

Name:

1. (3pts) Is the series

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

convergent or divergent? Justify your answer.

2. (3pts) Use the **Comparison Test** or **Limit Comparison Test** to determine whether the series converges or diverges. Verify your answer.

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

3. (4pts) Determine whether the statement true or false. If false give a counterexample.

(a) (2pts) The series $\sum_{n=1}^{\infty} a_n^2$ is divergent then $\sum_{n=1}^{\infty} a_n^3$ is divergent.

(b) (2pts) The series $\sum_{n=1}^{\infty} a_n$ and $\sum_{n=1}^{\infty} b_n$ are convergent then the series $\sum_{n=1}^{\infty} a_n + b_n$ is convergent.