

(A) Profit and Loss

$$\text{profit} = \text{selling price} - \text{cost price}$$

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

$$\text{percentage profit} = \frac{\text{profit}}{\text{cost price}} \times 100\%$$

$$\text{percentage loss} = \frac{\text{loss}}{\text{cost price}} \times 100\%$$

(B) Interest is the fee earned when you put money in the bank or the “fee” charged when you borrow money from a bank.

The formula for calculation of interest is:

$$\text{simple interest} = \text{principal} \times \text{rate} \times \text{time}$$

Where **principal** is the initial amount of money, **rate** is the percentage earned or charged by the bank, **time** is the period in order to earn or being charged on the interest, usually on a yearly or quarterly basis.

In the computation of Compound Interest, the interest earned for the first period of the time forms part of the principal for the computation of interest for the second period of the time and so on.

The selling price of a figurine is \$8000.
If it is sold at \$4800, the profit is 20%.
How much should it be sold for if the profit has to be 75%?

Advanced Example 1

A product is marked at 20% above the cost price. It is then sold at 90% of the selling price. The profit is \$120. What is the cost price of this product?

Advanced Example 2

A shop purchased some shoes at \$65 each pair. The shop sold these pairs of shoes at \$74 each. The shopkeeper calculated that the profit was \$440 when there were 5 pairs of shoes left. How many pairs of shoes did the shop purchase initially?

Advanced Example 3

A bank charged 8% annual interest on the money lent to the customers. John borrowed \$20 000 from the bank that was repayable within 6 years.

- (a) What was the payable interest?
- (b) What was the total amount payable?
- (c) What was the monthly repayment?

Advanced Example 4

Mr Young deposited \$30 000 with a bank which pays an interest of 5%. How much interest will be earned at the end of 3 years if the rate is compounded every year?

Advanced Example 5

The selling price of a set of sofa is \$12 000.
It is later sold at \$6500 at an exhibition. The profit made is 30%.
What is the percentage of profit if the profit is \$5000?

Advanced Question 1

The Megamart sold 60% fewer cans of soft drinks than mineral water on Sunday.
The profit of each can of mineral water is 70% less than that of each can of soft drinks.
The profit gained from selling the cans of soft drinks was \$1200. What was the profit gained from the sales of cans of mineral water?

Advanced Question 2

A shop bought 80 laptops at \$4000 each. The shop sold 50 of these laptops at a 20% profit in the first month. In the second month, the remaining laptops were sold at 75% of the first month's selling price. How much profit was made altogether?

Advanced Question 3

A product was marked at 20% above the cost price. It was eventually sold at 80% of the selling price. The loss was \$40. What was the cost price of the product?

Advanced Question 4

A shop purchased some tennis rackets at \$150 each. The shop then sold these rackets at \$175 each. When the shop was left with 8 rackets, the proceeds had covered the initial total cost price plus a profit of \$525. How many tennis rackets did the shop purchase at first?

Advanced Question 5

The cost of publishing a children book for a publishing house has gone up by 10% as compared to last year but the publisher wishes to maintain the selling price of the book. The profit for each book drops by 40% as a result. The number of books purchased, however, increases by 80%. What is the percentage increment in the profit?

Advanced Question 6

Two sets of television of different brands were sold at the same price, \$2040 each. The sale of the first set of television made a profit of 20% while the second set of television made a loss of 20%. Did the shopowner profit from the sales of the two televisions?

Advanced Question 7

Stephen puts \$800 in a bank that earns him a simple interest of 8% per annum. What is the amount of simple interest earned in 3 years? When will his interest accumulate to \$512?

Advanced Question 8

Maurice deposits \$500 with the bank.
The interest rate is calculated at 3% on a yearly basis.
How much will she get at the end of 2 years?

Advanced Question 9

Solution for Advanced Example 1

$$\text{cost price} = \frac{\$4800}{120\%} \times 100\% = \$4000$$

To make a 75% profit,

$$\$4000 \times 175\% = \$7000$$

it should be sold for **\$7000**.

Solution for Advanced Example 2

If the cost price is $\$n$,

$$\text{marked price} = n \times (1 + 20\%)$$

$$= 1.2n$$

$$\text{selling price} = 1.2n \times 90\%$$

$$= 1.08n$$

$$\text{profit} = \text{selling price} - \text{cost price}$$

$$= 1.08n - n$$

$$= 0.08n$$

$$0.08n = \$120$$

$$n = \$1500$$

The cost price of this product is **\$1500**.

Solution for Advanced Example 3

$$\text{Total profit} = \$440 + \$74 \times 5$$

$$= \$810$$

$$\text{Profit from each pair} = \$74 - \$65 = \$9$$

$$\text{Number of pairs of shoes} = \$810 \div \$9 = 90$$

The shops purchased **90** pairs of shoes initially.

Solution for Advanced Example 4

(a) Interest = $\$20\,000 \times 0.08 \times 6 = \9600

The payable interest was **\$9600**.

(b) $\$20\,000 + \$9600 = \$29\,600$

The total amount payable was **\$29 600**.

(c) $\$29\,600 \div (6 \times 12) = \$411\frac{1}{9}$ or $\$411.11$

The monthly repayment was **\$411.11**.

Solution for Advanced Example 5

The interest earned for each year:

$$\begin{aligned} \text{End of 1st year} &= \$30\,000 \times 0.05 \times 1 \\ &= \$1500 \end{aligned}$$

$$\begin{aligned} \text{End of 2nd year} &= (\$30\,000 + \$1500) \times 0.05 \times 1 \\ &= \$1575 \end{aligned}$$

$$\begin{aligned} \text{End of 3rd year} &= (\$31\,500 + \$1575) \times 0.05 \times 1 \\ &= \$1653.75 \end{aligned}$$

$$\$1500 + \$1575 + \$1653.75 = \$4728.75$$

\$4728.75 will be earned at the end of 3 years if the rate is compounded every year.

Solution for Advanced Question 1

$$\text{cost price} = \frac{\$6500}{130} \times 100 = \$5000$$

$$\frac{5000}{5000} \times 100\% = 100\%$$

The percentage of profit is **100%** if the profit is \$5000.

Solution for Advanced Question 2

Ratio of profits

$$= (100\% - 60\%) : (100\% - 70\%)$$

$$= 40 : 30$$

$$= 4 : 3$$

Profit from selling mineral water

$$= 1200 \div \frac{4}{3} = 1200 \times \frac{3}{4} = \$900$$

The profit gained from the sales of cans of mineral water was **\$900**.

Solution for Advanced Question 3

profit in the first month
= $(\$4000 \times 20\%) \times 50$
= \$40 000
selling price in the second month
= $(100\% + 20\%) \times 75\%$
= $120\% \times 75\%$
= 90%
loss in the second month
= $\$4000 \times (100\% - 90\%) \times (80 - 50)$
= \$12 000
Total profit = $\$40\ 000 - \$12\ 000$
= \$28 000
A profit of \$28 000 was made altogether.

Solution for Advanced Question 4

Let the cost price be C .
marked price = $C \times (1 + 0.2) = 1.2 C$
selling price = $1.2 C \times 0.8 = 0.96 C$
loss = $C - 0.96 C = 0.04 C$
 $0.04 C = \$40$
 $C = \$1000$
The cost price of the product was \$1000.

Solution for Advanced Question 5

total profit = $\$525 + 8 \times \$175 = \$1925$
profit from each racket = $\$175 - \150
= \$25
Number of rackets = $\$1925 \div \25
= 77
The shop purchased 77 tennis rackets at first.

Solution for Advanced Question 6

(1) Suppose the cost price of the book is \$8 and was sold for \$10.

Last year's profit = $\$10 - \8
= \$2 each book

The cost increased to = $8 \times 110\%$
= \$8.80

This year's profit = $\$10 - \8.80
= \$1.20

Percentage drop = $\frac{2 - 1.20}{2} \times 100\%$
= $\frac{0.80}{2} \times 100\%$
= 40%

(2) Suppose the number of books sold during last year was 1000, this year will be 1800.

Profit last year = $1000 \times \$2$
= \$2000

Profit this year = $1800 \times \$1.2$
= \$2160

Increment in profit %

= $\frac{2160 - 2000}{2000} \times 100\%$
= $\frac{160}{2000} \times 100\%$
= 8%

The percentage increment in the profit is 8%.

Solution for Advanced Question 7

Cost price of the 1st set = $\$2040 \div (1 + 0.2)$
= \$1700

Cost price of the 2nd set = $\$2040 \div (1 - 0.2)$
= \$2550

profit amount = $\$2040 - \$1700 = \$340$

loss amount = $\$2550 - \$2040 = \$510$

$\$510 - \$340 = \$170$

No, the shopowner did not profit from the sales of the two televisions.

Solution for Advanced Question 8

Interest for 3 years = $\$800 \times 0.08 \times 3 = \192

The amount of simple interest earned in 3 years is \$192.

Suppose it takes n years to have an interest of \$512.

$$512 = \$800 \times 0.08 \times n$$

$$512 = 64n$$

$$n = 512 \div 64 = 8$$

His interest will accumulate to \$512 in 8 years.

Solution for Advanced Question 9

Interest at the end of 1st year

$$= \$500 \times 3\% \times 1 = \$15$$

Total amount at the end of 1st year

$$= \$500 + \$15 = \$515$$

Interest at the end of 2nd year

$$= \$515 \times 3\% \times 1 = \$15.45$$

Total amount at the end of the 2nd year

$$= \$515 + \$15.45 = \$530.45$$

She will get \$530.45 at the end of 2 years.