

Calculus II, Exam IV, Spring 2009

Name: _____

Student signature: _____

Show all your work and give reasons for your answers. Good luck!

- (1) (10 points) Test the following series for convergence. Your answer should be either: absolutely convergent, conditionally convergent or divergent. $\sum_{n=0}^{\infty} \frac{(-1)^n n^2}{3n^4 - 2n^2 + 1}$

- (2) (15 points) Find the interval and radius of convergence for $\sum_{n=1}^{\infty} \sqrt{n} x^n$.

(3) (15 points) Find the interval and radius of convergence for $\sum_{n=1}^{\infty} \frac{x^n}{5^n n^5}$.

(4) (15 points) Find the MacLaurin series and state the interval of convergence for $\frac{x^2}{2+x}$

- (5) (23 points) Find the MacLaurin series and state the interval of convergence for $f(x) = e^{-(x^2)}$. Use this series to estimate the value of $f(1/10)$ with an error less than 10^{-8} . **(You do not need to compute and add the terms in the series!)**

- (6) (22 points) Use the MacLaurin series to estimate $\int_0^{(1/10)} e^{-(x^2)} dx$ with an error less than 10^{-8} . (**You do not need to compute and add the terms in the series!**)