

## Homework 4 - due Friday, August 4th at 10:00AM

### Series Practice

Make sure to justify your solution for each problem.

1. Prove or disprove: If  $\sum_{n=1}^{\infty} a_n$  is convergent and  $\sum_{n=1}^{\infty} b_n$  is divergent, then  $\sum_{n=1}^{\infty} (a_n + b_n)$  is divergent.

2. Determine whether the series is convergent or divergent.

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

(b)  $\frac{1}{1} + \frac{1}{2\sqrt{2}} + \frac{1}{3\sqrt{3}} + \frac{1}{4\sqrt{4}} + \dots$

3. **Challenge:** Can you find a sequence  $\{a_n\}$  converging to 0 such that the series  $\sum_{n=1}^{\infty} a_n$  diverges?