

### Practice Midterm Exam

**Instructions.** The actual exam will be in class, closed book, 105 minutes, no communications devices allowed, 50 points total. Solutions to the practice problems will be posted 24 hours before the exam.

**Part I. True, False, or Uncertain? Explain briefly.** 50 word maximum for each question. 5 points each.

- 1) After tickets for a major sporting event are purchased at the official box office price, a market often develops whereby these tickets sell at prices well above the official box office price. This is to be expected when the box office has unsold tickets. T/F/U?
- 2) If the demand curve for comic books is expressed as  $Q = 10,000/p$ , then demand has a unitary elasticity, and a price change will have no effect on consumer expenditures on comic books.
- 3) You pay \$15 for an all-you-can-eat buffet. The food isn't so good, but definitely edible. When you finish eating, the marginal value of the last bite of food you consumed is positive.

**Part II. Problems.** When insufficient information is provided, write down a plausible specific assumption and proceed to the solution. Points will be indicated.

1. Suppose a market is supplied by domestic producers and an international supply. The domestic (inverse) supply curve is given by the  $p=5+2Q$ , and the foreign supply curve is given by  $p=15$ . Draw the total supply curve. On a second graph, draw the total supply curve if the government imposes a quota of 10 on foreign supply.

2. Suppose that the supply and demand of wheat depend on the price of wheat ( $p$ ), the amount of annual rainfall ( $r$ ), and the level of disposable consumer income ( $I$ ). The equations describing the supply and demand curves are given by:

$$Q_S = 20r + 100p$$

$$Q_D = 4000 - 150p + 10I$$

- a. Sketch a graph of the supply and demand curves for wheat and show the effects of an increase in the quantity of rainfall. How does each curve shift (if at all) from the increase in rainfall? Which direction (increase/decrease) does this shift move the equilibrium price  $p^*$  and quantity  $Q^*$ ?
- b. Compute the derivatives of  $p^*$  and  $Q^*$  with respect to  $r$ .
- c. Sketch the supply and demand curves demonstrating the effect of an increase in disposable consumer income -- how does each curve shift (if at all)? What does the shift do to equilibrium price and quantity?
- d. Compute the derivatives of  $p^*$  and  $Q^*$  with respect to  $I$ .

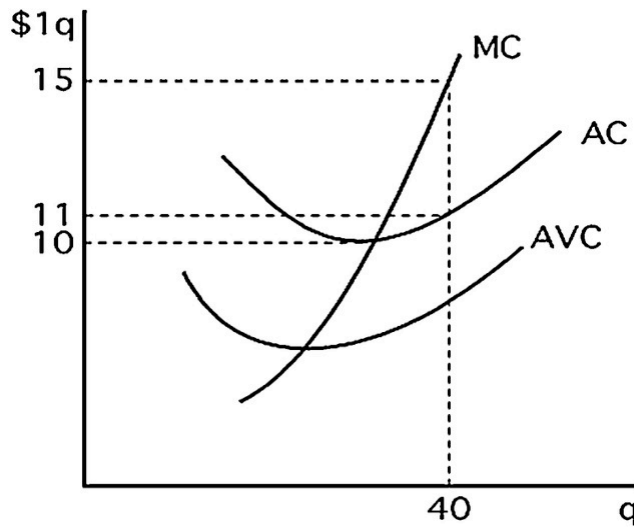
3. Consider Jen, a consumer with preferences  $U(H,F) = F^{1/3}H^{2/3}$ , where  $H$  is the quantity of housing and  $F$  is the quantity of food (per month). Suppose Jen has a stipend of

\$600/month which she uses to purchase food at a price of \$1/unit and housing at a price of \$10/unit.

- Compute Jen's utility-maximizing bundle of goods.
- Suppose that Jen's employer subsidizes housing by paying 50% of her total housing costs, thereby effectively lowering the price Jen pays for housing to \$5/unit. Compute Jen's new optimal consumption bundle.
- How much does Jen's employer pay in total for this subsidy? How much utility does Jen enjoy with this subsidy (compute her utility at the optimal bundle).
- Suppose that her employer simply gave Jen the dollar cost you found in (c) as a lump sum (instead of subsidizing housing). Will Jen gain a higher utility from the housing subsidy or the lump-sum equivalent transfer?  
(approximate) and a utility of 114 (approximately). Jen is better off from getting the lump-sum transfer.

4. Suppose the only goods you consume are apples and peaches. One day the price of apples goes up and the price of peaches goes down, and you find that you can still just afford to buy the same combination of peaches and apples that you were buying all along. The price changes leave you neither better nor worse off.

5. Homer's Donut Shoppe has the production function  $q=10L +20L^2- 5L^3$ . What is the Shoppe's marginal product of labor (MPL)? Average product of labor (APL)? At what point is the APL maximized?



6) The above figure shows the cost curves for a competitive firm. What price (or higher) is required for the firm to earn economic profit? To not shut down? What are the firm's economic profits at  $p=15$ ?