

Names and Student IDs: _____

Homework 4 Calculus 1

1. Prove that if a_k is a monotonic sequence and $\sum_{k=1}^{\infty} a_k$ converges, then

$$\lim_{k \rightarrow \infty} k a_k = 0.$$

(Hint: You may assume that all $a_k > 0$ or $a_k < 0$ (why?), then use the Cauchy criterion.)

2. Rudin Chapter 3, 6abc.

3. Rudin Chapter 3, 11a.

(Hint: You may assume that $\lim_{n \rightarrow \infty} \frac{a_n}{1+a_n} = 0$ (why?). Show that $a_n \rightarrow 0$. Then compare the series with an appropriate multiple of $\sum a_n$.)

4. Rudin Chapter 3, 14ab.

5. Salas 12.3: 12, 18, 23, 26, 28, 36.