Microeconomic Analysis
Professor M.Torras
Fall 2019

Problem Set #1

Instructions
(a) Answer all four questions.
(b) Unless you know how to do them on a computer, make sure to construct neat, scaled graphs using a ruler. I would recommend using graph paper.
(c) Answer each question *completely* and make sure that all your answers are in complete sentences.
(d) Type all text (aside from any appearing on hand-constructed graphs) in a clear, legible font.
(e) Staple together or otherwise securely fasten all pages.
(f) The completed problem set must be <u>handed to me</u> at the beginning of class on September 24th. Sending me the problem set as an email attachment *would result in a one-grade reduction*, as would tardiness or failure to observe the above instructions.

Good luck!

1) Suppose that the demand curve for a product is given by $Q_D = 300 - 2P + 4Y$, where Y is average income measured in thousands of dollars. The supply curve is $Q_S = 3P - 50$.
   a) If $Y = 25$, find the market-clearing price and quantity for the product.
   b) Do the same assuming that $Y = 50$.
   c) Draw a graph to illustrate your answers (all three curves should appear on one graph).
   d) Briefly discuss any observations.

2) The table below shows the retail price and sales for instant coffee and roasted coffee for two years.

Year	Retail Price of Instant Coffee ($/lb.)	Sales of Instant Coffee (million lbs.)	Retail Price of Roasted Coffee ($/lb.)	Sales of Roasted Coffee (million lbs.)
Year 1	10.35	75	4.11	820
Year 2	10.48	70	3.76	850

   a) Using these data alone, estimate the short-run price elasticity of demand for roasted coffee. Derive a linear demand curve for roasted coffee.
   b) Now estimate the short-run price elasticity of demand for instant coffee. Derive a linear demand curve for instant coffee.
   c) Which coffee has the higher short-run elasticity of demand? Explain in some detail why you think this is the case.

3) Connie has a monthly income of $200 that she allocates between two goods: meat and potatoes.

a) Suppose that meat costs $4 per pound and potatoes $2 per pound. Draw her budget constraint.

b) Suppose also that her utility function is given by the equation $U(M, P) = 2M + P$. What combination of meat and potatoes should she buy to maximize her utility? (Hint: Meat and potatoes are perfect substitutes).

c) Connie's supermarket has a special promotion. If she buys 20 pounds of potatoes (at $2 per pound), she gets the next 10 pounds for free. This offer applies only to the first 20 pounds she buys. All potatoes in excess of the first 20 pounds (excluding bonus potatoes) are still $2 per pound. Draw her budget constraint.

d) An outbreak of potato rot raises the price of potatoes to $4 per pound. The supermarket ends its promotion. What does her budget constraint look like now? What combination of meat and potatoes maximizes her utility?

4) Jane receives utility from days spent traveling on vacation domestically (D) and days spent traveling on vacation in a foreign country (F), as given by the utility function $U(D,F) = 10DF$. In addition, the price of a day spent traveling domestically is $100, the price of a day spent traveling in a foreign country is $400, and Jane's annual travel budget is $4000.

a) Illustrate the indifference curve associated with a utility of 800 and the indifference curve associated with a utility of 1200.

b) Graph Jane's budget line on the same graph.

c) Can Jane afford any of the bundles that give her a utility of 800? What about a utility of 1200?

d) Find Jane's utility maximizing choice of days spent traveling domestically and days spent in a foreign country.