21 Mar, 2014
MATH 1005D
Total marks: 22

TEST 4

1. Consider the series

$$\sum_{n=3}^{\infty} \frac{(\ln n)^3}{n}$$

Show that the series converges or diverges by the specified method [6 marks].

(a) Use the Integral test.

(b) Use the Comparison test.

2. Use the Ratio test or Root test, as specified, to determine if the following series converge (absolutely or conditionally) or diverge? Show **ALL** your work [7 marks].

   (a) (use Ratio test)

$$\sum_{n=1}^{\infty} \frac{(-3)^n}{2n!}$$

   (b) (use Root test)

$$\sum_{n=0}^{\infty} \frac{(-1)^n n^{2n}}{2^n (n^2+1)^n}$$

3. Do the following series converge (absolutely or conditionally) or diverge? Show **ALL** your work, including comments [6 marks].

   (a)

$$\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n\sqrt{n}}$$

   (b)

$$\sum_{n=0}^{\infty} \frac{(-1)^{n}\sqrt{n^2+1}}{n+1}$$

4. Find the sum of the series [3 marks]

$$\sum_{n=0}^{\infty} \frac{(-2)3^n}{4(-5)^{n-1}}$$