

Lab I: Introduction to Maple

Try the following commands in *Maple* and then answer the questions that follow.

Name: _____

Date: _____

Symbolic Expressions and Numerical Evaluation

- a) $1/4+1/6$;
- b) `evalf(1/4+1/6);`
- c) `evalf(1/4+1/6,50);`
- d) `pi;`
- e) `Pi;`
- f) `evalf(pi,10);`
- g) `evalf(Pi,10);`
- h) `cos(Pi/2);`
- i) `cos(evalf(Pi/2));`
- j) `sin(arcsin(2^(1/2)/2));`
- k) `arcsin(sin(Pi/4));`
- l) `arcsin(sin(5*Pi/6));`

Graphing Symbolic Expressions

- m) `plot(arcsin(x));`
- n) `plot(arcsin(x),x = -1..0)`
- o) `plot(arcsin(x),x = -1..0, y = -2..2)`
- p) `f1:=x -> x^3-x^2-9*x+9;`
`f2:=x -> f1(x)+1;`
`plot([f1(x),f2(x)], x = -4..4);`
`plot([f1(x),f2(x)], x = 0.4..0.6, y = 4..7, color = [magenta, turquoise]);`
- q) `?plot`
- r) `p1:=plot([f1(x),f2(x)],x=-4..4,y=-30..20,color=[magenta,turquoise]);`
`p2:=plot(10*sin(x),x=-4..4,y=-30..20,color=green);`
`plots[display](p1,p2);`
- s) `plots[interactive](sin(x));`

Calculus Operations on Symbolic Expressions

- t) `limit(sin(x)/x, x = 0);`
- u) `f:=x -> sin(x);`
`limit(f(x), x=0);`
`diff(f(x), x);`
`diff(f(x), x$3);`
`subs(x=Pi, diff (f(x), x$3));`
- v) `g:=x -> 1/(1+4x^2);`
`int(g(x), x);`
`int(g(x), x = -Pi/2..Pi);`
`evalf(%);`

Questions:

2. What is the difference between pi and Pi?
3. Why is the answer to question (i) not zero?
4. Why is the answer to question (l) not $5\pi/6$?
5. What happens if you do `v=1; v+2; ,` as opposed to `v:=1; v+2; ?`
6. From the plot help menu, find one other interesting color that maple can use in plots.
7. Compute the following derivatives. When working with the exponential function, use `exp(_)`.
 $\frac{dg}{dx}(1)$ for $g(x) = \frac{x^2-3}{x^3+2}$, and
 $\frac{d^2g}{dx^2}(0)$ for $g(x) = e^{x^2} \cos(x^2 + 1)$. (You may want to use the `simplify` command on your answer).
8. Evaluate the following integrals.
 $\int_0^3 x^4 e^{3x} dx$ and
 $\int_{-1}^1 x^2 \sin(4x) dx$.
9. What does the ditto operator, `%`, do?