Test 3 Calculus II 3450:222 April 14, 2006 Show all of your work.

1. For each of the following series, determine whether they *converge absolutely*, *converge conditionally*, or *diverge*. You must state which test(s) you are using, and show that you have checked all appropriate conditions.

(a)
$$\sum_{n=1}^{\infty} \frac{5 - 2n + 6n^2}{\sqrt{5n^8 + n^6 + 7}}$$

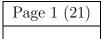
7 points

(b)
$$\sum_{n=2}^{\infty} \frac{(-1)^n}{n^2 \ln n}$$

7 poin	ts
--------	----

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

7	points	



(d)
$$\sum_{n=2}^{\infty} \frac{1}{n \ln n}$$

7 points

(e)
$$\sum_{n=1}^{\infty} \left(\frac{1-3n}{5n+1}\right)^n$$

7 points

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

7 points

(g)
$$\sum_{n=1}^{\infty} (-1)^n \frac{n}{2n + (0.5)^n}$$

7 points

Page 2 (28)

2. Use a geometric series to write 2.74 74 74 $\,\cdots\,$ as a rational number.

3. Find the *centre*, radius of convergence and interval of convergence for the power series $\sum_{n=0}^{\infty} \frac{(3-2x)^n}{4^n+1}.$

11 points

10 points

4. (a) Write the Maclaurin series for $\cos x$.

5 points

(b) Use your series above to write a simplified power series for $\cos \sqrt{x}$.



(c) Use your power series to write $\int_0^1 \cos \sqrt{x} \, dx$ as a series.

 $5~{\rm points}$

5. Suppose that
$$f(x) = \sum_{n=0}^{\infty} \frac{2 - \sin^2 n!}{4^n} (x - 2)^n$$
.
Find $f(2), f'(2)$ and $f^{(13)}(2)$.

 $5~{\rm points}$

6. Find the first 3 non-zero terms of the Maclaurin expansion for $g(x) = \ln(1+x) + e^x$.

10 points

Page 4 (20)