



hp calculators

HP 17bII+ Statistics – Weighted Averages

Statistics on the HP 17bII+

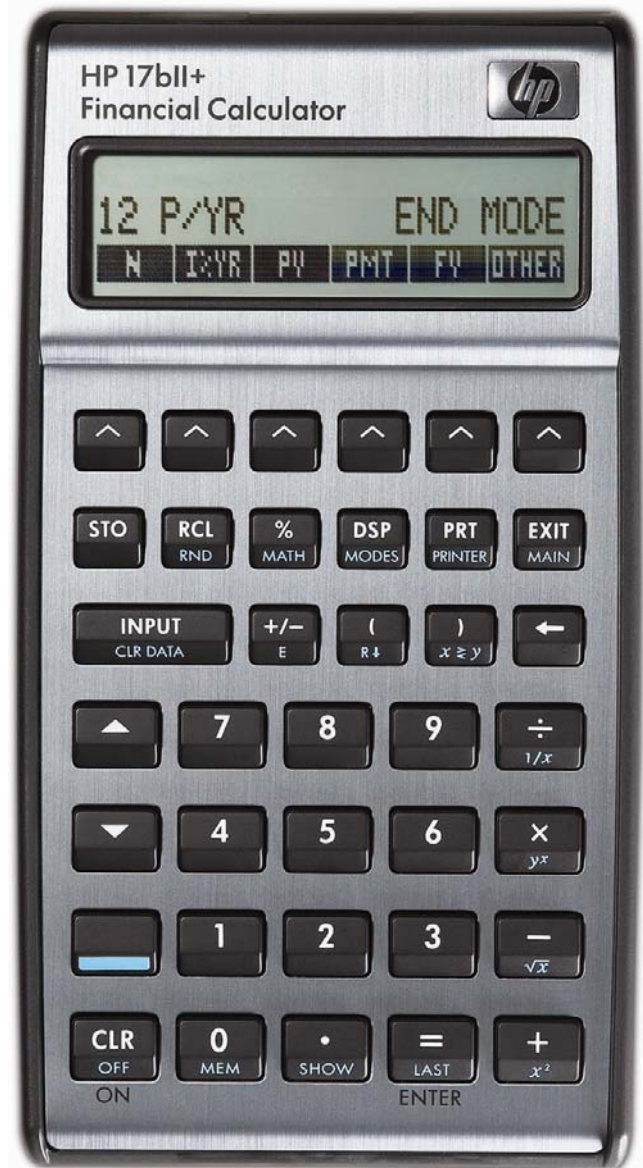
Weighted averages

Sum lists

Entering data values

Weighted averages on the HP 17bII+

Practice solving problems involving weighted averages








Statistics on the HP 17bII+

The HP 17bII+ has many built-in statistics functions that apply to finding averages and standard deviations as well as linear regression and correlation.

Weighted averages

A simple average is defined as the sum of all data points divided by the number of data points included. This gives each data value equal weight toward the computed simple average value. A weighted average is an average that is computed by giving different weights to individual data values and computing the “average” appropriately.

For example, a weighted average might apply a 60% weight to the first data value and a 40% weight to the second data value. The weighted average of data values 10 and 20 would then be $10 \times (0.6) + 20 \times (0.4)$ or 14. In RPN of course, that would be 10  0.6  20  0.4  .

Sum lists

On the HP 17bII+, statistics problems are solved in the Sum environment. This is entered from the main menu by pressing .





Figure 1



Figure 2

On this screen, the menu keys on the bottom of the display perform these functions:








 – Ends the entry of statistical data into the sum list and enters the statistics calculation environment.

 – Displays the total of the data values in the current sum list.

The other menu functions, , , , and  allow you to edit and save a sum list. They are covered in another learning module.

The HP 17bII+ uses a different approach to handling statistics problems than other HP calculators. Rather than storing the data values in registers, the HP 17bII+ stores data values in lists that can be named and saved for future use. This also provides the flexibility to have multiple lists of statistical data stored within the calculator at the same time, limited only by the available calculator memory.

Entering data values

The initial data value is keyed and entered using the  key. The remaining data values are entered in the same manner. Data values can be keyed or computed. They are added to the list when you press . Note to RPN users: This is an instance where there is a difference between the  and  keys. If you wish to compute a value and add it to a sum list, use  rather than  to serve as ENTER. Pressing  in RPN mode while entering data into a sum list will add the number displayed to the list.









When you have entered all data values, press  followed by  to enter the calculation environment, which appears as shown below in figure 3. The menu choices of , , ,  and  are covered in other learning modules. Pressing  shows the second page of the statistics calculation environment as shown in figure 4 below.



Figure 3



Figure 4

, , and are covered in other learning modules. displays a series of menus for calculations involving two variables for curve fitting or statistical analysis requiring two lists.

Weighted averages on the HP 17bII+

On the HP 17bII+, weighted average problems involve entering two sum lists – one for the dependent variable (X) and one for the independent variable (Y). These must be entered and saved with a name in order to associate them together for a regression problem. Once these have been entered, pressing will allow you to choose a list for the X values and a list for the Y values. Once chosen, the screen displays the forecasting menu as shown below. The first two menu positions represent the independent and dependent variables chosen as you entered the environment.



Figure 5

- The name shown at the position represents what will be referred to in this learning module as the X-variable list. This is the list of values that will be averaged using weights to be specified by the second list. The name shown at this menu position will depend upon the list chosen.
- The name shown at the position represents what will be referred to in this learning module as the Y-variable list. This is the list of values that will be used as weights to be applied to the X-variable list. The name shown at this menu position will depend upon the list chosen.
-
- These three functions are explained in another learning module.
- Displays the second page of forecasting menu options as shown below in figure 6.



Figure 6

The functions , , and are covered in another learning module. Pressing will move to the next page of the menu. Functions on that next page are covered in another learning module.

- Computes and displays the weighted mean of the X variable list using the weights in the Y variable list.

Practice solving problems involving weighted averages

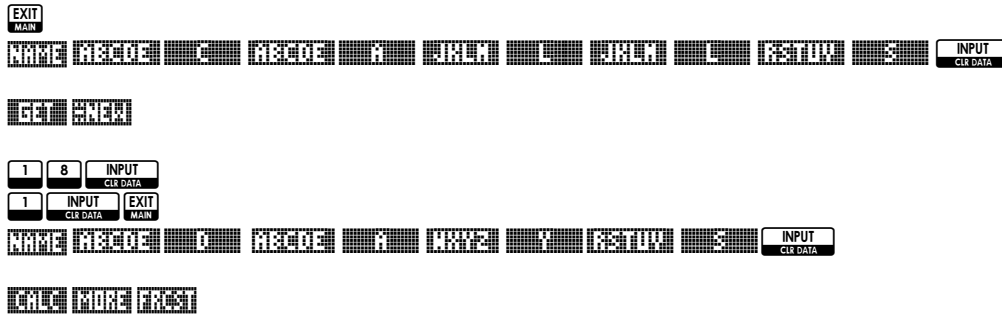
Example 1: Jill has received 6 telephone calls each night over the last 18 nights. Tonight, she received 4 telephone calls. What is the weighted average number of calls Jill has received over the last 18 nights?

Solution: Using the weighted average function:



If you already have at least one sum list, press:





SELECT X VARIABLE
 DAYS CALLS

Figure 7



SELECT Y VARIABLE
 DAYS CALLS

Figure 8



LINEAR
 CALLS DAYS CORR M B MORE

Figure 9



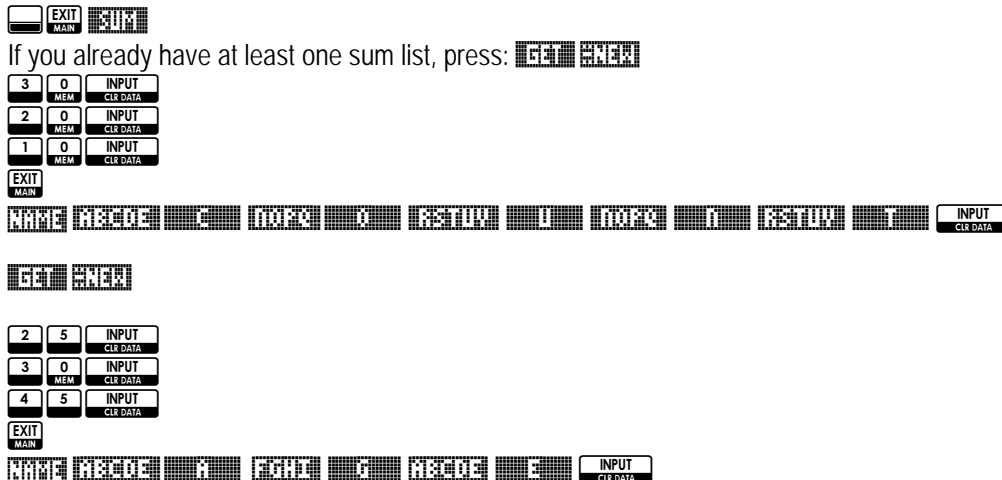
W. MN=5.89
 MODL W.MN G.SD SIZE MORE

Figure 10

Answer: The weighted average number of telephone calls is 5.89.

Example 2: The ages of people attending a movie premier were as follows: 30 people were 25 years old, 20 people were 30 years old and 10 people were 45 years old. What is the weighted average age of those attending the movie?

Solution:



AGE COUN DAYS CALLS

SELECT X VARIABLE
AGE COUN DAYS CALLS

Figure 11

AGE

SELECT Y VARIABLE
AGE COUN DAYS CALLS

Figure 12

COUN

LINEAR
AGE COUN CORR M B MORE

Figure 13

W.MN G.SD

W.MN=30.00
MODL W.MN G.SD SIZE MORE

Figure 14

Answer: The average age is 30 years.

Example 3: There is a 40% chance that the economy will grow by 4% over the next year and a 60% chance that it will grow by 2% over the next year. What is the expected growth rate?

Solution: The expected growth rate can be found by computing the weighted average, with the weights being the probability of each outcome. In this example, it will be computed using arithmetic rather than sum lists.

In RPN mode, press:

4 INPUT CLR DATA 0 MEM 4 X 2 INPUT CLR DATA 0 MEM 6 X +

In algebraic mode, press:

4 X 0 MEM 4 + (2 X 0 MEM 6 =

Answer: The weighted average growth rate is 2.8%. Directly computing the weighted average is certainly quicker for simple examples.