1. Given a two good, two person exchange economy:

   a) Calculate the slope of the market demand curve, in terms of the substitution and income effects for each person. Must the market demand curve be negatively sloped if both goods are normal for both people? Explain.

   b) Under what conditions can multiple equilibria occur?

   c) Compute the equilibria (there are three) for the following exchange economy:

   \[
   U^1(x_1^1, x_2^1) = \left[ (x_1^1)^{3} + (2/5)^4 \cdot (x_2^1)^{3} \right]^{1/3} \quad \omega_1 = (1, 0)
   \]

   \[
   U^2(x_1^2, x_2^2) = \left[ (2/5)^4 \cdot (x_1^2)^{3} + (x_2^2)^{3} \right]^{1/3} \quad \omega_2 = (0, 1)
   \]

2. Answer the following.

   a) “Pareto efficient allocations that are on the boundary of the Edgeworth box cannot be supported as competitive equilibria”. True or false, and why.

   b) Consider a two person, two good exchange economy where people have the following utility functions:

   \[
   u^1 = \ln(x_1^1) + x_2^1; \quad u^2 = 3\ln(x_1^2) + x_2^2
   \]

   Given aggregate endowments \((4, 6)\) find the set of Pareto efficient allocations. Which are supportable as competitive equilibria?

   c) Next, consider a two person, two good exchange economy where people have the following utility functions:

   \[
   u^1 = \min(x_1^1, x_2^1); \quad u^2 = 2\left[ (x_1^2)^{1/2} + (x_2^2)^{1/2} \right]
   \]

   Given aggregate endowments: \((10, 20)\), find the set of Pareto efficient allocations. Which are supportable as competitive equilibria?