Math 1620 Calculus II Your Name:________________________

Corning Community College

Instructor: Jay Hurlburt

Exam 4 (Sec 9.1-9.6)

Directions: Please show all your work neatly and clearly. You will not receive full credit unless you show all work. Each problem is worth 5 points.

PART I Competency Based Questions

Competency Completed?

1. Determine the convergence or divergence of the **sequence** with the given *n*th term. Show your work!

a. $a_n = \frac{2n^2 + 3}{n^2}$

b. $a_n = \frac{5n^3}{4n^2 + 1}$

2. Determine the convergence or divergence of the series. **State which test you are using.**

a. $\sum_{n=0}^{\infty} \frac{2n+1}{3n+2}$

b. $\sum_{n=0}^{\infty} \frac{3^n}{n!}$

c. $1 + \frac{1}{2\sqrt{2}} + \frac{1}{3\sqrt{3}} + \frac{1}{4\sqrt{4}} + \frac{1}{5\sqrt{5}} + \cdots$

d. $\sum_{n=1}^{\infty} \frac{2n+1}{(n+1)^2}$

e. $\sum_{n=0}^{\infty} \frac{1}{2^n + 3}$

f. $\sum_{n=1}^{\infty} \left(\frac{3n+1}{2n-1} \right)^n$

3. Determine whether the series converges absolutely or conditionally, or diverges. **(State which test(s) you are using)**

a. $\sum_{n=0}^{\infty} (-1)^n \frac{1}{2n^2+1}$

b. $\sum_{n=0}^{\infty} \frac{(-1)^n}{\sqrt{n-4}}$

PART II Other Questions – Answer any **two**:

1. Use the **integral test** to determine the convergence or divergence of $\sum_{n=1}^{\infty} \frac{n}{n^2+1}$. Be sure to check the hypotheses of the theorem!

2. Find the **sum** of the **series.** $\sum_{n=0}^{\infty} \frac{3}{2^n}$

3. Find the **sum** of the **series:** $\sum_{n=1}^{\infty} \frac{3}{n(n+1)}$ **(Use Partial Fractions)**

Note: Problem to skip in Part II: #______

BONUS!! Find the value of b for which $1 + e^b + e^{2b} + e^{3b} + \cdots = 9$