Exam 2

60 points, 75 minutes. Closed books, notes, calculators.
Show your reasoning. **Read all before answering any.**

1. (10 pts) A risk averse consumer satisfies the expected utility hypothesis. She has initial income w, and will suffer a monetary loss $0 < D < w$ with probability $\pi \in (0,1)$. She can buy insurance that costs q dollars for each dollar of coverage.

   Show, without using calculus, that she will demand full insurance if the insurance rate is actuarily fair. (No credit will be given for proofs that use calculus.)

2. (10 pts) Let $f : \mathbb{R}_+^K \to \mathbb{R}_+$ be a concave production function. Show that the associated cost function $c(w,q)$ is convex in q.

3. (20 pts) A consumer of L goods has a locally non-satiated utility function. She has a C^1 Marshallian demand function $x(p,m)$, and all her income-expansion paths are upward-sloping rays.

   (a) (10 pts) Show that her demand function takes the form $x(p,m) = m\hat{x}(p)$.
   (b) (10 pts) Show that $x(p,m)$ satisfies the Law of Reciprocity.

4. (20 pts) Consider a choice structure $\langle \mathfrak{B}, C \rangle$ on a set X, where $\mathfrak{B}$ contains all subsets of X of size three.

   (a) (5 pts) Define the Weak Axiom of Revealed Preference (WARP).
   (b) (5 pts) Define the revealed preference relation $\succeq^*$.
   (c) (10 pts) Show that $\succeq^*$ is transitive if $\langle \mathfrak{B}, C \rangle$ satisfies WARP.