CS2201 Worksheet 08

Work out the problems on your laptop/phone (there are several nice python interpreters that work on Android - I prefer qpython - but you may find some other app more to your taste. If you do not have access to any of these, write out our answers - scan them and upload (but this should be the absolute last resort!).

You will find link to the relevant videos and lecture slides on welearn.

Q 1) Write a program that calculates and plots the function

$$f(x) = x^2 e^{-x^2}$$

and its first derivative calculated using the forward difference formula on the same graph.

Q 2) Repeat the last problem, but this time use the central difference formula.

Q 3) Write a program to investigate the way the error in the central difference method changes with changing step size h.

Q 4) Write a program that will calculate the derivative using the five-point formula (see the video and/or the lecture slide)

Q 5) Write a program that will calculate the second derivative of a given function using the approximation

$$f''(x) \approx \frac{f(x+h) - 2f(x) + f(x-h)}{h^2}$$