MAC 2312H (202) ∘ Honors Calculus II ∘ Spring 2014

EXAM 3

(SAMPLE)

NAME(print) _____

UCF PID _____

* **Show all your work** on the test itself. Correct answers with little or no supporting work will not be given credit.

* You are allowed a **hand written**, **half** of **8.5 in** × **11 in**, **one-sided** sheet of notes. Books, calculators or other aids are not allowed.

* Write legibly. **Circle** your final answer to each problem.

# 1	# 2	# 3	# 4	# 5	TOTAL
20	20	10	8	12	70

1. Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

(1) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{\sqrt[4]{n}}$

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

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

(4) $\displaystyle\sum_{n=1}^{\infty}(-1)^{n}\,\frac{\arctan n}{n^3}$

2. Determine whether the series converges or diverges. Specify what TEST is used.

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

(2) $\displaystyle\sum_{n=1}^{\infty} \frac{|\cos n|}{1+(1.2)^n}$

(3) $\displaystyle\sum_{n=1}^{\infty} \ln\left(\frac{n}{2n+1}\right)$

(4) $\displaystyle\sum_{n=1}^{\infty} \frac{n^{2n}}{(1+2n^2)^n}$

3. Find the sum of the series.

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

(2) $\displaystyle\sum_{n=1}^{\infty} \big[\arctan(n+1) - \arctan n\big]$

4. For what values of x does the series $\sum_{n=1}^{\infty}(\ln x)^n$ converge.

5. Find the limit of the **sequence**.

(1) $a_n = \dfrac{n \sin n}{n^2 + 1}$

(2) $a_n = \dfrac{n^n}{(2n)!}$ (Hint : consider the series $\displaystyle\sum_{n=1}^{\infty} a_n$)

ANSWERS:

1. (1) conditionally convergent (2) conditionally convergent
   (3) absolutely convergent (4) absolutely convergent

2. (1) divergent (2) convergent
   (3) divergent (4) convergent

3. (1) $\dfrac{1}{11}$ (2) $\dfrac{\pi}{4}$

4. $e^{-1} < x < e$

5. (1) 0 (2) 0