

# PROFIT AND LOSS

SANIL JOSE

DEPARTMENT OF MATHEMATICS

SACRED HEART COLLEGE

*God used beautiful mathematics in  
creating the world.*

**Paul Dirac**

# How to Study Math

1. Write out complete solutions, even for practice and homework
2. Check your work once you're finished
3. Give word problems extra attention
  - Read through the entire problem before you begin to solve it. Make sure you understand the situation and what math techniques you'll need to use.
  - Some problems may have associated graphs, charts, or tables. Make sure to read those carefully, too.
  - Select the numbers you'll need to use to solve the problem. Keep in mind that some word problems might have unneeded details designed to make you use your understanding of what you need to solve it.
  - After you've solved the problem, make sure to check your work steps and see whether your answer makes sense in its size and is in the correct units, etc.
4. Do your homework, then do more for practice.
5. Try a practice test.
6. Take advantage of extra help from a teacher or tutor, if you can.

**REMEMBER !!!!!!!!!!!**

**THE ONLY WAY TO  
LEARN MATHEMATICS  
IS  
TO DO  
MATHEMATICS**

# IMPORTANT FACTS

## Cost Price:

The price, at which an article is purchased, is called its **cost price**, abbreviated as **C.P.**

## Selling Price:

The price, at which an article is sold, is called its **selling prices**, abbreviated as **S.P.**

## Profit or Gain:

If S.P. is greater than C.P., the seller is said to have a **profit** or **gain**.

## Loss:

If S.P. is less than C.P., the seller is said to have incurred a **loss**.

# IMPORTANT FORMULAE

- $\text{Gain} = (\text{S.P.}) - (\text{C.P.})$
- $\text{Loss} = (\text{C.P.}) - (\text{S.P.})$
- Loss or gain is always reckoned on C.P.
- Gain Percentage:  $\text{Gain \%} = \left(\frac{\text{Gain}}{\text{C.P.}} \times 100\right)$
- Loss Percentage:  $\text{Loss \%} = \left(\frac{\text{Loss}}{\text{C.P.}} \times 100\right)$
- Selling Price:  $(\text{S.P.}) = \left[\left(\frac{100 + \text{Gain}\%}{100}\right) \times \text{C.P.}\right]$
- Cost Price:  $(\text{C.P.}) = \left[\left(\frac{100}{100 + \text{Gain}\%}\right) \times \text{S.P.}\right]$
- Cost Price:  $(\text{C.P.}) = \left[\left(\frac{100}{100 - \text{Loss}\%}\right) \times \text{S.P.}\right]$
- If an article is sold at a gain of say 35%, then  $\text{S.P.} = 135\%$  of C.P.
- If an article is sold at a loss of say, 35% then  $\text{S.P.} = 65\%$  of C.P.

**EXAMPLES**

1. Alfred buys an old scooter for Rs. 4700 and spends Rs. 800 on its repairs. If he sells the scooter for Rs. 5800, his gain percent is:



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- **Explanation:**

- Cost Price (C.P.) = Rs.  $(4700 + 800) = \text{Rs. } 5500$ .
- Selling Price (S.P.) = Rs. 5800.
- Gain = (S.P.) - (C.P.) = Rs.  $(5800 - 5500) = \text{Rs. } 300$ .
- Hence Gain % =  $\left( \frac{\text{Gain}}{\text{C.P.}} \times 100 \right) = \left( \frac{300}{5500} \times 100 \right) \% = \frac{60}{11} \%$

2. The cost price of 20 articles is the same as the selling price of  $x$  articles. If the profit is 25%, then the value of  $x$  is:

The cost price of 20 articles is the same as the selling price of  $x$  articles. If the profit is 25%, then the value of  $x$  is:

- **Explanation:**

- Let C.P. of each article be Rs. 1
- C.P. of  $x$  articles = Rs.  $x$ .
- S.P. of  $x$  articles = Rs. 20.
- Profit = Rs.  $(20 - x)$ .
- Hence  $\frac{20-x}{x} \times 100 = 25$
- *ie*  $2000 - 100x = 25x$
- *ie*  $125x = 2000$
- *hence*  $x = \frac{2000}{125} = 16$



If selling price is doubled, the profit triples.  
Find the profit percent.

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Find the profit percent.

- **Explanation:**

- Let C.P. be Rs.  $x$  and S.P. be Rs.  $y$ .

If selling price is doubled, the profit triples

*ie  $3 \times \text{profit} = \text{new SP} - \text{CP}$*




- Then,  $3(y - x) = (2y - x)$  *ie*  $y = 2x$ .
- Profit = Rs.  $(y - x) = \text{Rs. } (2x - x) = \text{Rs. } x$
- Profit % =  $\left(\frac{x}{x} \times 100\right) = 100\%$

A trader mixes 26 kg of rice at Rs. 20 per kg with 30 kg of rice of other variety at Rs. 36 per kg and sells the mixture at Rs. 30 per kg. His profit percent is:

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- **Explanation:**

- C.P. of 56 kg rice = Rs.  $(26 \times 20 + 30 \times 36) = \text{Rs. } (520 + 1080)$
- = Rs. 1600.
- S.P. of 56 kg rice = Rs.  $(56 \times 30) = \text{Rs. } 1680$ . 
- Gain =  $1680 - 1600 = 80$
- Gain% =  $\left( \frac{80}{1600} \times 100 \right) \% = 5\%$

A shopkeeper sells one transistor for Rs. 840 at a gain of 20% and another for Rs. 960 at a loss of 4%. His total gain or loss percent is:



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- **Explanation:**


- C.P. of 1st transistor =  $\left(\frac{100}{120} \times 840\right) = \text{Rs } 700$
- C.P. of 2nd transistor =  $\left(\frac{100}{96} \times 960\right) \Rightarrow \text{Rs } 1000$
- So, total C.P. = Rs.  $(700 + 1000) = \text{Rs. } 1700$ .
- Total S.P. = Rs.  $(840 + 960) = \text{Rs. } 1800$ .
- Gain = Rs  $(1800 - 1700) = \text{Rs } 100$
- Gain % =  $\left(\frac{100}{1700} \times 100\right) \% = \frac{100}{17} \%$

100 oranges are bought at the rate of Rs. 350 and sold at the rate of Rs. 48 per dozen. The percentage of profit or loss is:

100 oranges are bought at the rate of Rs. 350 and sold at the rate of Rs. 48 per dozen. The percentage of profit or loss is:

- **EXPLANATION**

- C.P. of 1 orange =  $\text{Rs} \frac{350}{100} = \text{Rs } 3.5$

- S.P of 1 orange =  $\text{Rs} \frac{48}{12} = \text{Rs } 4$  

- Profit =  $4 - 3.5 = 0.5$

- Profit % =  $\left( \frac{0.5}{3.5} \times 100 \right) = \frac{100}{7} \%$

On selling 17 balls at Rs. 720, there is a loss equal to the cost price of 5 balls. The cost price of a ball is:

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- Explanation:


- $(\text{C.P. of 17 balls}) - (\text{S.P. of 17 balls}) = (\text{C.P. of 5 balls})$



- $\text{C.P. of 12 balls} = \text{S.P. of 17 balls} = \text{Rs.720}.$

- $\text{C.P. of 1 ball} = \text{Rs } \left( \frac{720}{12} \right) = \text{Rs } 60$

*“Mathematics is  
exercise for  
your left brain.”*



**Lets do some exercise  
for left brain as assignment**

# QUESTIONS

Q1. A shopkeeper gives a discount of 19% on marked price of article A and selling price of article B is  $11\frac{1}{9}\%$  more than selling price at article A. If shopkeeper made 20% profit on article B and selling price of article A was Rs. 840 more than cost price of article B, then find the cost price of article A. Shopkeeper sold article A at profit of 25%?

Q2. A shopkeeper sold an article at a 10% discount at mark price. He found that he earns a profit of  $16\frac{2}{3}\%$  but instead of calculating profit on cost price he calculates it on the sum of cost price and selling price. If cost price of article is 1350 then find out the mark price

Q3. Cost price of 12 oranges is equal to the selling price of 9 oranges and the discount on 10 oranges is equal to the profit on 5 oranges. What is the difference between the profit percentage and discount percentage

Q4. A sold a pen to B at Rs 60 profit. 'B' increased its marked price by 50% and then sold it to C at a discount of 25%. Profit earned by 'B' is Rs 10 more than A. Find A's cost price?

- Q5. A shopkeeper has mixtures of nitrous oxide and water in two vessels A and B. Vessel A and vessel B contains mixtures of nitrous oxide and water in the ratio of 7 : 2 & 5 : 3 respectively. The shopkeeper has taken out the mixtures from vessels A and B in the ratio of 9 : 8 and mixed it in vessel C. If shopkeeper sold 68 gm of mixture from vessel C on the cost price of nitrous oxide, which is Rs. 80 per gm, find profit of shopkeeper?
- Q6. Transportation cost of a bike is 25% of itself. At the time of selling shopkeeper marks the price of bike 20% above and allows a discount of 12. If transportation cost of bike increased by 20% and selling price of bike remains the same, then profit of shopkeeper reduced by Rs. 2400. Find the total cost price of the bike?
- Q7. Satish buy two articles i.e. type A at Rs 500 and type B at Rs 1500. He sold type A article at  $x\%$  profit and mark up type B article  $2x\%$  above the cost price and gave  $x\%$  discount at the time of the sale. By this Satish earn  $(x - 6)\%$  profit. Find the value of 'x'.



- Q8. A Shopkeeper bought 30 kg of rice at the rate of Rs. 40 per kg. He sold 40% of the total quantity at the rate of Rs. 50 per kg. At what price per kg should he sell the remaining quantity to make 25% overall profit?
- Q9. A seller had 100kg of wheat. Cost price of packaging 100 kg of wheat is 15% of production cost of wheat itself. If production cost of 100 kg wheat decreased by 10% and cost price of packaging increased by 40%. Then find the percentage increment or decrement in actual cost price of 100 kg wheat?
- Q10. The marked price of a note book in two stationery shops P and Q is same. In shop P note book is available at 25% discount and that of in shop Q is available at two successive discounts of  $d\%$  and 8%. A man bought note book from shop P at Rs. 375. If man would have paid Rs. 39 more, he could have bought the same note book from shop Q. Find the discount 'd' allowed by shop Q on note book?
- Q11. The ratio of the cost price to the marked price of a watch is 3:5 and ratio of the percentage profit to the percentage discount is 5:3. Find the profit percentage ?

- Q12. A shopkeeper buys 60 cycles and marks them at 20% above the cost price. He allows a discount of 10% on the marked price for cash sale and 5% discount for credit sales. If three-fourth of the cycles are sold at cash and remaining for credit, the total profit be Rs. 11400. What is the cost price of a cycle?
- Q13. Deep buys two bangle set for a total cost of Rs. 600. By selling one bangle set for  $\frac{4}{5}$  of its cost and the other for  $\frac{5}{4}$  of its cost, She makes a profit of Rs. 96 on the whole transaction. The cost of the lower priced bangle
- Q14. A dishonest shopkeeper takes 25% more than the indicated weight when he purchases the items from the dealer. He gives 25% less than the indicated weight to his customer at the cost price, then find the profit percentage of the shopkeeper.
- Q15. A shokeeper bought 150 calculators at the rate of Rs. 250 per calculator. He spent Rs. 2500 on transportation and packing. If the marked price of calculator is Rs. 320 per calculator and the shopkeeper gives a discount of 5% on the marked price then what will be the percentage profit gained by the shopkeeper?

*Honesty and integrity  
are absolutely essential  
for success in life – all areas of life.  
The really good news is that  
anyone can develop  
both honesty and integrity.  
– Zig Ziglar*

Thank  
you