

Phys 3010 Mathematical Physics

Assignment 1

This assignment is an introduction to Maple, to help you familiarize yourself with its operation. Using Maple find the answers to the following (straightforward) math questions. You can email me your worksheet if you like, but please suppress output of graphs and animations (terminate line with a colon (:)).

Many of the needed functions are contained in the panels to the left of the screen. Some that are not

- evalf – to get numbers from complicated expressions
- evalc - for performing operations using complex numbers
- plot – for syntax to draw 2D (y vs x) graphs
- solve – to find roots of an equation, or to solve simultaneous equations
- dsolve – for solving differential equations

1. Find the numerical value of $\int_0^{\pi/4} \sin \phi e^{\tan \phi} d\phi$

2. Find the value of $\sum_{n=1}^{1000} \frac{n^2}{4+n}$

3. Make a plot of $y = \frac{4 + \sin x e^x}{1 + \tan x}$ from $x=0$ to $x=\pi/2$

4. If $y = \frac{x + x^3}{1 + x^5}$ then

- Use Maple to find the slope dy/dx
- Solve for the value of x when the slope is zero (Note: there are multiple complex roots of this equation, but only one real root. It might also help to make a plot of y within the range $0 < x < 4$)
- Find the maximum value of y