



## hp calculators

HP 17bII+ Statistics – Averages and Standard Deviations

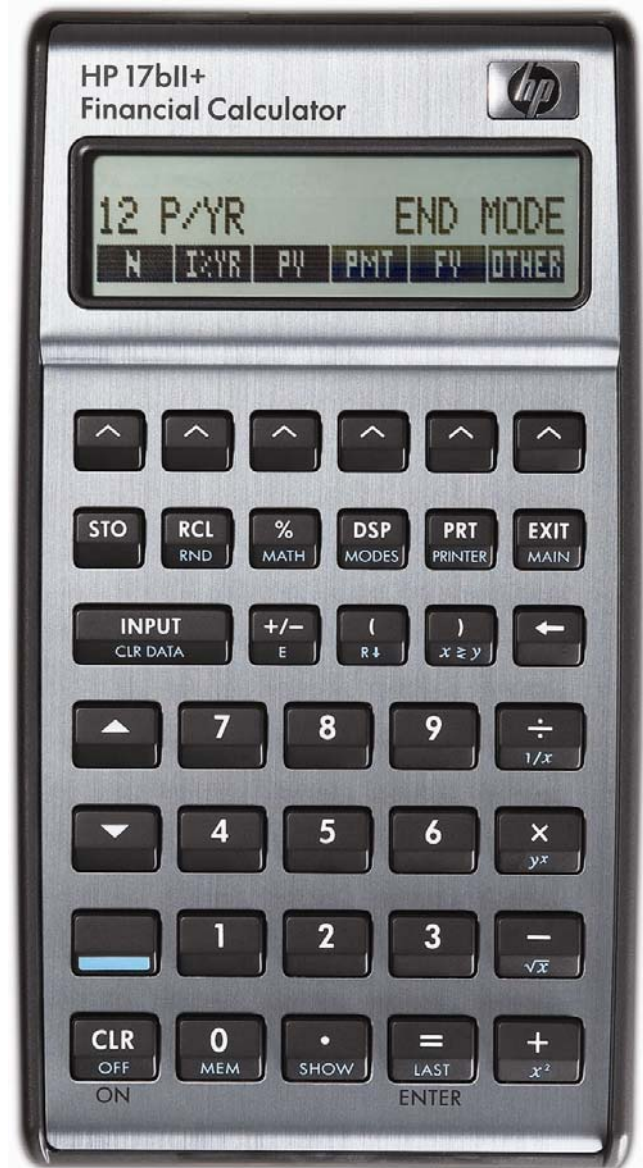
Statistics on the HP 17bII+

Sum lists

Entering data values

Averages and standard deviations

Practice solving problems involving averages and standard deviations



### 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, correlation and rearranging items.

The average is defined as the sum of all data points divided by the number of data points included. It is a measure of central tendency and is the most commonly used. A standard deviation is a measure of dispersion around a central value. To compute the standard deviation, the sum of the squared differences between each individual data point and the average of all the data points is taken and then divided by the number of data points included (or, in the case of sample data, the number of data points included minus one). The square root of this value is then taken to obtain the standard deviation. The property of the standard deviation is such that when the underlying data is normally distributed, approximately 68% of all values will lie within one standard deviation on either side of the mean and approximately 95% of all values will lie within two standard deviations on either side of the mean. This has application to many fields, particularly when trying to decide if an observed value is unusual by being significantly different from the mean.

### 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.
-   
  
  
 – These functions 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.

HP 17bII+ Statistics – Averages and Standard Deviations

When you have entered all data values, press **EXIT** followed by **STAT** to enter the calculation environment, which appears as shown below in figure 3.



Figure 3

- TOTAL** – Displays the total of the data values in the current sum list
- MEAN** – Computes and displays the mean or average of the data
- MEDN** – Computes and displays the median of the data
- STDEV** – Computes and displays the sample standard deviation of the data
- RANG** – Computes and displays the range of the data, which is equal to the largest value minus the smallest value
- MORE** – Displays the second page of statistics menu options, which is shown below in figure 4.



Figure 4

- MIN** – Finds and displays the smallest value item in the list
- MAX** – Finds and displays the largest value item in the list
- SORT** – Sorts the list into ascending order
- FRCT** – Displays a series of menus for calculations involving two variables for curve fitting, etc. These functions are covered in a separate learning module.

Practice solving problems involving averages and standard deviations

**Example 1:** The sales price of the last 10 homes sold in the Parkdale community were: \$198,000; \$185,000; \$205,200; \$225,300; \$206,700; \$201,850; \$200,000; \$189,000; \$192,100; \$200,400. What is the average of these sales prices and what is the sample standard deviation? Would a sales price of \$240,000 be considered unusual in the same community?

**Solution:**



Figure 5

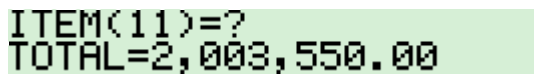
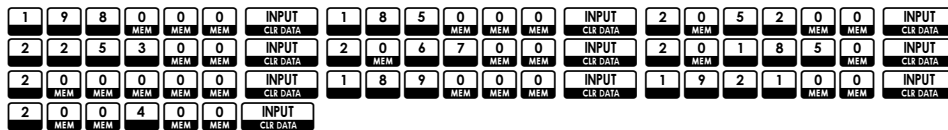


Figure 6



Figure 7



```

MEAN=200,355.00
TOTAL MEAN MEDN STDEV RANG MORE

```

Figure 8

EXIT

```

STDEV=11,189.04
TOTAL MEAN MEDN STDEV RANG MORE

```

Figure 9

Answer: The average sales price is \$200,355 and the sample standard deviation is \$11,189. Within two standard deviations on either side of this average, in this case between \$177,977 and \$222,733, 95% of all home sales prices should fall. If a home were to sell for \$240,000 in this area, it would be an somewhat unusual event.

Example 2: The sales price of the last 7 homes sold in the real estate office's zip code were: \$245,000; \$265,000; \$187,000; \$188,000; \$203,000; \$241,900; \$222,000. What is the average of these sales prices and what is the sample standard deviation?

Solution:

EXIT MAIN    INPUT CLR DATA    INPUT CLR DATA

```

ITEM(1)=?
CALC INSR DELET NAME GET TOTAL

```

Figure 10

2 4 5 0 0 0    INPUT CLR DATA    2 6 5 0 0 0    INPUT CLR DATA    1 8 7 0 0 0    INPUT CLR DATA  
1 8 8 0 0 0    INPUT CLR DATA    2 0 3 0 0 0    INPUT CLR DATA    2 4 1 9 0 0    INPUT CLR DATA  
2 2 2 0 0 0    INPUT CLR DATA

```

ITEM(8)=?
TOTAL=1,551,900.00

```

Figure 11

EXIT MAIN

```

ITEM(8)=?
CALC INSR DELET NAME GET TOTAL

```

Figure 12

EXIT

```

MEAN=221,700.00
TOTAL MEAN MEDN STDEV RANG MORE

```

Figure 13

EXIT

```

STDEV=30,318.81
TOTAL MEAN MEDN STDEV RANG MORE

```

Figure 14

Answer: The average sales price is \$221,700 and the sample standard deviation is \$30,318.81.