

Mathematics 1101Y – Calculus I: Functions and calculus of one variable

TRENT UNIVERSITY, 2011–2012

Assignment #4

Definite integrals with Maple

Due on Thursday, 2 February, 2012.

For this assignment, look up Maple's basic integration command, `int`, as well as the commands for evaluating an expression as a decimal, `evalf`, and for solving an equation numerically, `fsolve` (which works pretty much like `solve` otherwise).

The latter part of this assignment is concerned with the function $f(x) = e^{-x^2}$, which does not have a nice antiderivative. However, we will start with things you can do by hand for a warmup.

1. Compute $\int_0^1 x^2 dx$ both by hand and using Maple. [2]
2. Find the value of t such that $\int_0^t x^2 dx = 9$ both by hand and using Maple. [2]
3. Use Maple to find $\int_0^\pi x^2 dx$ to 10 decimal places. [1]
4. Compute $\int_{-\infty}^\infty e^{-x^2} dx$ using Maple. [2]
5. Use Maple to find $\int_0^\pi e^{-x^2} dx$ to 10 decimal places. [1]
6. Find the value of t such that $\int_{-t}^t e^{-x^2} dx = \frac{1}{2} \int_{-\infty}^\infty e^{-x^2} dx$, also to 10 decimal places, using Maple. [2] [2]

Note: In the “Classic” mode, Maple use `Pi` and `infinity` to name π and ∞ , respectively.