## Quiz 13

Time:10min

Choose *one* of the following two sets of problems:

## Set 1.

- 1. Show that the power series representation for  $\frac{1}{1+x}$  is given by  $1-x+x^2-x^3+x^4\ldots$ , by recalling the summation formula for the geometric series.
- **2.** Use the above problem and a term by term integration to find a power series for ln(1+x).
- **3.** Use the previous problem to find the sum of the alternating harmonic series.

## Set 2.

- **1.** Use problem 1 in the first set above to find a power series representation for  $\frac{1}{1+x^2}$ .
- **2.** Use the previous problem and a term by term integration to find a power series for  $\tan^{-1} x$ .
- **3.** Use the previous problem to obtain a series which converges to  $\pi$ .

Each set is worth a total of 10 points.