# 4 Percentages

**By studying this lesson you will be able to;**

- calculate the profit earned or loss incurred through a sale,
- calculate the profit percentage or loss percentage,
- identify what commissions and discounts are,
- perform calculations in relation to commissions and discounts.

## 4.1 Profit and Loss

Most of the items that we use in our day to day lives are bought from supermarkets. People who sell these items are known as sellers whereas people who buy them are known as customers.

The goods sold by sellers are either produced by them or are bought from someone else. In producing or buying goods, a cost is incurred. An item produced or purchased at a cost is generally sold at a price which is greater than the incurred cost. When selling goods at a price which is greater than the cost, it is said that the seller has earned a **profit** from the sale.

A seller will not always be able to sell his goods at a profit. For example, when goods are damaged or about to expire, they may have to be sold at a price which is less than the cost. In such a situation, it is said that the seller has incurred **a loss**. When a seller sells an item at the price at which he bought it, he neither earns a profit nor incurs a loss.

Accordingly, if
the selling price > the cost,
then a profit is earned, and

profit = selling price – cost.

Similarly, if
the cost > the selling price, then a loss is incurred and
loss = cost – selling price.

**Example 1**

A company which produces shoes incurs a cost of Rs 1000 in manufacturing a pair of shoes. The company sells each pair of shoes at Rs 2600. Find the profit earned by the company in selling one pair of shoes.

The manufacturing cost of a pair of shoes = Rs 1 000
Selling price = Rs 2 600
∴ Profit earned = Rs 2 600 − 1 000
= Rs 1 600

**Example 2**

A vendor buys a stock of fifty coconuts at the price of Rs 45 per coconut. If the vendor sells all the coconuts at the price of Rs 60 per fruit, calculate his profit.

**Method I**

The buying price of the stock of coconuts = Rs 45 × 50
= Rs 2 250

Income generated by selling the stock of coconuts = Rs 60 × 50
= Rs 3 000

∴ The profit earned by selling the stock of coconuts = Rs 3 000 – 2 250
= Rs 750

**Method II**

The purchase price of a coconut = Rs 45
The selling price of a coconut = Rs 60
The profit earned by selling one coconut = Rs 60 – 45
= Rs 15
The profit earned by selling the whole stock of coconuts = Rs 15 × 50
= Rs 750

**Example 3**

A vendor buys a stock of 100 mangoes at the price of Rs 20 each and decides to sell them at the price of Rs 18 each due to the fruits being damaged during transportation. Calculate the loss incurred by the vendor.

**Method I**

The purchase price of the stock of mangoes = Rs 20 × 100
= Rs 2 000

The amount made by selling the stock of mangoes = Rs 18 × 100
= Rs 1 800

The loss incurred in selling the whole stock of mangoes = Rs 2 000 – 1 800
= Rs 200

**Method II**

The purchase price of a mango = Rs 20
The selling price of a mango = Rs 18
The loss incurred in selling a mango = Rs 20 – 18
= Rs 2
The loss incurred in selling the whole stock of mangoes = Rs 2 × 100
= Rs 200

**Example 4**

A vendor buys 60 kg of manioc from a farmer at the price of Rs 50 per kilogramme. He initially sells 20 kg at Rs 70 per kilogramme. Of the remaining manioc he sells 15 kg at Rs 60 per kilogramme, 5 kg at Rs 50 per kilogramme and finally 10 kg at Rs 40 per kilogramme. The vendor discards the remaining 10 kg of manioc due to his inability to sell it. Determine whether the vendor earned a profit or incurred a loss from selling the manioc and calculate the profit earned or loss incurred by him.

The cost incurred in buying the manioc = Rs 50 × 60
= Rs 3 000
The amount made by selling the first 20 kg of manioc = Rs 70 × 20
= Rs 1 400

The amount made by selling the next 15 kg of manioc = Rs 60 × 15
= Rs 900

The amount made by selling 5 kg of manioc = Rs 50 × 5
= Rs 250

The amount made by selling 10 kg of manioc = Rs 40 × 10
= Rs 400

The amount made by selling the whole stock of manioc = Rs 1400 + 900 + 250 + 400
= Rs 2950

Since 3000 > 2950, a loss is incurred by the vendor.

The loss incurred by the vendor = Rs 3000 − 2950
= Rs 50

## Exercise 4.1

**1.** Fill in the blanks based on the given information.

| Item | Purchase price/ Production cost (Rs) | Selling price (Rs) | Whether it is a profit or a loss | Profit/Loss (Rs) |
|---|---|---|---|---|
| Wristwatch | 500 | 750 | ..... | ..... |
| School Bag | 1 200 | 1 050 | ..... | ..... |
| Calculator | ..... | 1 800 | Profit | 300 |
| Drink Bottle | ..... | 750 | Loss | 175 |
| Water Bottle | 350 | ..... | Loss | 50 |
| Box of mathematical instruments | 275 | ..... | Profit | 75 |
| Umbrella | ..... | 450 | Loss | 100 |
| Pair of Slippers | | 700 | Profit | 150 |

**2.** Find the more profitable business of each pair given below.

**i.** Selling mangoes at Rs 60 per fruit which were bought at Rs 50 per fruit.
Selling oranges at Rs 55 per fruit which were bought at Rs 50 per fruit.

**ii.** Selling coconuts at Rs 60 per fruit which were bought at Rs 40 per fruit.
Selling jack fruits at Rs 60 per fruit which were bought at Rs 50 per fruit.

**iii.** Selling pens at Rs 15 each which were bought at Rs 10 each.
Selling books at Rs 28 each which were bought at Rs 25 each.

**3.** A vendor buys a stock of 100 rambutans at the price of Rs 3 per fruit. He discards 10 fruits which are spoilt and sells the remaining stock at the price of Rs 5 per fruit. Determine whether the vendor earns a profit or incurs a loss and calculate the profit earned or loss incurred by him.

**4.** A vendor buys a stock of 50 kg of beans at the price of Rs 60 per kilogramme. On the first day he sells 22 kg of beans at the price of Rs 75 per kilogramme and on the second day he sells the remaining stock at the price of Rs 70 per kilogramme.

**i.** Calculate the profit earned by the vendor on each day and determine on which day he earned a greater profit.

**ii.** Calculate his total profit.

**5.** The production cost of a cane chair is Rs 650. A manufacturer produces 20 such chairs. He expects to earn a profit of Rs 7 000 by selling all the chairs. In order to do this, what should be the selling price of a chair?

**6.** A vendor, who sells apples by the roadside after buying them from a wholesaler, buys 200 apples on a certain day at the price of Rs 25 per fruit. He expects to earn a profit of Rs 1000 by selling the whole stock of apples. In order to do this, determine the price at which he should sell a fruit.

**7.** A vendor bought a stock of 50 kg of onions at the price of Rs 60 per kilogramme and sold 30 kg of it at the price of Rs 80 per kilogramme. He had to sell the remaining stock of onions at a lesser price because they were close to getting spoilt. Due to this, the vendor neither made a profit nor incurred a loss from selling the whole stock of onions. Find the price at which the vendor sold each kilogramme of the remaining stock of onions.

## 4.2 Profit percentage/loss percentage

Ramesh and Suresh are two vendors. Ramesh owns a clothing store. He sells a pair of trousers which he bought for Rs 800, at the price of Rs 900. Suresh owns an electrical items store. He sells an electric kettle which he bought for Rs 2500, at the price of Rs 2600.

The items sold by Ramesh and Suresh are not the same, and the buying prices and selling prices of the items are also different. However, the profit earned by them from selling the items is equal.

The profit earned by Ramesh from selling a pair of trousers = Rs 900 – 800
= Rs 100

The profit earned by Suresh from selling an electric kettle = Rs 2600 – 2500
= Rs 100

Can you identify which of these two sellers engaged in the more profitable sale if both had Rs 5000 each?

Even though the profit earned by Ramesh and Suresh is equal, it is clear that the amount of money each person spent in order to earn that profit is not equal. In order to find out which was the more profitable sale, the amount of money spent by each person has to be considered. The below given calculation is performed in order to determine this.

The profit earned by Ramesh after spending Rs 800 = Rs 100

The profit earned by Ramesh as a fraction of the amount he spent $= \frac{100}{800}$

The profit earned by Suresh after spending Rs 2500 = Rs 100

The profit earned by Suresh as a fraction of the amount he spent $= \frac{100}{2500}$

It is easy to compare the fractions $\frac{100}{800}$ and $\frac{100}{2500}$ since the numerators of both fractions are equal. Since $\frac{100}{800} > \frac{100}{2500}$ Ramesh's transaction was more profitable.

Even when the numerators are not equal, the more profitable business is determined using a similar method. Since the comparison of fractions when the denominators are different could be difficult, these fractions are most often converted into percentages to facilitate comparison. Let us calculate these percentages as follows.

Since the profit earned by Ramesh written as a fraction of the cost is $\frac{100}{800}$,

Ramesh's profit percentage $= \frac{100}{800} \times 100\%$

$= \underline{\underline{12.5\%}}$ .

Accordingly, it is clear that the profit earned by Ramesh from spending Rs 100 is Rs 12.50.

Since the profit earned by Suresh written as a fraction of the cost is $\frac{100}{2500}$,

Suresh's profit percentage $= \frac{100}{2500} \times 100\%$

$= \underline{\underline{4\%}}$ .

Accordingly, it is clear that the profit earned by Suresh from spending Rs 100 is Rs 400.

Since $12.5\% > 4\%$, it can be said that Ramesh's transaction was more profitable.

The meaning of the percentages calculated above can be described as follows.

$\frac{100}{800} \times 100$ is the profit Ramesh earns from spending Rs 100.

$\frac{100}{2500} \times 100$ is the profit Suresh earns from spending Rs 100.

The profit earned/loss incurred by a vendor when the buying price/production cost of the item is Rs 100, is known as the profit/loss percentage. Therefore, by representing the profit/loss as a fraction of the buying price/production cost and multiplying that fraction by 100%, the profit/ loss percentage can be calculated.

$$\text{Profit percentage} = \frac{\text{profit}}{\text{buying price (or production cost)}} \times 100\%$$

$$\text{Loss percentage} = \frac{\text{loss}}{\text{buying price (or production cost)}} \times 100\%$$

**Example 1**

A vendor buys exercise books at Rs 25 each, and sells them at Rs 30 each. Calculate the profit percentage earned by the vendor from selling one exercise book.

$$\text{Profit} = \text{Rs } 30 - 25$$
$$= \text{Rs } 5$$

$$\text{Profit percentage} = \frac{5}{25} \times 100\%$$
$$= 20\%$$

**Example 2**

A vendor buys a pair of trousers for Rs 500. Due to a damage, he sells it for Rs 450. Determine the loss percentage.

$$\text{Loss} = \text{Rs } 500 - 450$$
$$= \text{Rs } 50$$

$$\text{Loss percentage} = \frac{50}{500} \times 100\%$$
$$= 10\%$$

**Example 3**

A carpenter incurs a cost of Rs 4000 in making a table which he sells at Rs 5600. A blacksmith incurs a cost of Rs 250 in making a knife which he sells at Rs 360. Determine who has engaged in the more profitable sale.

The profit earned by the carpenter as a percentage of the cost incurred $= \frac{1600}{4000} \times 100\% = 40\%$

The profit earned by the blacksmith as a percentage of the cost incurred $= \frac{110}{250} \times 100\% = 44\%$

Therefore, the blacksmith's transaction was more profitable.

**Example 4**

If a vendor buys an almirah for Rs 30 000 and earns a profit percentage of 15% (of the purchase price) by selling it, calculate the selling price of the almirah.

**Method I**

Here, what is meant by a profit percentage of 15% is that, if Rs 100 is invested, then a profit of Rs 15 is earned. In other words, if Rs 100 is invested, then the item is sold at the price of Rs 115.

Therefore, the selling price of the item when Rs 30 000 is invested $= \frac{115}{100} \times 30\,000$

$= \underline{\text{Rs } 34\,500}$

**Method II**

As in method I above,
since the profit is Rs 15 when Rs 100 is invested,

the profit earned when Rs 30 000 is invested $= \frac{15}{100} \times 30\,000$

$= \text{Rs } 4\,500$

Therefore, the selling price of the item = cost + profit

$= 30\,000 + 4\,500$

$= \underline{\text{Rs } 34\,500}$

**Example 5**

A vendor buys a pair of shoes for Rs 1500 and sells it at a loss of 2%. What is the selling price of the pair of shoes?

**Method I**

Since the pair of shoes is sold at a loss of 2%,

the selling price if the item is worth Rs 100 = Rs 98

$\therefore$ The selling price of the item worth Rs 1 500 = Rs $\frac{98}{100} \times 1\,500$

$= \underline{\text{Rs } 1\,470}$

**Method II**

$$\text{The loss incurred} = \text{Rs } 1\,500 \times \frac{2}{100}$$
$$= \text{Rs } 30$$
$$\therefore \text{ The selling price} = \text{Rs } 1\,500 - 30$$
$$= \underline{\underline{\text{Rs } 1\,470}}$$

**Example 6**

If a vendor earns a profit of 10% by selling a television set at the price of Rs 22 000, find the price at which the vendor bought the set.

**Method I**

In order to earn a profit of 10% when the purchase price of the item is Rs 100, the item should be sold for Rs 110.

Therefore, the purchase price of an item sold for Rs 110 at a profit of 10% = Rs 100

$$\therefore \text{ The purchase price of an item sold for Rs } 22\,000 \text{ at a profit of } 10\% = \text{Rs } \frac{100}{110} \times 22\,000$$
$$= \underline{\underline{\text{Rs } 20\,000}}$$

**Method II**

If the purchase price of the item is Rs $x$, then

$$\text{the profit earned} = \text{Rs } x \times \frac{10}{100}$$
$$= \text{Rs } \frac{x}{10}$$
$$\text{The selling price of the item} = \text{Rs } x + \frac{x}{10}$$
$$\therefore x + \frac{x}{10} = 22\,000$$
$$\frac{10x + x}{10} = 22\,000$$
$$\frac{11x}{10} = 22\,000$$
$$x = 22\,000 \times \frac{10}{11}$$
$$x = 20\,000$$

Therefore, the purchase price of the television set is Rs 20 000.

**Method III**

If the purchase price is Rs $x$,

$$\text{the selling price} = \text{Rs } x \times \frac{110}{100}$$

$$\therefore x \times \frac{110}{100} = 22\,000$$

$$x = 20\,000$$

Therefore, the purchase price of the set is Rs 20 000.

**Example 7**

A vendor had to sell a sports item for Rs 6 800 due to a manufacturing defect, which caused him a loss of 15%. Find the purchase price of the item.

**Method I**

The selling price of an item which is bought at Rs 100 and sold at a loss of 15%, is Rs 85.

$\therefore$ The purchase price of an item sold at Rs 85 at a loss of 15% = Rs 100

Hence, the purchase price of an item sold at Rs 6 800 at a loss of 15% = Rs $\frac{100}{85} \times 6\,800$

$$= \underline{\underline{\text{Rs } 8\,000}}$$

**Method II**

If the purchase price of the item is Rs $x$,

$$\text{the loss incurred} = \text{Rs } x \times \frac{15}{100}$$

$$= \text{Rs } \frac{3x}{20}$$

$\therefore$ The selling price of the item

$$= \text{Rs } x - \frac{3x}{20}$$

$$\text{Then, } x - \frac{3x}{20} = 6\,800$$

$$\frac{20x - 3x}{20} = 6\,800$$

$$\frac{17x}{20} = 6\,800$$

$$x = 6\,800 \times \frac{20}{17}$$

$$\underline{\underline{x = 8\,000}}$$

$\therefore$ The purchase price of the item is Rs 8000.

## Exercise 4.2

**1.** Fill in the blanks in the table based on the information that is given.

| | Purchase price (Rs) | Selling price (Rs) | Whether it is a profit or a loss | Profit/ Loss (Rs) | Profit/ Loss percentage |
|---|---|---|---|---|---|
| **i.** | 400 | 440 | Profit | 40 | 10% |
| **ii.** | 600 | 720 | ..... | ..... | ..... |
| **iii.** | 1500 | 1200 | ..... | ..... | ..... |
| **iv.** | 60 | ..... | Profit | ..... | 60% |
| **v.** | 180 | ..... | Profit | ..... | 30% |
| **vi.** | 150 | 75 | Loss | ..... | ..... |
| **vii.** | 200 | ..... | Loss | ..... | 10% |

**2.** If a vendor buys a pair of trousers for Rs 500 and sells it at Rs 650, determine

**i.** his profit,

**ii.** the profit percentage.

**3.** If an electric iron which is worth Rs 2500 is sold at the price of Rs 2300, determine

**i.** the loss,

**ii.** the loss percentage.

**4.** A vendor buys a stock of 100 mangoes at the price of Rs 18 each. He discards 20 mangoes due to them being spoilt and sells the rest of the stock at the price of Rs 30 per fruit. Determine whether he has earned a profit or incurred a loss and calculate,

**i.** the profit earned/ loss incurred,

**ii.** profit/ loss percentage.

**5.** The production costs of several types of clothing produced and sold by a certain tailor, together with their selling prices are given in the table below.

| **The types of clothing** | **Production cost (Rs) per item** | **Selling price (Rs) per item** |
|---|---|---|
| Shirts | 300 | 350 |
| Pairs of trousers | 400 | 450 |
| Frocks | 500 | 575 |
| Raincoats | 1000 | 1150 |

**i.** For each of the above items, find the profit and the profit percentage earned by the tailor.

**ii.** Giving reasons, write the most profitable item that is produced by the tailor.

**6.** If a bookseller earns a profit of 25% by selling a novel worth Rs 300, calculate the selling price of the novel.

**7.** If a bicycle worth Rs 12 000 is sold at a loss of 10%, calculate the selling price of the bicycle.

**8.** A carpenter spends Rs 1800 in producing a chair. He sells the chair to a vendor at a profit of 20%. The vendor then sells the chair to a customer at a profit of 20%.

**i.** How much does the vendor spend to buy the chair?

**ii.** How much does the customer spend to buy the chair?

**iii.** Write with reasons whether the carpenter or the vendor earns a greater profit.

**9.** If a vendor earns a profit of 10% by selling a refrigerator for Rs 33 000, calculate its purchase price.

**10.** If a vendor incurs a loss of 5% by selling an electric stove for Rs 28 500, calculate its purchase price.

**11.** The profit/loss percentages of several items sold by a vendor and their selling prices are given in the table below. Calculate the purchase price of each item.

| Item | **Selling price** | **Profit percentage** | **Loss percentage** |
|---|---|---|---|
| Clock | 3 240 | 8% | - |
| Electric stove | 7 500 | 25% | - |
| Camera | 12 048 | - | 4% |

## 4.3 Discounts and Commissions

### Discounts

A discount of 20% is given on every book

The price at which an item is expected to be sold is called the marked price. According to the Consumer Affairs Authority Act, the price of an item that is for sale needs to be marked on the item.

A notice displayed in a bookshop is given in the picture shown above. What is mentioned in the notice is that a discount of 20% is given when a book is bought. This means that, when the book is purchased, 20% will be reduced from the price mentioned on the book. The amount that is reduced is called a "**discount**". Most often, a discount is indicated as a percentage of the marked price.

Since customers usually tend to buy goods from shops which offer discounts, there is an increase in sales in these shops. Due to this, the profits of the shop also increase. Discounts result in direct benefits for customers while the shop owners too gain long term benefits.

**Example 1**

Kaveesha buys books which are worth Rs 1500 from a bookshop which offers a discount of 20%. Calculate the discount that Kaveesha receives.

$$\text{Discount} = \text{Rs } 1\,500 \times \frac{20}{100}$$
$$= \text{Rs } 300$$

**Example 2**

The production cost of a mobile phone is Rs 9000. The price of the phone has been marked keeping a profit of Rs 3000. If the phone is sold at a discount of 10% on the marked price, find the selling price.

**Method I**

The marked price = Rs 9000 + 3000
= Rs 12 000

Discount = Rs 12 000 × $\frac{10}{100}$
= Rs 1 200

∴ Selling price = Rs 12 000 − 1 200
= Rs 10 800

**Method II**

Since an item of marked price Rs 100 is sold for Rs 90 when the discount is 10%, the selling price of an item of marked price Rs 100, sold at a discount of 10% = Rs 90

∴ The selling price of an item of marked price Rs 12 000, sold at a discount of 10% = Rs $\frac{90}{100}$ × 12 000
= Rs 10 800

**Note:** In the above example, two methods of solving the problem have been given. Since the second method presented is shorter than the first, it is important to practice this method.

**Example 3**

A discount of Rs 250 is given on the marked price of Rs 2000 when a certain wristwatch is bought. Find the discount percentage offered.

The discount percentage = $\frac{250}{2000}$ × 100%
= 12.5%

**Example 4**

If a storybook is sold for Rs 460 at a discount of 8%, what is the marked price?

$$\text{The marked price} = \text{Rs } 460 \times \frac{100}{92}$$
$$= \underline{\underline{\text{Rs } 500}}$$

**Commissions**


A notice issued by a company which facilitates the sale of properties, vehicles and houses is shown in the above picture. While such companies find customers for these kinds of sales, once the deal is over, a certain percentage of the value of the transaction is charged by the company. Such companies are known as brokerages. The amount that is charged by such companies for facilitating the sale is known as the commission. This is usually a percentage of the value of the transaction.

**Example 5**

What is the commission charged by a company for facilitating the sale of a motorcar worth Rs 3 000 000, if a commission of 5% is charged?

$$\text{The commission charged} = \text{Rs } 3\,000\,000 \times \frac{5}{100}$$
$$= \underline{\underline{\text{Rs } 150\,000}}$$

**Example 6**

A real estate company charges a fee of Rs 36,000 to facilitate the sale of a land worth Rs 1 200 000. Calculate the commission percentage charged by the company.

$$\text{The commission percentage} = \frac{36\,000}{1\,200\,000} \times 100\%$$
$$= \underline{\underline{3\%}}$$

## Exercise 4.3

**1.** A discount of 5% is offered when a television set of marked price Rs 25 000 is purchased.

(i) How much is offered as the discount (in rupees) ?
(ii) Find the selling price of the television set.

**2.** Nimithee buys a pair of trousers worth Rs 1 500 and a shirt worth Rs 1 200 from a shop which offers a discount of 5%. How much does Nimithee have to pay for both the items?

**3.** Two notices displayed during the festive season in two shoe shops which sell the same types of shoes are given below.

| **Shop A** | **Shop B** |
|---|---|
| **A discount of 8% on all purchases** | **A reduction of Rs 100 on all purchases of value greater than Rs 1000** |

**i.** How much needs to be paid when purchasing a pair of shoes of marked price Rs 1 500 from shop A?

**ii.** How much needs to be paid when purchasing a pair of shoes of marked price Rs 1 500 from shop B?

**iii.** What is the discount percentage offered by shop B for this pair of shoes?
**iv.** Is it more beneficial for the customer to buy the pair of shoes from shop A or from shop B?

**4.** A seller of bicycles buys a bicycle for Rs 8 000 and marks its selling price so that he earns a profit of 25%. When selling the bicycle, if the payment is done outright, a discount of 10% is offered to the customer.

**i.** Find the marked price of the bicycle.
**ii.** Find the price of the bicycle when the discount is given.
**iii.** If the seller marks the selling price so that he earns a profit of 20% on the amount he paid for the bicycle, then find its selling price.

**5.** A vendor marks the price of an item such that he earns a profit of 10%. He intends to offer a discount of 10% on the marked price when the item is sold. Describe the profit earned or loss incurred by the vendor at the sale of the item.

**6.** A company charges a commission of 3% on the sale of a land. When selling a land worth Rs 5 000 000,

**i.** how much needs to be paid as the commission?
**ii.** how much does the land owner receive after paying the commission?

**7.** If a broker charged Rs 25 000 for selling a generator which was worth Rs 300 000, calculate the commission percentage that he charged.

**8.** A person who sells his vehicle is left with Rs 570 000 after paying Rs 30 000 to the broker.

**i.** What is the selling price of the vehicle?
**ii.** What is the commission percentage charged by the broker?

**9.** A person paid a commission of 3% when he purchased a house. If he paid Rs 54 000 as commission, find the amount he paid for the house.

## Miscellaneous Exercise

**1.** Kasun decides to sell 10 perches of a land he owns at the price of Rs 300 000 per perch. He promises a commission of 3% on the sale of the land to a broker. If he gives a discount of 1% on the original price to the buyer, find his income from the sale of the land, after paying the commission to the broker.

**2.** Amal who is a car dealer purchases a car for Rs 5 000 000. He intends selling the car for Rs 6 000 000. However, he gives a discount of 3% on this price to the buyer and a commission of 2% to a broker. Determine Amal's profit.

## Summary

**Summary**

- profit = selling price – cost
- loss = cost – selling price
- Profit percentage $= \frac{\text{profit}}{\text{buying price (or production cost)}} \times 100\%$
- Loss percentage $= \frac{\text{loss}}{\text{buying price (or production cost)}} \times 100\%$