hp calculators

HP 10BII Statistics – Correlation

Statistics on the HP 10BII

Correlation

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Practice solving problems involving correlation

Statistics on the HP 10BII

The HP 10BII has many built-in statistics functions that apply to finding averages and standard deviations as well as linear regression, correlation and rearranging items.

Correlation

The correlation is a measure of how closely one group of numbers or values change as another group of numbers of values change. The correlation's value will always be between –1 and +1, where values closer to –1 and +1 indicate a good "fit" of the a linear regression line to the data upon which it is based. Values nearer to zero indicate little to no "fit." The correlation also applies when comparing two sets of values that are not being used in a linear regression problem. In these circumstances, a correlation value close to +1 would indicate that both sets of data move in the same direction (up or down) at the same time. Correlation values close to –1 indicate that the sets of data tend to move in nearly opposite directions. A value near zero would indicate that there is no real pattern to changes in the sets of data.

Little reliance should be placed upon predictions made from a linear regression line where the correlation is not near –1 or +1. Exactly how far away from these values the correlation can be and the equation still be considered a good predictor is a matter of debate.

Correlation on the HP 10BII

Before beginning a new statistics problem, it is always a good idea to clear the statistics registers by pressing the yellow-shifted function of the [→M] key, or [▬] [CLΣ] .

On the HP 10BII, finding the correlation involves entering pairs of numbers by keying the first number, pressing [INPUT] and then entering the second number and pressing the [Σ+] key. Note that each time the [Σ+] key is pressed, the HP 10BII will display a number representing the number of data pairs entered into the statistics registers. Wrong pairs of numbers can be deleted by entering the incorrect pair of numbers again and then pressing [▬] [Σ-] . Once all the pairs of numbers have been entered, pressing [C] [▬] [x̂,r] [▬] [SWAP] will display the correlation.

Practice solving problems involving correlation

Example 1: John's store has had sales for the last 5 months of $150, $165, $160, $175, and $170. Enter the data and determine how good a fit a trend line would be to the data. Interpret if this indicates whether or not the trend line would be a good predictor of future sales.

Solution:

[▬] [CLΣ]
[1] [INPUT] [1] [5] [0] [Σ+] [2] [INPUT] [1] [6] [5] [Σ+] [3] [INPUT] [1] [6] [0] [Σ+]
[4] [INPUT] [1] [7] [5] [Σ+] [5] [INPUT] [1] [7] [0] [Σ+]
[C] [▬] [x̂,r] [▬] [SWAP]

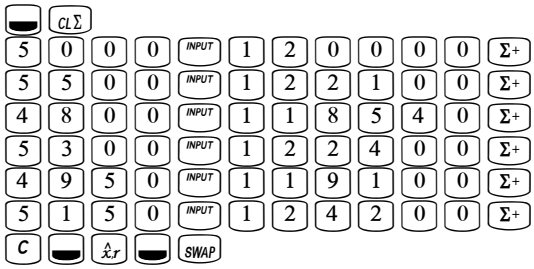
Answer: The correlation is 0.82. Since this is fairly close to +1, the line would do a reasonable job of predicting the future. (Obviously, this is a very broad statement and is subject to debate).

Example 2: Johnson's Chair Company has experienced the following costs for the first 6 months of the year:

# Chairs Made	Total Costs
5,000	$120,000
5,500	$122,100
4,800	$118,540
5,300	$122,400
4,950	$119,100
5,150	$124,200

What is the correlation between these two sets of data? Does the correlation indicate that costs and the number of chairs made tend to move in the same direction or the opposite direction? How strong is the relationship between these two sets of data?

Solution: The X values will be the number of chairs produced. The Y values will be the total costs.



Answer: The correlation is 0.72. Since the correlation is positive, this indicates that the two sets of data tend to move in the same direction – costs go up when more chairs are made. Since the correlation is fairly close to +1 (much closer to +1 than to 0 at least), there is a fairly good relationship between the data sets. Since the correlation is, however, only 0.72, there might be other factors influencing the costs other than the number of chairs being made.