CHAPTER 1: CONSUMER THEORY

Exercise 1

Show that if $\succsim$ is complete and transitive, then:

1. if $\mathbf{x} \succ \mathbf{y} \succsim \mathbf{z}$, then $\mathbf{x} \succ \mathbf{z}$;
2. $\succ$ is both irreflexive ($\mathbf{x} \succ \mathbf{x}$ never holds) and transitive (if $\mathbf{x} \succ \mathbf{y}$ and $\mathbf{y} \succ \mathbf{z}$, then $\mathbf{x} \succ \mathbf{z}$);
3. $\sim$ is reflexive ($\mathbf{x} \sim \mathbf{x}$ for all $\mathbf{x}$), transitive (if $\mathbf{x} \sim \mathbf{y}$ and $\mathbf{y} \sim \mathbf{z}$, then $\mathbf{x} \sim \mathbf{z}$), and symmetric (if $\mathbf{x} \sim \mathbf{y}$, then $\mathbf{y} \sim \mathbf{x}$).

Exercise 2

Prove that strict monotonicity implies local nonsatiation, but not vice versa.

Exercise 3

Assume that there are only two goods in one economy. Draw indifference curves that (a) satisfy and (b) violate each of the following properties:

1. transitivity;
2. strict convexity;
3. convexity;
4. monotonicity.

Exercise 4

Show that if there exists a utility function that represents $\succsim$, then $\succsim$ must be complete and transitive.

Exercise 5

Let $u(x_1,x_2) = kx_1^a x_2^{1-a}$, for $0 < a < 1$. Solve the utility maximization problem and find the Marshallian demand functions.

Exercise 6

Let $u(x_1,x_2) = ax_1 + bx_2$, for a, b > 0. Solve the utility maximization problem and find the Marshallian demand functions.

Exercise 7

Let $u(x_1,x_2) = \min\{ax_1, bx_2\}$, for a, b > 0. Solve the utility maximization problem and find the Marshallian demand functions.

Exercise 8

Let $u(x_1,x_2) = kx_1^a x_2^{1-a}$, for $0 < a < 1$.

a) Solve the expenditure minimization problem and find the Hicksian demand functions.

b) Show that the indirect utility function is the inverse of the expenditure function.

Exercise 9

Let $u(x_1,x_2) = ax_1 + bx_2$, for a, b > 0. Solve the expenditure minimization problem and find the Hicksian demand functions.

Exercise 10

Let $u(x_1,x_2) = \min\{ax_1, bx_2\}$, for a, b > 0. Solve the expenditure minimization problem and find the Hicksian demand functions.