Math 163, Fall 2001 **Due Date:____________** **Name(s): ________________________**

# Project 0.1: Arithmetic and Simple Algebra using Maple

Objective

The objective of this project is to acquaint you with some of the arithmetic and algebraic capabilities of Maple. Since Maple can be run on different types of computers and under different operating systems (such as Macintosh, Windows, and UNIX), and since the choice of operating system used for this and future projects is yours, we make minimal platform-specific comments. Questions regarding specific platforms — including how to get Maple up and running, how to save, edit, and print — are left to you to resolve.

Narrative

Maple combines the features of a computer algebra system with those of graphing software in one package. In this project you will learn about some of Maple's basic algebraic features; in the next project you will learn about some of its graphing features. To complete this project you must be able to get Maple up and running, edit, and print.

Task

After having gotten Maple up and running, type the command lines in the left-hand column below into Maple in the order in which they are listed. The effect of each command is described in the right-hand column for your reference; *do not* type what is written in the right-hand column into Maple! If your output does not agree with what is written in the right-hand column, then you have probably made a mistake; in this case, check what you have written ... you must go back and correct your mistake before going on. A message such as "`Error ...`" also means that you have made a mistake; it, too, must be corrected before going on! Your lab report will be a hard copy of your typed input and Maple's responses. (A summary of the commands used in this project is available on the Department's web site.)

`> # Your name, today´s date`	This is a comment. Comments clarify what you do but they do not affect computation. Comments always begin with a "#". Enter your name and today's date here. See Comment 2 at the end of this project.
`> # Project 0.1:  Arithmetic and Simple Algebra Using Maple`	
`> restart;`	Clear Maple's memory.
`> 6+7;`	Add 6 and 7.
`> 6+7:`	Maple performs the addition, but the colon suppresses any output.
`> 9-3;`	Subtract 3 from 9.
`> 4*3;`	Multiply 4 by 3.
`> 24/2;`	Divide 24 by 2.
`> 1/2+1/3;`	Add 1/2 and 1/3.
`> evalf(%);`	Express the previous value as a decimal.
`> Digits := 20;`	Henceforth express decimals to 20 places.
`> evalf(%%%);`	Express the third-last value as a floating point number.
`> 1/(2+1/3);`	Note that this *isn't* $1/2+1/3$! The moral: watch your parentheses!
`> Pi;`	Write π.
`> evalf(Pi);`	Write π as a decimal to 20 places.
`> x := 5;`	Let x be 5.

`> x^3;`	Find x^3.
`> x^(1/2);`	Find $x^{1/2}$.
`> evalf(x^(1/2));`	Find (or evaluate) $x^{1/2}$ as a floating point number.
`> x := ´x´;`	Reestablish x as a variable.
`> x^2;`	Find x^2.
`> 17!;`	Find 17!.
`> p := (x-4)*(3*x+2);`	Let $p = (x-4)(3x+2)$.
`> expand(p);`	Expand p.
`> factor(p);`	Factor $p = 3x^2 - 10x - 8$.
`> solve(p=0,x);`	Solve $p = 3x^2 - 10x - 8 = 0$ for x *exactly.*
`> fsolve(p=0,x);`	Solve $p = 3x^2 - 10x - 8 = 0$ for x *numerically.*
`> subs(x=5,p);`	Substitute 5 for x in p.
`> subs(x=x+h,p);`	Substitute $x + h$ for x in p.
`> expand(%);`	Note that if we replace $x + h$ by x in $3x^2 - 10x - 8$, we *don't* get $3x^2 - 10x - 8 + 3h^2 - 10h - 8$.
`> expand((x+2)^8);`	Expand the expression $(x+2)^8$.
`> eqns := {x-y-z=0,6*x+4*z=12,3*y-4*z=-3};`	Let `eqns` denote the system of equations $x - y - z = 0, 6x + 4z = 12, 3y - 4z = -3$.
`> sols := solve(eqns);`	Solve the system `eqns` for x, y, and z.

Comments

1. As you work through the projects in this and subsequent courses, think about what you're doing: think about what you're typing, why you're typing it, and what you are — or should be — getting as output. Errors often arise from simple typographical mistakes, and one of the best indicators that you've made a typographical mistake is output that is not what it should be.
2. It is wise, for many reasons, to document your code with your name, the date of your work, the project number and project title. You will, in fact, be asked to do this throughout MATH 163, 164, and 261.