

Documentation for DFind/DSolve

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1. Contact Details:

I will not be able to respond to any questions about this package. I am a year 12 student in 2002 doing SIX TEE subjects, so my time is short as it is!

2. Legal Information:

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It *should* be impossible to crash your calculator by using DFind/DSolve, but be warned: no software is bug free!

3. Installing DFind/DSolve

It is quite easy to install the package. Here is a step by step method that will ensure it works properly:

1. Unzip the DFind/DSolve zip file to any suitable location.
2. Fire up the HPCom software and point it too that location.
3. On your calculator go into the APLET view and push RECV.
4. Select "Disk drive..." and push OK.
5. A Menu displaying the options "DFind", "DSolve" and "Other" will appear. Use the CHK Button to check BOTH DFind and DSolve.



6. Press OK and the download will be completed automatically.

4. Using DFind/DSolve:

I will take you through an example of the use of the DSolve/DFind applet. Although it may seem laborious at first, I can ASSURE you that this applet will drastically improve the speed of working with derivatives.

The example is as follows:

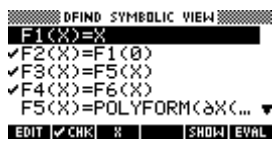
Find all the stationary points on the following equation and state what they are.

$$F(X)=X^3+2X^2-9X+1$$

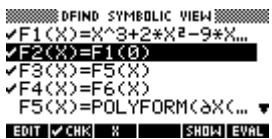
To do this start up the applet "DFind" (Do not start DSolve, this comes later). A menu is displayed asking to



At this stage select reset. This resets the applet so that it is ready for a new session. The applet will ask for the type of equation, this is a polynomial so select polynom. If it is not a polynomial select other.

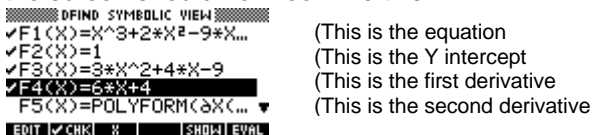


The function symbolic view is displayed (as above) You enter the equation that you are working with into F1(X) eg:



(When you push OK the equation will automatically check itself)

The cursor should be on F2, push EVAL, then DOWN then EVAL then DOWN then EVAL the screen should now look like this:



DO NOT TOUCH ANY OF THE FUNCTIONS BELOW F4(X). THESE ARE ALL USED BY THE APPLLET INTERNALLY!

In itself this is useful, but DSolve applet now becomes very useful. You get to DSolve, by pressing VIEWS and selecting DSOLVE. The purpose of DSolve is to solve the derivative for the points where it is 0 and for the X intercept of the graph. You will be presented with a menu as follows:



The choice now is yours. I will follow through as per the example. First I want to find the turning points. These occur when the first derivative is zero. I will therefore select option one: 1'st dy/dx. Go to the NUMERIC view enter and enter a value for X (I recommend entering a very high value ...say 100 and a low one say... -100 so that you can quickly find ALL the solutions:



I get 1.189... and -2.522...to find out if these are Max or Min you could write them down OR.....

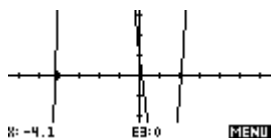
Leave the value currently displayed in DSolve i have -2.522... , press VIEWS and select DFIND, now press CONTINUE. (if you press RESET you will have to start over!) Go into NUMeric view and scroll your cursor over to the X column by pressing the left key. Then press ALPHA X ENTER. The display will scroll to -2.522 and in each of the columns the result will be displayed. The one that you are looking for is F4(X): to get to this scroll across using the right arrow. The value is -11.1355 so it is concave down or a MAX. The co-ordinates are now found by the X value (-2.522) and the F1(X) value (20.377) the turning point is (-2.522, 20.377).

X	F1	F3	F4
-2.5226	20.37783	1E-10	-11.1355
-1.4226	20.32315	1.08355	-10.5355
-0.3226	20.16312	2.10711	-9.43553
0.7226	19.40373	3.07066	-8.33553
1.8226	14.55044	3.47421	-8.73553
2.9226	14.11084	-4.81776	-8.13553

By pressing VEIw, DSolve and solving the 1'st derivative again for the upper value (1.189....) and repeating the above process to find the min point at (1.189,-5.192)

Now to find the point of inversion go to DSolve and select option two (2'nd dy/dx). Solve the equation. (I get -0.666667) Now use views to get to the numeric view of DSolve) Once again, scroll to the x column and enter ALPHA X ENTER, the y value of the inversion is in the F1 which is 7.592.

To find the x-intercepts I would recommend using POLYROOT in the HOME view however this applet can also do it by going to DSolve and selecting X-int. Make SURE you solve for ALL roots. This is best achieved using plot and numeric views together. To do this, go to the plot view, make sure that TRACE is selected, move the cursor to the approximate location of the intercept:



Then go to the numeric view (which will display the cursor location);

DSOLVE NUMERIC VIEW
X: -4.1

ENTER VALUE OR PRESS SOLVE
EDIT INFO DEFN SOLVE

and press solve....

DSOLVE NUMERIC VIEW
X: -4.19970498074

ENTER VALUE OR PRESS SOLVE
EDIT INFO DEFN SOLVE

So one of the answers is (-4.199,0) approx (-4.2,0)

WARNING there are THREE solutions to this example, to complete the question you must find all of them.

And that's it, this applet simplifies the whole process without the need to write anything down except the answers!