

**Math 166: Honors Calculus II**

Name: \_\_\_\_\_

**Quiz 9** Apr. 15, 1999

1. Prove the following.

a) If  $a_n > 0$  for all  $n$  and if  $\lim_{n \rightarrow \infty} \frac{a_{n+1}}{a_n} = L < 1$ , then  $\sum_{n=1}^{\infty} a_n$  converges.

b) If  $a_n > 0$  for all  $n$  and if  $\sum_{n=1}^{\infty} a_n$  converges then  $\sum_{n=1}^{\infty} (a_n)^n$  converges.

2. Determine whether the following series converge.

a) 
$$\sum_{n=2}^{\infty} \frac{n-1}{n^{3/2}}$$

b) 
$$\sum_{n=1}^{\infty} \left( \frac{\sqrt{n+1}}{n} \right)^n$$

c) 
$$\sum_{n=1}^{\infty} \frac{(n!)^3}{n^{4n}}$$