PHAS1245: Mathematical Methods I - Problem Sheet 9

(Solutions to be handed in at the lecture on Tuesday 11th December 2007)

Staple your answer sheets together and put **your name** and your **tutor's name** on your script (or Dr. Konstantinidis, if you have no tutor in the P&A department).

1. (a) Sum the even numbers between 1000 and 2000 (including 1000 and 2000).

   (b) If you invest £ 1000 on the first day of each year and interest is paid at 5% on your balance at the end of each year how much money do you have after 25 years?

2. Assuming that the sum of the squares of natural numbers $S_N = \sum_{n=1}^{N} n^2$ can be written as $S_N = aN^3 + bN^2 + cN$, determine the constants a, b, c.

   (Hint: Start by writing S_{N+1} in two different ways.)

3. Obtain the Maclaurin series for the following functions:

$$\ln(1 + x) \qquad \ln\left(\frac{1 + x}{1 - x}\right).$$