HOMEWORK 10

Due: 20 November 2009 in recitation hour.

From the Book.

Chapter 8

Problem # 48, 55, 70, 76, 81, 84

Not From the Book.

(1) Let \((V, \parallel \cdot \parallel)\) and \((W, \parallel| \cdot \parallel|)\) be two normed spaces.

- Show that \(B(V, W)\) is a normed vector space where

\[
\parallel T \parallel = \inf \{ C : \parallel|T(x)|\parallel| \leq C \parallel x \parallel \text{ for all } x \in V \}
\]

for any \(T \in B(V, W)\).

- Show that

\[
\parallel T \parallel = \sup_{x \neq 0} \frac{\parallel|T(x)|\parallel|}{\parallel x \parallel} = \sup \{ \parallel|T(x)|\parallel : \parallel x \parallel = 1 \}
\]

- Show that \(B(V, W)\) is complete if \(W\) is complete.