.400 per table. The shopkeeper sold 18 of them at the rate of Rs.600 per table and the remaining at the rate of Rs.500 per table. Find the gain or loss percent of the shopkeeper. [IMO-2014]

(A) 44% gain

(B) 28.57% loss

(C) 40% gain

(D) 32.33% loss





ANSWER KEY



SECTION -A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	В	Α	С	Α	Α	Α	Α	В	Α	Α	Α	D	D	O	С
Ques.	16	17													
Ans.	В	Α													

FILL IN THE BLANKS

- 1. cost price 2. marked price 3. CP 4. Profit
- **5.** overhead expenses

TRUE / FALSE

1. False 2. False 3. True 4. False 5. True

MATCH THE COLUMN

1. (A) - (s), (B) - (p), (C) - (q), (D) - (r)

SECTION -B (FREE RESPONSE TYPE) VERY SHORT ANSWER TYPE

1. 25% **2.** 30% profit **3.** 1000 **4.** Rs. 20,000

SHORT ANSWER TYPE

5. $16\frac{2}{3}\%$ **6.** 5% **7.** $16\frac{2}{3}\%$ gain **8.** Rs. 50

LONG ANSWER TYPE

- **9.** 2.25% **10.** $12\frac{1}{2}\%$ **11.** Rs. 2000. **12.** 25%
- **13.** Rs. 6300





SECTION -A (COMPETITIVE EXAMINATION QUESTION)

MULTIPLE CHOICE QUESTIONS

Ques.	1	2	3	4	5	6	7	8	9
Ans.	Α	С	С	В	С	D	В	В	С

SECTION -B (TECHIE STUFF)

Ques.	10	11	12
Ans.	С	В	D

EXERCISE > 03

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ans.	С	С	D	С	С	С	Α	С	A	С	D	С	Α	С

