EC 501 Midterm Exam Oct 31, 2016

Answer all questions, showing all your work. Time allowed: 1 hour 30 minutes. Good luck! (Numbers in parentheses indicate the points attached to each question.)

(30) 1. Olivia's utility function is

$$U(x, y) = xy$$

where x, y are the quantities consumed per month of the only two goods she buys.

(a) Find Olivia's demand functions for *x* and *y*. (You do not need to derive them.)
(b) If Olivia's income is \$100 per month and p_x = \$1 and p_y = \$5, how much of each good would she buy per month?
(c) Suppose p_x goes up to \$4. What is her consumption pattern now? How much of the change in the demand for *x* is due to the substitution effect and how much to the income effect?
(d) Define the Compensating Variation (CV) in income. Find the CV for this price change.

(20) 2. Xandra consumes only two goods, *x* and *y*. The table below provides some data for her consumption in years 1 and 2:

Year	p_x	p_y	*x*	*y*
1	2	10	30	4
2	5	5	10	22

(a) In which year is Xandra better off? Explain fully, drawing a diagram to illustrate your answer.
(b) Calculate the Laspeyres and Paasche price indexes for year 2 prices in terms of year 1 prices.

(25) 3. All 12 firms in the (perfectly competitive) widget industry face the following cost function:

$$C(q) = q^2 + 1$$

where *q* is the quantity each produces. The demand for widgets is given by

$$D(p) = 28 - p.$$

(a) Find each firm's short-run supply curve. What will be the short-run price and quantity of widgets?
(b) What would be the long-run price and quantity of widgets? How many firms would operate in the industry in the long run?

(25) 4. The widget market is perfectly competitive. The equilibrium price and quantity in the market are $p = 10$, $Q = 1000$. The elasticities of demand and supply have been estimated to be $\epsilon_d = -0.2, \epsilon_s = 1.8$.

(a) Suppose the government declares a per unit subsidy of \$5 per widget produced, payable to the suppliers. What would now be the equilibrium price of widgets, and what quantity would be produced?
(b) How much would the subsidy program cost the government?
(c) Who gains and who loses from the subsidy and by how much? How much better off or worse off is society as a result? Draw a diagram to illustrate.