



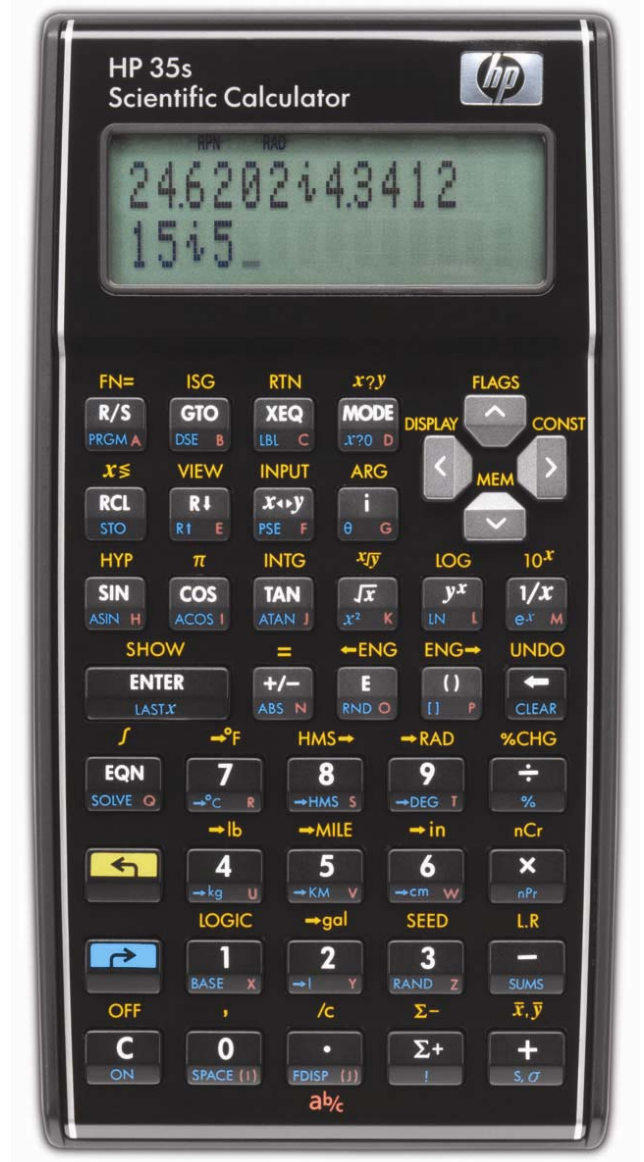
hp calculators

HP 35s Percentages and Percentage Changes

Percentages

Practice working problems involving percentages

Practice working problems involving percentage changes



Percentages




A percentage is a fraction multiplied by 100. For example, 25 percent is written 25%, and is 0.25 (one quarter) multiplied by 100.

Percentages are used very widely in business, for example to specify bank rate, interest rates, tax rates, or discounts. Percentages and percent changes are also used outside business – scientific or engineering measurements, results, and uncertainties are stated as percentages.

The HP 35s provides a % key for use in calculating percentages, and adding or subtracting percentages. It also provides a percent change key for the calculation of changes as percentages.

Practice working problems involving percentages

Most business calculations are made to the nearest cent or penny, so it is useful to set the display mode of the HP 35s to FIX 2 before doing these practice problems, to have two digits displayed after the decimal point. Press

   to set FIX 2 mode.

Example 1: What is 12% of \$1,235.17?






Solution: In RPN mode, the number 1,235.17 is typed and then  is pressed. Then 12 is typed and the  key is pressed.



Figure 1

The number 1,235.17 is still displayed in the upper line (it is left in register Y) and the result, 12% of 1,235.17, is displayed in the lower line (in register X). Unlike other RPN commands such as  or , the  command leaves the number in the Y register unchanged. This makes it possible to continue a calculation, using that number. This will be shown in the next example.

In algebraic mode, press:

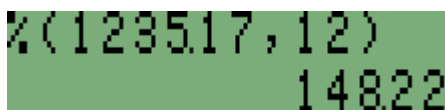


Figure 2

Note that in algebraic mode “n” percent *of* something is obtained by multiplying by the percentage.

Answer: 12% of \$1,235.17 is \$148.22 when written to the nearest cent.

Example 2: What is 12% added to \$1,235.17?

Solution: In RPN mode, the calculation shown in Figure 1 has left the original number in register Y, and 12% of it in register X. Pressing $\boxed{+}$ adds the 12 percent to the original number, giving the answer.



Figure 3

In algebraic mode, press:

$\boxed{1} \boxed{2} \boxed{3} \boxed{5} \boxed{\cdot} \boxed{1} \boxed{7} \boxed{+} \boxed{\rightarrow} \boxed{\%} \boxed{1} \boxed{2} \boxed{3} \boxed{5} \boxed{\cdot} \boxed{1} \boxed{7} \boxed{\>} \boxed{1} \boxed{2} \boxed{\text{ENTER}}$

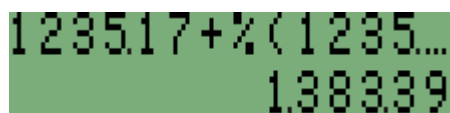


Figure 4

Note that in algebraic mode “n” percent *added to* something is obtained by adding the percentage to the original value.

Answer: 12% added to \$1,235.17 is \$1,383.39 to the nearest cent.

Example 3: The local grocery store is offering 8% off all tinned foods this week. What will be the cost of buying 5 tins that normally cost \$1.85 each?

Solution: In RPN mode, the usual cost of 5 tins is first calculated by multiplying 1.85 by 5. Then 8% is calculated as in Example 1. Finally, the $\boxed{-}$ key is used to subtract the percentage from the original.

$\boxed{1} \boxed{\cdot} \boxed{8} \boxed{5} \boxed{\text{ENTER}} \boxed{5} \boxed{\times} \boxed{8} \boxed{\rightarrow} \boxed{\%} \boxed{-}$



Figure 5

In algebraic mode, the price of 5 tins is also calculated first, then the percent discount is computed

$\boxed{1} \boxed{\cdot} \boxed{8} \boxed{5} \boxed{\times} \boxed{5} \boxed{\text{ENTER}}$



Figure 6

$\boxed{\rightarrow} \boxed{\text{LAST}x} \boxed{-} \boxed{\rightarrow} \boxed{\%} \boxed{\rightarrow} \boxed{\text{LAST}x} \boxed{\>} \boxed{8} \boxed{\text{ENTER}}$

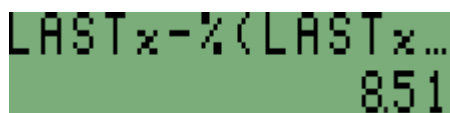


Figure 7

Answer: 8% subtracted from 5 times \$1.85 gives a price of \$8.51 for the 5 tins, to the nearest cent.

Practice working problems involving percentage changes

The examples so far have shown how percentages are calculated, and how they are added or subtracted, by use of the $\%$ key. Calculating a percent change is carried out using $\%CHG$ above the \div key.

Example 5: An investor began the day with \$28,758.91 as the value of her investment only to find that when the market closes in the afternoon, the investment is worth \$28,701. By how much did the market change during the day?

Solution: In RPN mode, enter the old value, the new value, and then the $\%CHG$ key is pressed.

$\boxed{2} \boxed{8} \boxed{7} \boxed{5} \boxed{8} \boxed{\cdot} \boxed{9} \boxed{1} \boxed{ENTER} \boxed{2} \boxed{8} \boxed{7} \boxed{0} \boxed{1} \boxed{\div} \boxed{\%CHG}$



The calculator display shows the number 28,758.91 on the top line and -0.20 on the bottom line.

Figure 8

As with the $\%$ key, the original value stays in register Y so that it can be used again.

In algebraic mode, press:

$\boxed{\div} \boxed{\%CHG} \boxed{2} \boxed{8} \boxed{7} \boxed{5} \boxed{8} \boxed{\cdot} \boxed{9} \boxed{1} \boxed{>} \boxed{2} \boxed{8} \boxed{7} \boxed{0} \boxed{1} \boxed{ENTER}$



The calculator display shows %CHG(28758.91, ... on the top line and -0.20 on the bottom line.

Figure 9

Answer: The market changed by -0.20 during the day, in other words it fell by 0.2%.

Note: It is important to remember that the change is calculated as a percentage of the *first* number. If you have 100 apples and give 20 to your neighbor, then you have 80 apples left and the percentage change is $-20/100$ or -20% . If you have 80 apples and your neighbor gives you 20 then you have 100 again, but this time the change is $20/80$ or $+25\%$. This means that a percent change down, followed by exactly the same percent change up, does not bring you back to the original number.

Finally, if FIX 2 mode was set before these practice problems were done, it may be useful to set a different mode now they are finished.

Press: $\boxed{\div} \boxed{DISPLAY} \boxed{4}$ to set "All" mode.