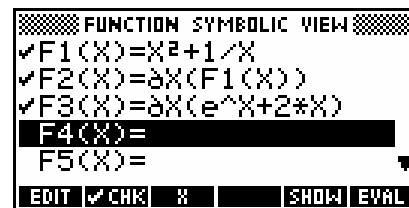### *Symbolic Differentiation*

There are different approaches that can be taken to differentiating, most of which are best done in the **SYMB** view of the Function aplet.

The syntax of the differentiation function is:

$$\partial X\,(\,function)$$

where *function* is defined in terms of X.

The function can be already defined in the **SYMB** view of the Function aplet as shown in functions **F1(X)** and **F2(X)** in the screen shot above. Alternatively it can be directly entered into the brackets as shown in function **F3(X)**.

The ∂ symbol most easily obtained by pressing the key labeled $d/_{dx}$. It can also be found in the **MATH** menu.
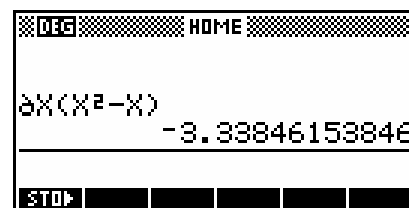
One point to remember is that if you use this function in the **HOME** view you may not receive the result you expect. If you try this yourself your result will probably not be the same as that shown right.

The reason for this is that the result you see is the derivative of $x^2 - x$ evaluated at whatever value of *x* happens to be currently in memory. This can be seen more clearly if we store a specific value into the memory **X** beforehand. In the example shown right, the answer of 3 is the value of the derivative $2x-1$ at the value of $x = 2$.

But what of algebraic differentiation? It is possible but not very convenient to do this in the **HOME** view using a "formal variable" of **S1**. The drawback of this is simply the awkwardness of having to work with **S1**'s rather than with **X**'s.

Algebraic differentiation is BY FAR most easily handled in the **SYMB** view of Function. The best method is to define your function as **F1(X)** and its derivative as **F2(X)** (see below) because then you can graph the function and its derivative.

press **EVAL**