Mathematical Economics
Midterm Examination
April 27, 2017

Please, answer the following 3 questions. ***Time allowed****: one hour and 30 minutes.*
PLEASE PLEASE, make an effort to write in a legible and organized fashion.

Question 1. Compact sets. Definition, properties and (fundamental) relation to continuous functions. Show that if $f : M \to N$ is continuous and M is compact, then f is a closed mapping (i.e., it maps closed sets into closed sets).

Question 2. The contraction mapping theorem. Statement, proof, and a sufficient condition.

Question 3. In a normed vector space V, define convex sets, and then prove:

1. that the (algebraic) sum of two convex sets is convex

2. that the intersection of two convex sets is convex

3. that (if $V \subseteq \mathbb{R}^m$) the interior of a convex set is convex