Math 182 Honors Quiz 8 Version A

1. Find the following derivatives and limits.

   (i) $\dfrac{d}{dx}|x|^x$

   (ii) $\displaystyle\lim_{x\to 0}\dfrac{xe^x - \sin x}{x^2}$

2. Use the integral test to determine whether $\displaystyle\sum_{n=8}^{\infty}\dfrac{\ln n}{n^2}$ converges.

3. Prove the ratio test:

Let $a_n > 0$ for all n and suppose $\lim\limits_{n \to \infty} \dfrac{a_{n+1}}{a_n} = r$ where $r < 1$.

Then $\sum\limits_{n=1}^{\infty} a_n$ converges.