

# Problem Set 2

*ECON 306 Spring 2020*

*Due by Thursday, February 20, 2020*

Please write your answers to the following questions on a piece of paper, or download and print a PDF copy (link above) to write on. You may also type your answers and print out a hard copy.

You may work together (and I highly encourage that) but you must turn in your own answers. Your TA, under my supervision, will grade homeworks 70% for completion, and for the remaining 30%, pick one question to grade for accuracy - so it is best that you try every problem, even if you are unsure how to complete it accurately.

## Concepts and Critical Thinking

Please answer the following questions briefly (1-3 sentences). Use examples as necessary. Be sure to label graphs fully, if appropriate.

1. Describe, in your own words, the (i) price effect, (ii) real income effect, and (iii) substitution effect from a price change.
2. Under what conditions can the law of demand be violated (however theoretical)?

3. For each of the following pairs, which of the two goods is more likely to have a *low* price elasticity of demand (less elastic) and why?
- a. Demand for tangerines vs. demand for fruit
  - b. Demand for beef next month vs. demand for beef over the next decade
  - c. Demand for Exxon gasoline at the corner of 7th and Grand vs. demand for gasoline in the entire city
  - d. Demand for insulin vs. demand for vitamins

4. Suppose that, holding prices constant, Alice has preferences over the number of books she purchases, illustrated in the table below.

Income	Books
5	5
10	6
15	20
20	25
25	26
30	10
35	9
40	8
45	7
50	6

Draw a smooth approximation of Alice's Engel curve for books, and indicate the range(s) of income over which books are *normal* and/or *inferior* goods.

## Quantitative Applications

Show all work for calculations. You may lose points, even if correct, for missing work. Be sure to label graphs fully, if appropriate.

5. Steve spends his disposable income on meals at restaurants ( $r$ ) and paperback novels ( $n$ ). His usual restaurant meal costs \$25, and paperback books cost \$8. When Steve's monthly income is \$240, he goes out to eat 8 times and purchases 5 books. When his income rises to \$282, he goes out to eat 10 times and purchases 4 books.
  - a. Calculate the income elasticity for meals at restaurants ( $r$ ). Is this an inferior, necessity, or luxury good?
  - b. Calculate the income elasticity for paperback novels ( $n$ ). Is this an inferior, necessity, or luxury good?

6. Kendra buys eggs ( $e$ ), bagels ( $b$ ), and coffee ( $c$ ) for breakfast for the week.
- a. When eggs are \$2/carton, she buys 5 bagels. When the price of eggs falls to \$1/carton, she buys 4 bagels. Calculate the cross-price elasticity between eggs and bagels. Are they complements or substitutes for Kendra?
  - b. When eggs are \$2/carton, she buys 3 cups of coffee. When the price of eggs falls to \$1/carton, she buys 6 cups of coffee. Calculate the cross-price elasticity between eggs and coffee. Are they complements or substitutes for Kendra?

7. Sketch a graph showing a *decrease* in the price of a good (on the horizontal axis, e.g.  $x$  if you want). Indicate the (real) income effect, substitution effect, and price effect on the graph. Labelling points and describing each effect as a movement between specific points is sufficient.

8. The demand for gym memberships is given by

$$q_D = 500 - 5p$$

- a. Write the inverse demand function.
- b. Calculate the price elasticity of demand at a price of \$80. Is this relatively elastic or relatively inelastic?
- c. What is the total revenue at a price of \$80?
- d. Calculate the price elasticity of demand at a price of \$10. Is this relatively elastic or relatively inelastic?
- e. What is the total revenue at \$10?
- f. At what price is demand unit elastic, i.e.  $\epsilon_D = -1$ ?
- g. What is the total revenue at the price you find in part (f)?