

# Introduction to Maple<sup>1</sup>

Maple is a computer algebra system. It can do essentially everything a graphing calculator can do as well as much more. Additionally, computers have much more processing power than calculators, so Maple is much faster than a calculator when performing difficult computations. Today, you will discover how maple can be useful for arithmetic, algebra, calculus, and graphing.

## Arithmetic

1. Type `2+3; [RETURN]` to add 2 and 3. Try other numbers (including more than just two numbers). Also try subtraction (`-`), multiplication (`*`), and exponentiation (`^`).
2. Type `2/3; [RETURN]` to divide 2 by 3. What happens? Type `evalf(%); [RETURN]`. What is the output now? What does the `%` symbol do?
3. The Maple procedure for square root is `sqrt`. Try to get Maple to produce a decimal approximation of  $\sqrt{5}$ .

## Algebra

1. Type `(a+b)^5; [RETURN]`. What happens? Type `expand(%); [RETURN]`. What is the output now?
2. Type `a:=1;b:=2; [RETURN]` and then type `(a+b)^5; [RETURN]`. What happens now?
3. Type `solve(x^2+2x+1=0,x); [RETURN]`. Try solving other equations this way. Try using the `factor` procedure to factor  $x^2 + 2x + 1$  and other polynomials.

## Calculus

1. Type `diff(x*sin(x),x); [RETURN]` to differentiate the function  $x \sin x$ . Try differentiating other functions.
2. Type `int(sec(x),x); [RETURN]` to compute the antiderivative of  $\sec x$ . Try integrating other functions. Try computing definite integrals by replacing the `x` argument with an expression of the form `x=-1..1` (e.g. to integrate from  $-1$  to  $1$ ).

## Graphing

1. Choose your favorite function of  $x$ . Graph it by typing `plot(f(x),x); [RETURN]` (where you replace  $f(x)$  by your function). Try assigning a range to  $x$  like you did when computing a definite integral. What happens?

When you are done with these exercises, try working through the longer tutorials found at [http://math.rutgers.edu/courses/251/maple\\_new/maple0.html](http://math.rutgers.edu/courses/251/maple_new/maple0.html).

---

<sup>1</sup>This document created by Nathan Fox for Sections 16, 17, and 18 of Math 251 in Spring Semester 2014