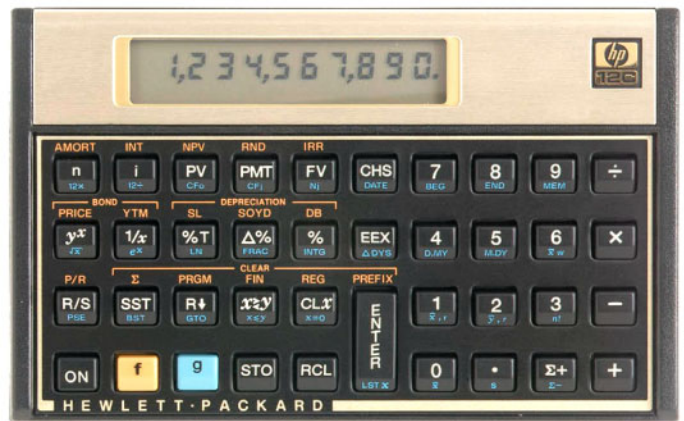**hp calculators**

HP 12C Percentage functions and calculations

Percent computations

The HP12C percent computation

Practice with percentage calculations

Percent computations

The percentage calculation gives the result of applying a rate, expressed as parts of a hundred (per cent), to a base value. A generic expression for a percentage computation is shown in Figure 1:

$$x = \frac{b \times a}{100}$$

Figure 1

where:
a is the rate, expressed in parts of a hundred (percents);
b is the base value;
x expresses the percent of the base when the rate is applied (%).

The percent change expresses the percent difference between two generic values related to one of the values. A generic expression for a percent change computation is shown in Figure 2:

$$\Delta x = \frac{(a-b) \times 100}{b}$$

Figure 2

where:
a is the reference amount;
b is the base value ($b \neq 0$);
Δx expresses the percent change from b to a (Δ%)

The percent of total expresses a percentage that relates two numbers. Usually one of them represents part of the other. A generic expression for a percent of total computation is shown in Figure 3:

$$xT = 100 \times \frac{a}{b}$$

Figure 3

where:
a is the part of the total;
b is the total amount ($b \neq 0$);
xT expresses the percentage a represents for the total b (%T)

The HP12C percent computations

The HP12C has three keys to compute percentages: %, Δ% and %T. To compute either percentage, percent change or percent of total given both a and b, simply key a and b in separated by ENTER and press the related percentage key.

On the HP12C, the base value used in percentages (first introduced value) is always kept, so it can be used in further calculations, like net amount. For example, the following sequence is a general sequence to compute net amount:

$$b \text{ ENTER } a \text{ % } \begin{cases} + \\ \text{or} \\ - \end{cases}$$

Practice with percentage calculations

Example 1:   Mr. O'Brien needs to compute an 11% tax fee over his employees extra activities. The amount to be paid for the extra activities is $1,230. How much is 11% of $1,230?

Solution: The simplest keystroke sequence to compute the 11% of $1,230 is:

1 2 3 0 ENTER 1 1 %

$$135.30$$

Figure 4

Answer: 11% of $1,230 is $135.30.

Example 2:   Now that Mr. O'Brien has the 11% tax fee computed, what is the net amount after adding 11% to $1,230? Assume this is performed immediately after example 1.

Solution: Simply press + because both the base and the percentage (display) are still available.

$$1,365.30$$

Figure 5

Answer: The net amount is $1,365.30.

Example 3:   Given that Mr. O'Brien's total expenses are $15,890, what is the percentage that $1,365.30 represents in this total? Assume this is performed immediately after example 2.

Solution: The simplest keystroke sequence to compute this percentage is:

1 5 8 9 0 x≷y %T

$$8.59$$

Figure 6

Answer: $1,365.30 represents 8.59% of $15,890.

Example 4:   In order to convince a possible customer to buy a new stereo, the salesman offers him a 5.5% discount off the price. Given that the stereo's price is $480, how much will the customer pay for it?

Solution: The keystroke sequence below can be used to compute the final price:

4 8 0 ENTER 5 · 5 % −

$$453.60$$

Figure 7

Answer: If he agrees with it, the customer will pay $453.60.

Example 5: The final balance of a savings account after six months is $12,325. Knowing that it started with $12,000, what is the percent change observed in this account?

Solution: The keystroke sequence to compute the percent change is:

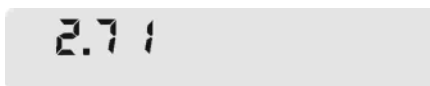[1] [2] [0] [0] [0] [ENTER] [1] [2] [3] [2] [5] [Δ%]

$$2.71$$

Figure 8

Answer: 2.71%. This means that $12,350 is 2.71% bigger than $12,000.

Example 6: A large company had sales of $123,000,000 last year. Given that one of its largest affiliates contributed to this total with sales of $11,500,000, what is the percentage that represents its contribution to the total?

Solution: This is a classic percent of total computation, and the following keystroke sequence can be used to compute it:

[1] [2] [3] [0] [0] [0] [0] [0] [0] [ENTER] [1] [1] [5] [0] [0] [0] [0] [0] [%T]

$$9.35$$

Figure 9

Answer: $11,500,000 represents 9.35% of $123,000,000 (the total).