hp calculators

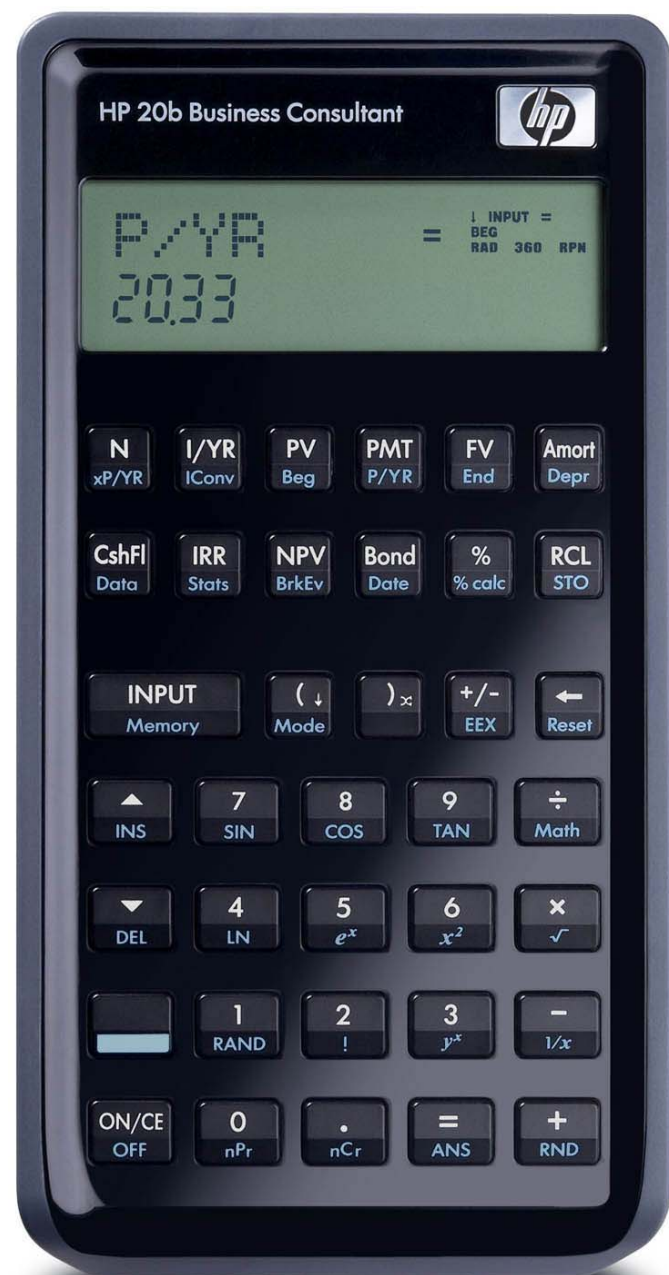## HP 20b Percent calculations

Percents

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HP 20b Percent and Percentage Change Calculations

Percents

Percent derives from a Latin phrase meaning "per 100." Many areas of our lives involve dealing with percents, from taxes to discounts to growth rates. Percent change calculations involve comparing one value to another value, computing the absolute difference between these two values and then dividing this difference by the first value, giving a percent change. Percent of total calculations can simplify calculations involving summations.

Percents on the HP 20b

Basic percent problems, such as adding X% to Y, or multiplying a number by a percent, are done using the ⌧key. This allows you to perform many basic business calculations involving percentages using the primary ⌧ key. Examples of this usage are given in the examples that follow.

The HP 20b % calculation menu

The HP 20b solves these many percentage problems using the %calc menu. This menu is entered by pressing ▭ ⌧ and contains areas where you can enter or compute values related to percentage problems. The map of this menu is presented below. There are four separate types of calculations found in this menu. Markup as a percent of cost and markup as a percent of price (both of which are covered in a separate learning module), part as a percent of a total, and percentage change calculations. To choose one of these types of calculations, press ⌧ when that calculation type is displayed, as shown below. Once a calculation type has been chosen, to move from one item in the menu to the next, press the down arrow key ⌧ . This key is abbreviated DWN in the map below.
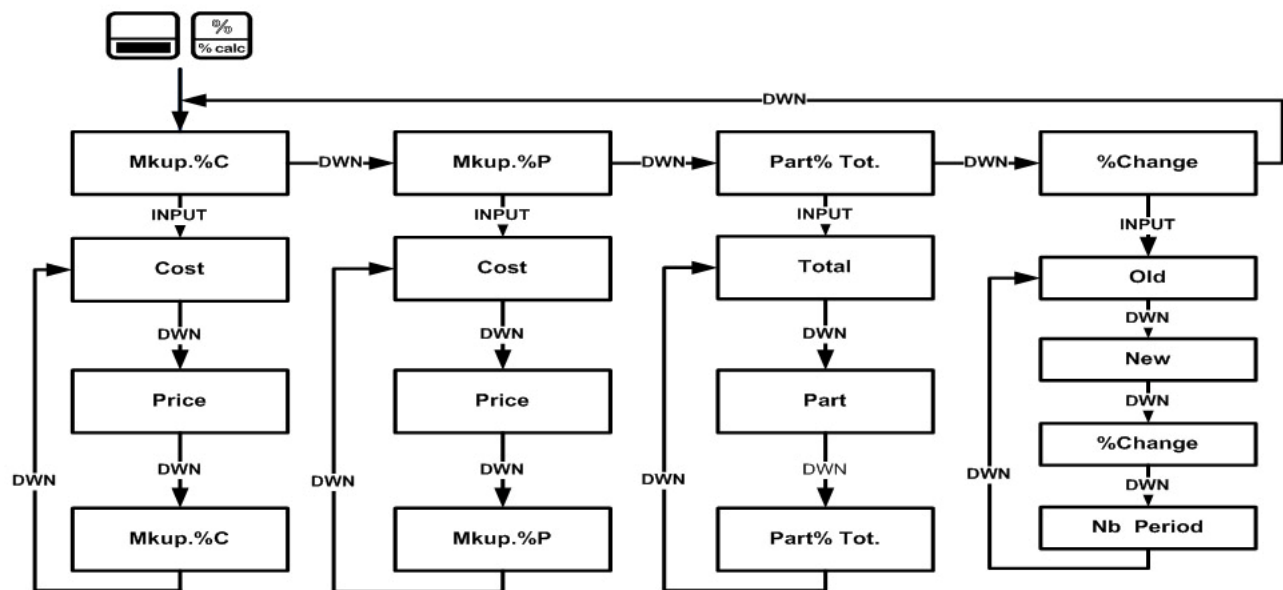

Figure 1 The Menu Map for the Percent Calculation (%calc) Menu

Each of these menu items is considered a read/write menu item, because when it is selected, both the *INPUT* and small (=) annunciators are lit in the top right corner of the HP 20b display. When lit, these annunciators indicate that entering a number and pressing ⌧ will store the entered number in the displayed menu item. Pressing ⌧ (outside of a mathematical operation) will then calculate the value for that item based on available data. Any of the menu items can be solved if the other items within the calculation area are known. To clear the %calc menu while in the menu, press

⬜ Reset │ INPUT │ . If you are in one part of the %calc menu and wish to do another type of percentage calculation, you can press ⬜ %calc to re-enter the menu and begin again.

Practice solving percent problems

Example 1: What is the sales tax on a $50 purchase, if the sales tax rate is 5.5%?

Solution: This is a straight percent problem and is solved using the │ % │ key on the keyboard rather than the menu.

In algebraic or chain mode, press: │ 5 │ │ 0 │ │ × │ │ 5 │ │ · │ │ 5 │ │ % │ │ = │

In RPN mode, press: │ 5 │ │ 0 │ │ INPUT │ │ 5 │ │ · │ │ 5 │ │ % │

Answer: The sales tax is $2.75. Note that when used in a multiplication, the │ % │ key serves the same purpose as multiplying the $50 by 5.5 and then dividing by 100. In most cases where a division by 100 is involved, it saves keystrokes to use the percent key.

Example 2: What is the total amount paid on a $50 purchase, if the sales tax rate is 5.5%?

Solution: This is also a straight percent problem and is solved using the │ % │ key on the keyboard.

In algebraic or chain mode, press: │ 5 │ │ 0 │ │ + │ │ 5 │ │ · │ │ 5 │ │ % │

In RPN mode, press: │ 5 │ │ 0 │ │ INPUT │ │ 5 │ │ · │ │ 5 │ │ % │ │ + │

Note that in algebraic mode, the percent is immediately added to the 50. In RPN mode, the % operates consistently with example 1. The only difference being the addition at the end.

Answer: The total amount paid is $52.75.

Example 3: John's portfolio had a value of $120,000 two years ago. Today, the value is $134,515. What percentage increase has occurred in the portfolio? In other words, what is the percent change?

Solution:

⬜ %calc ⬜ Reset │ INPUT │
│ ▼ │ │ ▼ │ │ ▼ │
│ INPUT │
│ 1 │ │ 2 │ │ 0 │ │ 0 │ │ 0 │ │ 0 │ │ INPUT │
│ ▼ │ │ 1 │ │ 3 │ │ 4 │ │ 5 │ │ 1 │ │ 5 │ │ INPUT │
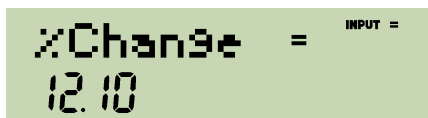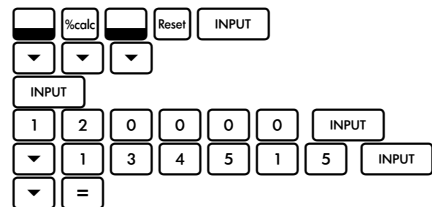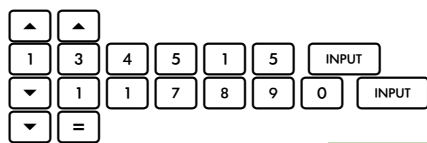│ ▼ │ │ = │

%Change   =   INPUT =
12.10

Figure 4

Answer: 12.10. John's portfolio has increased by 12.10%.

Example 4: One year later, John's portfolio had a value of $117,890. What percentage increase has occurred in the portfolio? In other words, what is the percent change? Assume this example is worked immediately after example 3 above.

Solution:

%Change   = ^{INPUT =}
- 12.36

Figure 4

Answer: -12.36. John's portfolio has now decreased by 12.36%. Easy come, easy go!

Example 5:   Jesse has 48 oranges. He wants to give 20% of these to Joan. To the nearest number of oranges, how many should Jesse give to Joan? Use the Part % Total calculation found in the %calc menu.

Solution:
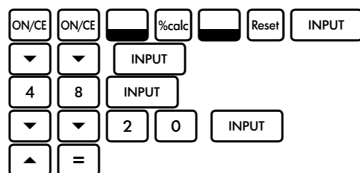
Part   = ^{INPUT =}
9.60

Figure 4

Answer: 9.6. Jesse should give 10 oranges to Joan.

Example 6:   John's portfolio had a value of $120,000 two years ago. Today, the value is $134,515. What percentage increase has occurred in the portfolio per year?

Solution:
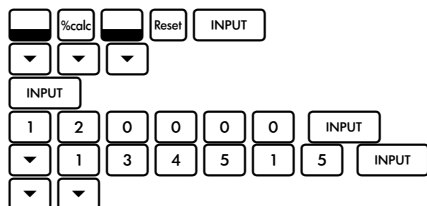
Nb Period= ^{INPUT}
1.00

Figure 4

Nb Period= ^{INPUT}
2.00

Figure 4

%Change   = ^{INPUT =}
5.88

Figure 4

Answer: 5.88%, per year. For the two year period, the total percentage increase is $(1+0.0588) \times (1+0.0588) -1$, or the 12.10%, which agrees with the result from example 3 above.