

## DERIVE Introduction

DERIVE will open showing an open algebra window. To enter a function into the window, you want to type in any function as

$$f(x) : =$$

Example: Type in  $f(x) : = x^2 + 5x + 6$

You can experiment with the Simplify commands at the top of the toolbar. One nice feature is to highlight an expression that you want to copy, then press F3 to copy it anywhere you want it.

Example: You can factor  $f(x)$  by highlighting just  $x^2 + 5x + 6$  (don't highlight the  $f(x) : =$ , just the rule itself) then click on Simplify, Factor, Factor.

Example: Solve  $f(x) = 0$ , by highlighting just the rule for  $f(x)$ , clicking Solve, Expression. If the function has an algebraic solution, then you can click on Algebraically. Otherwise, you can click on Numerically, and get an approximation for the solution.

Example: Evaluate  $f(x)$  at  $x = 2$  by first highlighting the rule only of  $f(x)$  then clicking on the SUB key and typing in 2 for New Value. Click on Simplify.

Example: Type in  $f(x) : = (x + 2)(x^3 + 5x - 4)$ . Highlight just the rule, then click on Simplify, Expand, Expand.

Example: Find  $\lim_{x \rightarrow 2^+} f(x)$  by highlighting the rule, click on Calculus, Limit or the lim icon Enter in 2 for the limit value and click on Approach from the Right, Simplify.

Example: Find  $\frac{df}{dx}$  and  $\frac{d^2f}{dx^2}$  by highlighting the rule for  $f(x)$ , clicking on Calculus then Derivative or clicking on the  $\partial$  icon. You can choose what order derivative you want to take. Click on simplify. Setting derivatives equal to zero and using the solve commands will enable you to find critical numbers.

Example: Type in  $f(x) : = x^2 + 4x + 4$

To graph, click on Window, New 2D Plot. You can then click on Window again and click on Tile Vertically in order to view both the graphing and algebra windows simultaneously.

To graph  $f(x) : = x^2 + x + 4$  highlight it, then click on the graph window and then the graph icon (Plot) at the top of the toolbar. To adjust the window dimensions, click on Set, Plot Range, Minimum/Maximum, then type in dimensions for x and y. There are various icons at the top that allow you to Trace, Zoom in and out, Annotate the graph (write on or label a graph), etc.

Example: Graph  $f(x) : = x^2 + 4x + 4$ ,  $f'(x)$  and  $f''(x)$ . Annotate which graph is which.

When finished with Derive, use File, exit. Print any algebra and/or graph screens before you exit. You can save a Derive session, but it will only save the algebra, not the graphs.