MTH4101   **Calculus II, Spring 2013**

Problem sheet for Tutorial 6   **Rainer Klages**

- The questions are designed to help you with material covered in Week 6/8. You will get help with them in the tutorial on 28 February or 1 March.

- You should write up your solution to the starred question (*) clearly and hand it in to your personal tutor in your assigned tutorial on 7 or 8 March for feedback. *Remember to put your full name and student number on the top of your solution.* Your marked solution to the feedback question will be returned to you in your tutorial on 14 or 15 March.

- It is important that you try to do all of the questions.

1: Use the ratio test to determine whether the following series converge or diverge:

$$\text{(a)} \quad \sum_{n=1}^{\infty} \frac{n^{\sqrt{2}}}{2^n}, \quad \text{(b)} \quad \sum_{n=1}^{\infty} \frac{1 \cdot 3 \cdot \dots \cdot (2n-1)}{4^n 2^n n!} \ .$$

2: Find the values of x for which the following series converge absolutely, specifying both the radius and interval of convergence:

$$\text{(a)} \quad \sum_{n=0}^{\infty} \frac{(x-2)^n}{10^n}, \quad (*)\text{(b)} \quad \sum_{n=1}^{\infty} \frac{x^n}{n\sqrt{n}3^n} \ .$$

3: Find the Maclaurin series generated by the function $f(x) = \ln(1+x)$.

4: Find the Taylor polynomials $P_1(x)$ and $P_2(x)$ of order 1 and 2 respectively for the function $f(x) = \ln(\cos x)$ at $x = 0$. [2012 exam question]