

# Maple Introduction

To enter in math commands, you will want to be in Math mode.

To enter an expression in Maple, type in

$$f :=$$

Example: Type in  $f := x^2 + 5x + 6$  then hit enter. (You may need to use your right arrow key to tab out of the exponent.)

If you highlight the expression  $x^2 + 5x + 6$  in the middle and right click, you will see many different options for what you can do with  $f$ .

Example: You can factor  $f$  by highlighting just  $x^2 + 5x + 6$  then right click and select Factor.

Example: Solve  $f = 0$ , by highlighting just the rule for  $f$ , right click and use Solve. If the function has an algebraic solution, then you can click on Solve. Otherwise you can click on Numerically Solve, and get an approximation for the solution.

Example: Evaluate  $f$  at  $x = 2$  by first highlighting the rule only of  $f$  then right clicking on Evaluate at a Point and typing in 2 for  $x$ . Another option is to type in  $\text{subs}(x = 2, f)$ .

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

Example: Find  $\lim_{x \rightarrow 2^+} f(x)$  by using the  $\lim_{x \rightarrow a} f$  button on the left-side. Enter in 2^+ for a, then hit enter.

Example: Type in  $f1 := \frac{d}{dx} f$  using the derivative button on the left-side. If you highlight the answer, then you can right click and select Simplify to simplify the answer. Type in  $f2 := \frac{d}{dx} f1$  to find the second derivative.

Example: To find critical points, you can type in  $\text{fsolve}(f1 = 0, x)$  to solve where the first derivative equals zero. You may need to narrow down the interval where the solution lies by including an interval where the solution lies between - for example,  $\text{fsolve}(f1 = 0, x = 2..5)$ .

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

To graph, highlight and right click and select Plots -> 2-D Plot. If you click on the graph and press the icon with the red circle and arrow, then you can zoom in and out of the graph. Another option for plotting is to type  $\text{plot}(f, x = a..b)$  or  $\text{plot}(f, x = a..b, y = a..b)$  to specify the domain and range you want.

Example: Type in  $g := \frac{d}{dx} f$ . (Make sure you are in Math mode.) To graph  $f$  and its derivative together, type in  $\text{plot}([f, g], x = -5..5, \text{color}=[\text{red}, \text{blue}])$

Example: Find  $f''(x)$ . Graph  $f$ ,  $f'$  and  $f''$  together.

If you decide to save a Maple session, you may need to press the !!! icon to reexecute your commands again.

If you are ever unsure of a command, you can enter in ?command to get help.