

**Quantitative Macroeconomic Theory**  
Problem set 2

*You can do this homework in Excel(tm). If you want to do it in Matlab(tm) or another programming language come and see me if you need help getting started with equivalent subroutines.*

For those of you doing this homework in Excel, this website calculates nodes and weights for various types of Gaussian quadrature. Just choose the appropriate class of Gaussian quadrature and number of nodes. The table with the nodes and weight can easily be cut and pasted into Excel.

1. Evaluate the integral

$$\int_2^5 e^x dx$$

using Gaussian quadrature (which one?) with 5, 11 and 22 nodes. Evaluate accuracy in each case.

2. Evaluate the expectation of  $e^x$  with  $x \sim N(4, 2)$  using Gaussian-Legendre and Gaussian-Hermite quadrature with 5, 11 and 22 nodes. Evaluate accuracy in each case noticing that the exact value of  $\mathbb{E}(e^x) = e^6$ . (Refresher: In the general case, if  $x \sim N(\mu, \sigma)$  it is  $\mathbb{E}(e^x) = e^{\mu + \frac{\sigma^2}{2}}$ .)