MAT201A Homework 8
Fall 2019

Professor Qinglan Xia

Due Date: Wednesday, November 20th at 9:00am

1. Exercise 5.6 in the book, page 121.

2. Show that if the sequence (x_n) in a normed linear space $(X, ||\cdot||)$ is weakly convergent to $x_0 \in X$, then
$$||x_0|| \leq \liminf_{n\to\infty} ||x_n||.$$

3. Let X be a separable Banach space. Show that there is an isometric embedding from X to $(\ell^\infty, ||\cdot||_\infty)$.

4. Exercise 5.7 in the book, page 122.

5. Exercise 5.11 in the book, page 122.

6. Suppose (x_n) is a weakly convergent sequence in a Banach space X. Show that the (weak) limit of (x_n) is unique.

7. Exercise 5.17 in the book, page 123.