

Name: _____

1. (30 pts.) Determine whether the following series converge:

(a) $\sum_{k=2}^{\infty} \frac{1}{k^{3/2} \log(k)}$ (b) $\sum_{k=1}^{\infty} \frac{(2k)!}{(k!)^2}$ (c) $\sum_{k=1}^{\infty} \left(\frac{k+1}{k}\right)^{k^2}$

2. (20 pts.) Find the interval of convergence of

$$\sum_{k=1}^{\infty} \frac{\cos(\pi k)}{\sqrt{k}} (2x + 1)^k$$

3. (30 pts.) Find the second order Taylor approximation for $\log(2 + x/2)$ at -2 . Estimate the absolute error on $[-3, -1]$.
4. (20 pts.) Find the first four nontrivial terms of the Maclaurin series for the following functions:

(a) $f(x) = \frac{x^8}{(2+x)^2}$ (b) $f(x) = x^5(x+1)e^{x^2}$

Extra credit (5 pts.): What would they be for e^{x^2+1} ?

1	2	3	4	5	total (100)