




3. Solving Equations.


Solving polynomial function can be done easily when it can be factored easily. If $f(x)$ is a quadratic polynomial function, choose Simplify/Factor on the menu bar and click Simplify in the entry form after choosing the method of factorisation to be complex. Alternatively, highlight the expression $f(x)$ (it is assumed that the equation to be solved is $f(x) = 0$) and click the  button. If you forget the function of a button, just hold the cursor on it and a bubble will pop up with the explanation. We can also choose Solve/Algebraically on the menu bar. When you know the solution may not be exact, plot the expression $f(x)$ to estimate a small enough interval containing the root that you are trying to get and choose Solve/Numerically. You will be asked to enter this interval.


4. Substitution


Suppose you want to evaluate the expression $f(x)$ for $x = 5$, that is, you want to know what is $f(5)$. Highlight the expression $f(x)$ and click the  button. This will open the substitution form. Type in the substitution value, say 5. You can also paste the substitution value into the substitution form. Then click Simplify on the substitution form.

5. Calculus.

After choosing the Calculus dropdown menu, you get a submenu with Differentiate, Integrate, Limit, Product, Sum, Taylor series and Vector. You can differentiate an expression by highlighting it and clicking the  button or choose Calculus/Differentiate. For the later method, a form will open and this form will have




entries for what variable to use and how many times to differentiate. To integrate an expression, just highlight it, then click the  button or choose Calculus/Integrate on the top menu bar. This will open the integrate form, which will have an entry for what expression to integrate, an entry for what variable to integrate with and entries for the limits of integration. It will also have buttons to choose definite or indefinite integral. For definite integral, click the appropriate button, and type in the upper and lower limits. You can type in $\pm\infty$.

For finding limits of an expression highlight the expression and choose Calculus/Limits or just click the  button. An entry form will open. Fill in the variable and the limit point. Choose whether left, right or double sided limit. Then click Simplify to get the answer.

In a similar way DfW does summation and product problems. For example, to find the summation $\sum_{n=1}^7 f(n)$, author $f(n)$ and highlight it, click the  button or choose Calculus/Summation. Then in the pop up form, fill in the required variable n along with the starting value 1 and the ending value 5 and click Simplify. DfW

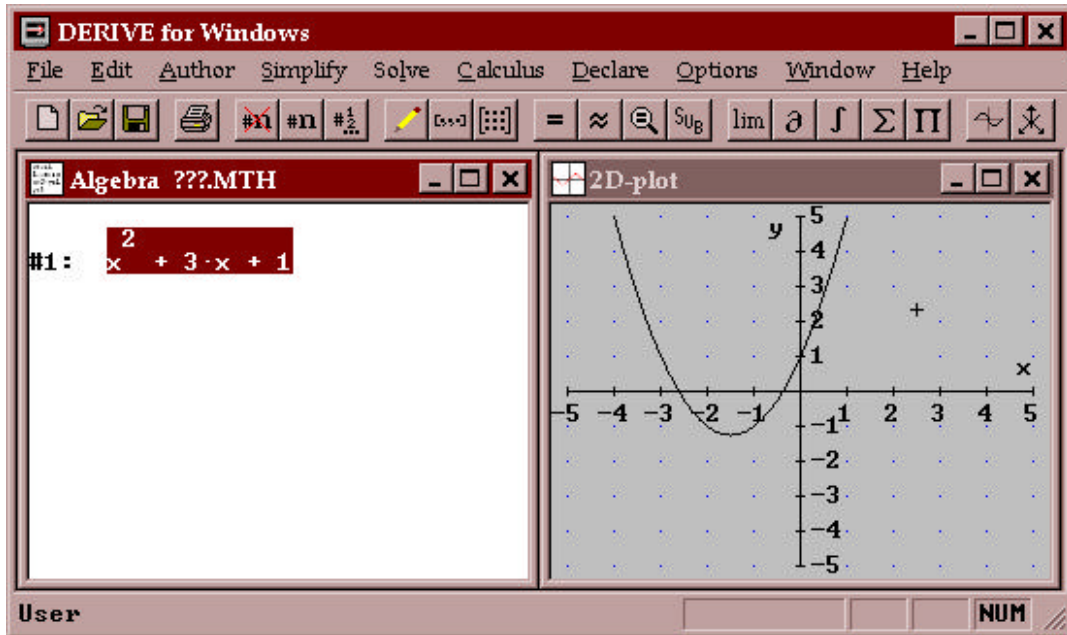
knows $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$.



6. Plotting.

To plot the function $f(x)$, click  and author the expression $f(x)$. For a 2D plot, click the  button. A plot window will then open up and the menu bar will change to a new set of icons. Click the  again to plot the function. You can view both the algebra window and the plot window together in several ways. If you

are in the plot window, then click the  button to return to the algebra window.

Then choose Windows/Tile Vertically. This will split the screen into two windows, an algebra window on the left and a plot window on the right.



You can have several plot windows associated with a single algebra window; but you cannot plot together expressions from different algebra windows. You can switch window by clicking either  or  or you can click anywhere in the window to select. Remember to click with the right most button. Clicking with the left button will change the previously selected expression or change the position of the cross-hair.


You can plot several functions in the same plot window. Just move to the algebra window and select the expression you want to plot and switch back to the plot window to plot. You can plot as many functions as you want in this way. The plot

window has a menu option Edit/ Delete Plot for removing some or all of the plots.

Pressing the delete key removes the current plot.

When you plot, there is a small cross-hair in the plot window. You can use this to locate the points on the graph either by moving using the arrow keys to the desired position or by just clicking at the new location.

Centering: If you want to centre the plot with the cross-hair at the centre of the plot,

just click the  button. This is useful for zooming in or out of the window. The

button  is for zooming in and the button  is for zooming out. There are two

more sets of buttons for changing the scales of the x and y axes. Alternatively, you

can scale the plot by clicking the  button and fill out the desired scale. The


current scale is displayed at the bottom of the screen.


Using Vectors for Plots

Plotting the expression $[f(x), g(x), h(x)]$ will graph the three functions $f(x)$, $g(x)$ and $h(x)$. You can use square brackets in this way to plot many functions at the same time.

Plotting Points

To plot a collection of individual points, we enter the points as a matrix. E.g., authoring the expression $[[-2,2],[0,-3], [1,-1]]$ and plotting it will graph the 3 points,

$(-2,2)$, $(0,-3)$ and $(1,-1)$. A quick way to author a vector is to click the  button

and a quick way to enter a matrix is to use the  button.