



## hp calculators

HP 30b Frequency statistics and quartiles

Frequency statistics and quartiles

Statistics on the HP 30b

Practice solving problems involving frequency  
statistics and quartiles





## Weighted statistics and quartiles

Frequency statistics involves computing descriptive statistics of one set of data, such as averages and standard deviations, using another set of data as counts for how often the corresponding data value was observed. For example, if you were sampling the number of telemarketing calls received per hour over a 10 hour period, you might have 0 calls that happened 4 times, 1 call that happened 2 times, 3 calls that happened 1 time and 6 calls that happened 3 times.






Quartiles divide data into 4 groups, starting with the minimum and ending with the maximum. The middle-most value is the median. Between the minimum and the median is the first quartile boundary and between the maximum and the median is the third quartile boundary.






## Statistics on the HP 30b

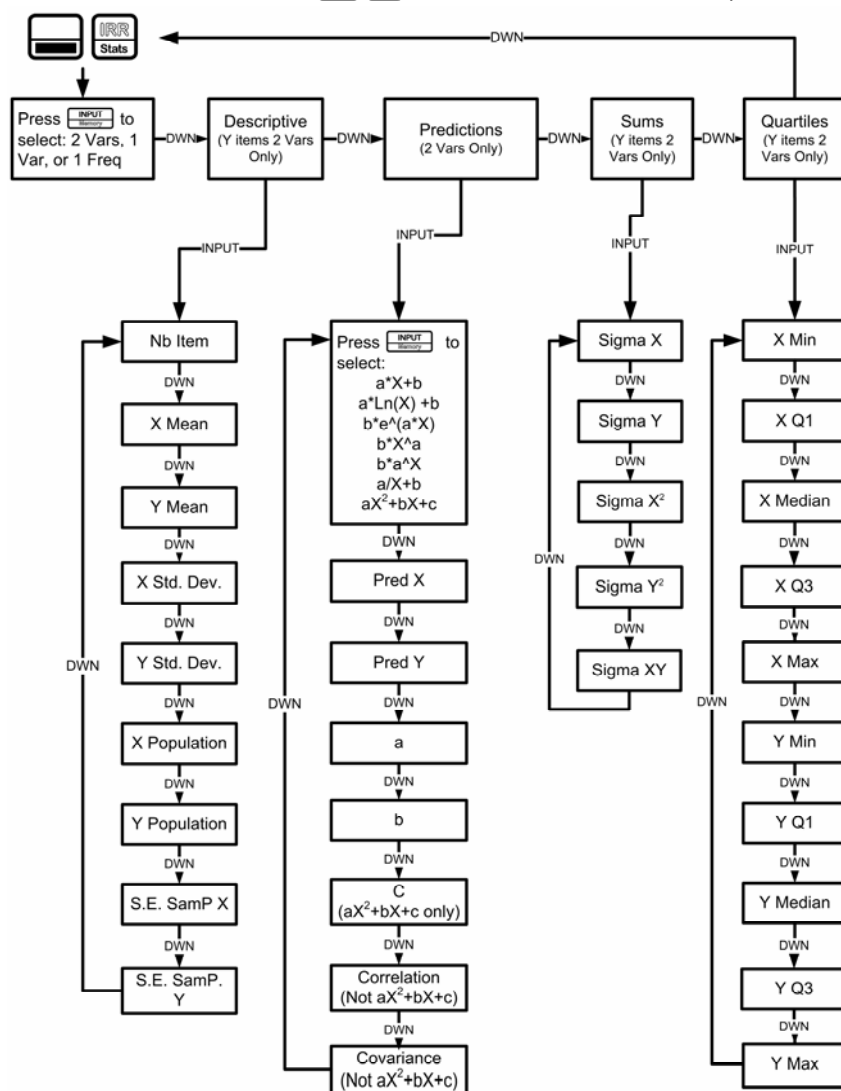
The HP 30b has many built-in statistics functions that apply to finding averages, standard deviations, standard error of the means as well as linear regression, correlation, and covariance. The HP 30b also accumulates many statistical sums for your use. Many of the HP 30b statistics functions are found in the  menu, shown in the menu map below.

The data the statistics functions use for computations must be entered first by pressing . If you enter the stats menu before you have entered any data, you will automatically be placed in the data menu. In this menu, enter a list of  $X$  values for one-variable statistics, a list of pairs,  $(X, Y)$  for two-variable statistics, or a list of pairs,  $(X, F)$  for one-variable statistics with frequencies given, where the  $F$  values would be the frequencies.






Note: the  $(X, F)$  prompt is displayed as  $(X, Y)$  until after 1 Freq is chosen in the stats menu.

To enter data, key in a number and press . To enter a list of  $x$  values only, press   to bypass the entry of  $y$  values. To review the data items that are in the data menu, you can press  or  to scroll through the values.

To clear the data menu while in the menu, press   , followed by pressing . To simply exit the menu, press .



## HP 30b Frequency statistics and quartiles

When you press , your first choice needs to be the type of statistics you will be analyzing: 2 Var, 1 Var, or 1 Freq. Press  to scroll through the options. When the option you wish to use is displayed, press  to enter the second level of the menu, where you will need to choose descriptive, predictions, or sums by pressing  to move between the choices and by pressing  when the choice you want is displayed.

In this learning module, we will focus on the 1 Freq choice of the stats menu and quartile computations.

The table below explains each of the entries in the Statistics – Descriptive sub-menu in more detail. Each of these menu items is input only. These tables only show items for the 1 Freq choice.

### HP 30b Statistics Menu – Descriptive Sub-Menu items

Item	Description
Nb Item	The number of data values entered in the data menu.
X Mean	The arithmetic average of the X values
X Std. Dev	The sample standard deviation of the X values.
X Population Dev	The population standard deviation of the X values.
S.E.Samp.X	The standard error of the sample X mean.

### HP 30b Statistics Menu – Quartiles Sub-Menu items

Item	Description
X Min	The minimum of all the X values in the data menu.
X Q1	The value of X at the first quartile.
X Median	The median of all the X values in the data menu. This is the value of X at the second quartile.
X Q3	The value of X at the third quartile.
X Max	The maximum of all the X values in the data menu.

## Practice solving problems involving averages and standard deviations

Example 1: Find the weighted average of this data:

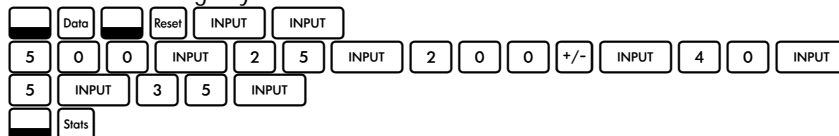
<u>Payoff</u>	<u>Probability</u>
500	0.25
-200	0.40
5	0.35

Note: to use the HP 30b's 1 Freq capabilities to solve for a weighted average, the "weights" must be converted into frequencies observed. This is very easy, since they can simply be entered as integers once multiplied by a power of ten large enough to remove the fractional part of the number. For this example, the frequencies would be 25, 40 and 35.

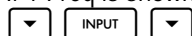
## HP 30b Frequency statistics and quartiles

Solution:

Press the following keys:

NOTE: If the display does not show 1 Freq, press **INPUT** until it is shown.

If 1 Freq is shown in the display, proceed to the next step.



$\bar{x}$  Mean =  
46.75

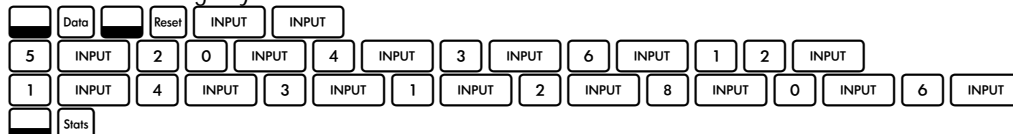
Figure 1

Answer: The "weighted average" is 46.75Example 2: Find the descriptive information for this data.

<u>Result</u>	<u>Frequency</u>
5	20
4	3
6	12
1	4
3	1
2	8
0	6

Solution:

Press the following keys:

NOTE: If the display does not show 1 Freq, press **INPUT** until it is shown.

If 1 Freq is shown in the display, proceed to the next step.



Nb Item =  
5400

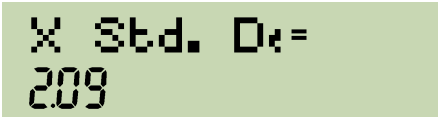
Figure 2



$\bar{x}$  Mean =  
383

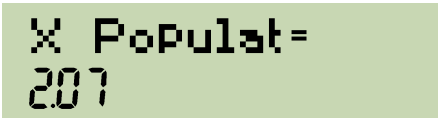
Figure 3






X Std. Dev =  
2.09

Figure 4

X Populat =  
2.07

Figure 5

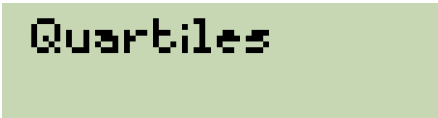
S.E. Samp. =  
0.28

Figure 6

**Answer:** The average value is 3.83, the sample standard deviation of the values is 2.09, the population standard deviation of the values is 2.07 and the standard error of the sample mean is 0.28. The total number of observations is 54.

**Example 3:** Find the quartile information for the data in Example 2. Assume Example 2 has just been solved.

**Solution:** Press the following keys:

Quartiles

Figure 7





X Min =  
0.00

Figure 8




X Q1 =  
2.00

Figure 9

X Median =  
5.00

Figure 10



The image shows a close-up of the HP 30b calculator's LCD screen. The screen displays the text 'X Q3 =' on the top line and the value '5.00' on the bottom line. The background of the screen is a solid light green color.

Figure 11

The image shows a close-up of the HP 30b calculator's LCD screen. The screen displays the text 'X Max =' on the top line and the value '6.00' on the bottom line. The background of the screen is a solid light green color.

Figure 12

Answer: The minimum X value is 0, the median is 5 and the maximum X value is 6. The value of X at the first quartile is 2 and at the third quartile is at 5.