NAME_____ 10 November 2008

MATH 224-001 — TEST III

PLEASE READ THESE INSTRUCTIONS:

Problems have varying point values, which are specified next to each problem number. Move quickly through the test, but try to be as accurate as you can. Do as many problems as you like; points over 100 will count as extra credit.

If you want credit for an answer, *you* **must** *explain what you are doing – this means:* **define your terms** *and* **explain each step** *in your work;* **name** *the tests/theorems/rules you are using as you use them; and* **check any hypotheses** *these tests/theorems/rules might require.*

You may use a graphing calculator, but **not** a calculator (such as the *TI-89* or the *TI-Nspire*) capable of symbolic manipulation. You may not use your book or notes.

PLEASE TURN OFF YOUR CELL PHONE.

[Please do not write in the boxes below:]

1 :	/10
2 :	/15
3 :	/15
4 :	/10
5 :	/30
6 :	/15
7 :	/30
Σ :	

[10] **1** Is the sequence $\left\{\dfrac{\cos^2 n}{2^n}\right\}$ convergent or divergent? Why? If convergent, what does it converge to?

[15] **2** Is the series $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$ absolutely convergent, conditionally convergent, or divergent? Why?

[15] **3** Is the series $\displaystyle\sum_{n=3}^{\infty} \frac{n+2}{(n+1)^3}$ absolutely convergent, conditionally convergent, or divergent? Why?

[10] **4** Is the series $\displaystyle\sum_{n=2}^{\infty} (-1)^n \frac{n}{\ln n}$ absolutely convergent, conditionally convergent, or divergent? Why?

[30] **5** Find the Maclaurin series for the function $f(x) = \ln(1 + x)$. Find also its radius of convergence.

[15] **6** Is the series $\displaystyle\sum_{n=1}^{\infty} \left(\frac{n^2 + 1}{2n^2 + 1} \right)^n$ absolutely convergent, conditionally convergent, or divergent? Why?

[30] **7** Find the interval of convergence of the power series $\displaystyle\sum_{n=1}^{\infty} \frac{2^n(x-3)^n}{\sqrt{n+3}}$.