

Statistics Functions

The HP-12C calculator provides functions to perform one or two variable statistical calculations. The data samples are entered into the calculator using the $\Sigma+$ key, which automatically calculates statistics sums and store them in the Storage Registers from 1 to 6 (called the “Statistics Registers”):

Register	Sum	Description
1	n	Number of data samples.
2	Σx	Summation of x-values.
3	Σx^2	Summation of squares of x-values.
4	Σy	Summation of y-values.
5	Σy^2	Summation of squares of y-values.
6	$\Sigma x \cdot y$	Summation of products of x and y-values.

As a special feature, the RLM-12 Finance Center has an additional tool to edit the data samples entered and to calculate statistics and curve-fitting. To show it, expand the calculator pressing the OPT key and in the "Options Selection Menu", select the “[Stat. & Curve-Fitting](#)” option.

One Variable Statistics :

In one-variable statistical calculations, to enter each data point (the “X-value”) key the X-value into the display, then press $\Sigma+$. Each time you press $\Sigma+$ the calculator does the following:

- Add 1 to the number in R_1 and is displayed.
- The X-value is added to the number in R_2 .
- The square of the X-value is added to R_3 .

Two Variable Statistics

In two-variable statistical calculations, to enter each data pair (the “X and Y-values”); type the Y-value into the display, then press **ENTER** (or **=** in ALG mode), type the X-value into the display, then press **$\Sigma+$** . Each time you press **$\Sigma+$** the calculator does the following:

- Add 1 to the number in R_1 and is displayed.
- The X-value is added to the number in R_2 .
- The square of the X-value is added to R_3 .
- The Y-value is added to the number in R_4 .
- The square of the Y-value is added to R_5 .
- The product of the X and Y-values is added to R_6 .

Correcting Accumulated Statistics:

If the data was entered incorrectly, the accumulated statistics can easily be corrected. Simply key in the incorrect data point or data pair again and press **g** **$\Sigma-$** to subtract the incorrect data from the “statistic registers”. Then enter the correct data point or data pair and press **$\Sigma+$** . Each time you press **g** **$\Sigma-$** the calculator does the following:

- Subtract 1 to the number in R_1 and is displayed.
- The x-value is subtracted to the number in R_2 .
- The square of the x-value is subtracted to R_3 .
- The y-value is subtracted to the number in R_4 .
- The square of the y-value is subtracted to R_5 .
- The product of the x and y-values is subtracted to R_6 .

Note: each time **$\Sigma+$** or **g** **$\Sigma-$** is pressed, the special [statistic list](#) is updated as well. You can review or edit the data samples in the list in a much easier way using the “[Stat. & Curve-Fitting](#)” tool in the Option Selection Menu.

The functions keys involved in the statistic calculations are:

Keys	Description
g \bar{x}	Calculates the means (arithmetic averages) of the X and Y-values. The mean of the X-values appears in the display; to display the mean of the Y-values, press $x\lesseqgtr y$.
g S	Calculates the standard deviation of the X and Y-values. The standard deviation of the X-values appears in the display. To display the standard deviation of the Y-values, press $x\lesseqgtr y$.
g \hat{x},r	Calculates a linear estimation of a new X-value given a Y-value. The new X-value appears in the display. To display the correlation coefficient (R^2) of the regression, press $x\lesseqgtr y$.
g \hat{y},r	Calculates a linear estimation of a new Y-value given a X-value. The new Y-value appears in the display. To display the correlation coefficient (R^2) of the regression, press $x\lesseqgtr y$.
g $\bar{x}w$	Calculates the Weighted Mean of the Y-values with the corresponding weights of X-values.
RCL $\Sigma+$	Recalls the content of R_4 (Σy values) to the stack-Y and R_2 (Σx values) to the stack-X
f clear Σ	Clear the "Statistic Registers" R_1 to R_6 and the stack.

Example of Statistic Calculations

Enter the following data samples :

Salesman	Hours / Week	Sales / Month
1	32	\$17,000
2	40	\$25,000
3	45	\$26,000
4	40	\$20,000
5	38	\$21,000
6	50	\$28,000
7	35	\$15,000

To enter the data, follow next sequence:

Keystrokes	Display	Comment
f clear Σ	0.00	Clears statistics registers.
“32” ENTER “17000” Σ+	1.00	First Sample Entry.
“40” ENTER “25000” Σ+	2.00	Second Sample Entry.
“45” ENTER “26000” Σ+	3.00	Third Sample Entry.
“40” ENTER “20000” Σ+	4.00	Fourth Sample Entry.
“38” ENTER “21000” Σ+	5.00	Fifth Sample Entry.
“50” ENTER “28000” Σ+	6.00	Sixth Sample Entry.
“35” ENTER “15000” Σ+	7.00	Seventh Sample Entry.

Base on the data entered, calculate:

- How many hours the average salesman work each week?.
- How much does the average salesman sell each month?
- What is the standard deviation of sales?.
- What is the standard deviation of hours worked?.
- What is the standard deviation of hours worked?.
- What will be sales estimation for a 48 hour workweek ?. Is a good estimation?.
- What are the total hours worked for week and the totals sales per month ?.

Keystrokes to find the answers (RPN or ALG mode)

Keystrokes	Display	Comment
g \bar{x}	21,714.29	Mean sales per month.
$x \lesseqgtr y$	40	Mean workweek in hours.
g S	4,820.59	Standard deviation of sales.
$x \lesseqgtr y$	6.03	Standard deviation of hours.
"48" g \hat{x}, r	28,818.93	Estimated sales for 48 hour work-week.
$x \lesseqgtr y$	0.9	R2 = 0.9 -> good estimation.
RCL $\Sigma +$	152,000	Total sales (Σx).
$x \lesseqgtr y$	280	Total hours (Σy).

What is the linear equation that represent the relation between the hours/week and the sales/month? (Straight line equation of the form $Y = B + A \cdot X$)

Keystrokes:

Keystrokes	Display	Comment
"0" g \hat{y}, r	15.55	For $X = 0$, Calculates the value $Y_0 \Rightarrow$ coefficient "B".
"1" g \hat{y}, r	15.55	For $X = 1$; Calculates the value Y_1 .
RPN mode: $x \lesseqgtr y$ R↓ $x \lesseqgtr y$ -	0.001	Calculates $Y_1 - Y_0 \Rightarrow$ Slope "A" of the line.
ALG mode: $x \lesseqgtr y$ R↓ - $x \lesseqgtr y$ =		

Finally, the equation is: **$Y = 15.55 + 0.001 \cdot X$**

Example: Weighted Mean

In a trip a car was loaded with 15 gallons at \$1.16 per gallon, 7 gallons at \$1.24 per gallon, 10 gallons at \$1.20 per gallon, and 17 gallons at \$1.18 per gallon. What was the average cost per gallon ?

Keystrokes to get the answer:

Keystrokes	Display	Comment
f clear Σ	0.00	Clears statistics registers.
"1.16" ENTER "15" Σ+	1.00	First Sample Entry.
"1.24" ENTER "7" Σ+	2.00	Second Sample Entry.
"1.2" ENTER "10" Σ+	3.00	Third Sample Entry.
"1.18" ENTER "17" Σ+	4.00	Fourth Sample Entry.
g \bar{x}_w	1.19	Calculates Weighted mean => average cost per gallon.