hp calculators

HP 9s Clearing, Editing and Correcting

Resetting and Clearing

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Resetting and clearing

You can restore the HP 9s to its initial state (that is: degrees mode, decimal operating mode and floating point) by resetting the memory. To reset your calculator press (M+) and (ENG) simultaneously. Be warned that all information in the calculator (the displayed number, pending operations, conversions and operands, the M register, statistical registers and data items) will be lost. In general, resetting is not necessary because there are ways of clearing that information individually, but it might be necessary after replacing batteries if there has not been any power source for a long time.

The (ON/C) key cancels the calculation in progress, including all pending operations. It is therefore wise to press it before starting a new calculation. If an error condition occurs, press this key to remove the error annunciator.

The (CE) key clears the current *entry*, so that it can be replaced by another number, but it does not affect the any pending operation. If no number is being entered, then the (CE) key is disabled, for example pressing (CE) does nothing after (ENTER) or any function key. If you press the wrong arithmetic function key, just press the correct key before keying in the other operand: pressing (CE) is *not* necessary in this case.

The (00-0) key is similar to (CE), but it does not clear all the entry at once, but one digit at a time: it is the *backspace* key. To clear the decimal point, press (00-0) until the tens digit is cleared.

The M register is cleared by storing 0 in it, which can be done by pressing (ON/C) (X-M) or (0) (X-M) in a row. The statistical data is lost when leaving the STAT mode, that is why this mode is retained even after turning the power off.

The exchange key

The main purpose of this key ((2ndF) X-Y) is to swap the operands of a two-argument function, which can be very useful in certain cases. The following two examples demonstrate the use of this key.

Example 1:   Calculate $365 \cdot (133 - 78)$ and divide 52 by the result.

Solution: The calculation in question is: $\dfrac{52}{365 \cdot (133 - 78)}$, which can be performed as follows:

(5) (2) (÷) (() (3) (6) (5) (x) (() (1) (3) (3) (−) (7) (8) (ENTER)

But, if the denominator is calculated first (e.g. it might be the result of a previous calculation), the exchange key can be used to swap the operands of the division:

(3) (6) (5) (x) (() (1) (3) (3) (−) (7) (8) (ENTER) (÷) (5) (2) (2ndF) X-Y (ENTER)

Answer: Rounding to four decimal places, 0.0026

Example 2:   Calculate $\sqrt[5]{365 \cdot (133 - 78)}$

Solution: After pressing the (ENTER) key to perform any two-argument function except the multiplication and coordinate conversions, (2ndF) X-Y retrieves the second operand; if the operation was a multiplication, it is the first operand that is retrieved. In fact, this feature is used by the (ENTER) key to repeat calculations (refer to the HP 9s learning module *Basic Arithmetic*). Since $365 \cdot (133 - 78)$ was the second operand (i.e. the divisor) of

the previous division, this number (20075) can be displayed by pressing $\boxed{2ndF}$ $\underline{X-Y}$, and its fifth root is given by:

$\boxed{2ndF}$ $\overset{x}{\sqrt{}}$ $\boxed{B}$ $\boxed{5}$ $\boxed{ENTER}$

Note that the number that $\boxed{2ndF}$ $\underline{X-Y}$ will now return is 5.

<u>Answer:</u>   Rounding to four decimal places, 7.2532.

Editing and correcting statistical data

As described in the instruction sheet enclosed with your HP 9s, there are two ways of editing the statistical data. The first one is to use the DEL function ($\boxed{2ndF}$ $^{DATA}\boxed{DEL}$) as follows:

<p align="center">Old Value $\boxed{2ndF}$ $^{DATA}\boxed{DEL}$ New Value $\boxed{ENTER}$</p>

Attempting to delete a non-existing data value is an error condition; press $\boxed{ON/C}$ or $\boxed{CE}$ to remove the error annunciator. The new value, which is optional, will become the n-*th* data item (i.e. the last one).

The second method is to use the Edit mode. This mode is selected by pressing $\boxed{2ndF}$ $\boxed{EDIT}$ while in STAT mode. The ED annunciator will be lit until you leave this mode by turning the calculator off or by pressing $\boxed{2ndF}$ $\boxed{EDIT}$ or almost any other key, except the number entry keys, $\boxed{M+}$, $\boxed{2ndF}$ $^{DATA}\boxed{DEL}$, and $\boxed{ENTER}$. In ED mode the $^{DATA}\boxed{DEL}$ (i.e. the $\boxed{M+}$ key) and $\boxed{ENTER}$ keys are used to review the data. The difference between $^{DATA}\boxed{DEL}$ and $\boxed{ENTER}$ is that the former displays the item number briefly before displaying the value. To delete an item in ED mode, simply display the item using these keys and then press $\boxed{2ndF}$ $^{DATA}\boxed{DEL}$ i. If you want to replace an item with a new value, the DEL function is not necessary in ED mode, simply key in the new value while the old one is being displayed and then press $\boxed{ENTER}$.

Up to 80 different data items can be entered, but all these values are not stored in 80 different registers internally. Instead, on the HP 9s the statistical data is *accumulated*. You should always bear in mind the effect of roundoff, since it is accumulated too. This is especially important in the following case:

<u>Example 3:</u>   Calculate the mean of the following values: $1.45 \cdot 10^{-45}$, $1.89 \cdot 10^{-39}$, $5.25 \cdot 10^{-41}$ and $1.09 \cdot 10^{-43}$.

               Calculate the mean after correcting the first value from $1.45 \cdot 10^{45}$.

<u>Solution:</u>   Let's enter the correct data:

$\boxed{2ndF}$ $\underline{STAT}$ $\boxed{2ndF}$ $\underline{STAT}$ (to clear the statistical data)
$^{DATA}\boxed{DEL}$ (i.e. the $\boxed{M+}$ key) $\boxed{1}$ $\boxed{\cdot}$ $\boxed{4}$ $\boxed{5}$ $\boxed{EXP}$ $\boxed{+/-}$ $\boxed{4}$ $\boxed{5}$
$^{DATA}\boxed{DEL}$ $\boxed{1}$ $\boxed{\cdot}$ $\boxed{8}$ $\boxed{9}$ $\boxed{EXP}$ $\boxed{+/-}$ $\boxed{3}$ $\boxed{9}$
$^{DATA}\boxed{DEL}$ $\boxed{5}$ $\boxed{\cdot}$ $\boxed{2}$ $\boxed{5}$ $\boxed{EXP}$ $\boxed{+/-}$ $\boxed{4}$ $\boxed{1}$
$^{DATA}\boxed{DEL}$ $\boxed{1}$ $\boxed{\cdot}$ $\boxed{0}$ $\boxed{9}$ $\boxed{EXP}$ $\boxed{+/-}$ $\boxed{4}$ $\boxed{3}$ $^{DATA}\boxed{DEL}$

Press $\overline{x}$ $\underline{\Sigma x}$ (i.e. the $\boxed{x-M}$ key) to display the mean: $4.86 \cdot 10^{-40}$ rounded to two decimal places.

What if the first value had been input as $1.45 \cdot 10^{45}$? Let's enter the data again, including that "typo":

$\boxed{2ndF}$ $\underline{STAT}$ $\boxed{2ndF}$ $\underline{STAT}$ (to clear the statistical data again)

DATA DEL (1) (•) (4) (5) (EXP) (4) (5)
DATA DEL (1) (•) (8) (9) (EXP) (+/−) (3) (9)
DATA DEL (5) (•) (2) (5) (EXP) (+/−) (4) (1)
DATA DEL (1) (•) (0) (9) (EXP) (+/−) (4) (3) DATA DEL

Pressing $\overline{x}$ $\Sigma x'$ returns the clearly wrong mean $3.625 \cdot 10^{44}$ which makes you review your data: you forgot the exponent sign of the first value. Let's try substituting the correct $1.45 \cdot 10^{-45}$ for that value as follows:

(1) (•) (4) (5) (EXP) (4) (5) (2ndF) DATA DEL (1) (•) (4) (5) (EXP) (+/−) (4) (5) (ENTER) (alternatively, you can fix the typo in Edit mode: (2ndF) EDIT (ENTER) (1) (•) (4) (5) (EXP) (+/−) (4) (5) (ENTER) (2ndF) EDIT)

All values are now correct (press (2ndF) EDIT and DATA DEL four times to review the data), but pressing $\overline{x}$ $\Sigma x'$ returns $3.625 \cdot 10^{-46}$ instead of $4.86 \cdot 10^{-40}$ because the typo $1.45 \cdot 10^{45}$ has a magnitude that is enormous compared with the correct value, and therefore generated a significant rounding error that was not removed when the value was corrected. In such cases, the best option is *to start over*.

In some cases involving data values that *differ by a relatively small amount*, the HP 9s cannot compute s and σ accurately because such calculations would exceed the precision of the calculator. For example, if your values were 199999, 200000 and 200001, then:

$$S = \sqrt{\frac{199999^2 + 200000^2 + 200001^2 - \frac{(199999 + 200000 + 200001)^2}{3}}{2}} = \sqrt{\frac{120000000002 - 120000000000}{2}} = 1$$

but, on the HP 9s $199999^2 + 200000^2 + 200001^2$ evaluates to $1.2 \cdot 10^{11}$, and therefore calculating S results in 0. This will not happen if you *normalize* the data by keying in only the *difference* between each value and the mean or *approximate* mean of the values. In the previous example, if you use the values –1, 0 and 1 instead, you will obtain the correct result S = 1. Remember to add the difference (200000) back to the calculation of $\overline{x}$.