American University of Beirut MATH 201 Calculus and Analytic Geometry III

Fall 2005-2006

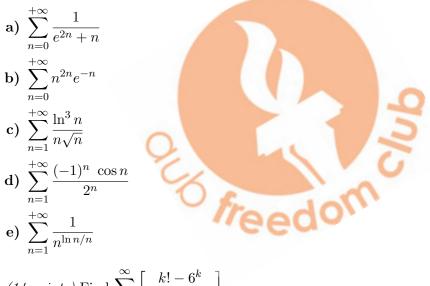
quiz # 1

Name:

ID #:

1. (12 points, 6 points each) Find each of the following limits:

- a) $\lim_{n \to +\infty} \frac{n^{2/n} \sin^2 n}{\sqrt{n} + 10}$ b) $\lim_{n \to +\infty} \frac{(n+1)^{n+1}}{(2n+1)n^n}$
- 2. (40 points, 8 points each) Determine if the following series converges or diverges. Justify your answers



- **3.** (14 points) Find $\sum_{k=1}^{\infty} \left[\frac{k! 6^k}{3^k \cdot (k-1)!} \right]$
- 4. a) (15 points) Find the interval of convergence of the power series $\sum_{n=2}^{+\infty} \frac{(2x-1)^n}{4^n \ln n}$ (be sure to check convergence at the endpoints)
 - **b)** (3 points) For what value(s) of x for which the series converges (i) absolutely? (ii) conditionally?

5. Let
$$f(x) = xe^{-x^2}$$
.

- **a)** (5 points) Find the Maclaurin series expansion of f.
- **b)** (5 points) How accurate is the approximation $f(x) = x x^3$ on the interval [0, 0.1]?
- c) (6 points) Find f⁽ⁿ⁾(0).
 (hint: you may notice that f is odd !)