Practice Midterm Exam

Instructions. The actual exam will be in class, closed book, 105 minutes, no communications devices allowed. 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. TFU?E.

A: U or F. Excess demand opens the door to a scalping market with much higher prices, but here there is excess supply at the official price. Possibly scalpers can offer convenience by delivering tickets immediately, but probably that commands at best a small price premium.

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.

A: T. Unit elastic means price elasticity is -1.0, which is true (take log derivative of demand, note that coefficient on ln p is -1) Expenditures are pQ = 10,000 = constant, independent of p.

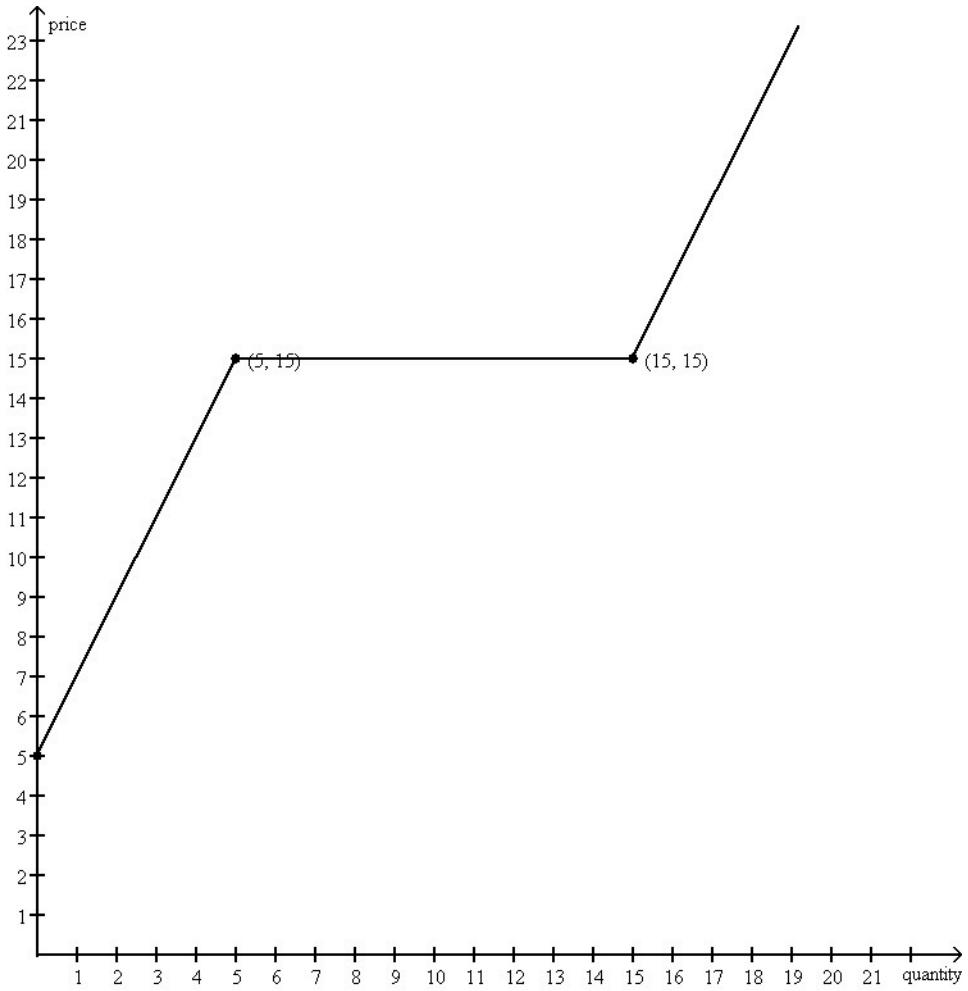
3) You pay $15 for an all-you-can-eat buffet. The food isn't so good, but definitely edible. When you finish eating, the marginal value of the last bite of food you consumed is positive.

A: T. Having sunk the $15, the marginal cost to you of another bite is zero, and as long as the marginal value (including all considerations – taste, digestion, health, etc) is positive you should keep on eating.

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

1. Suppose a market is supplied by domestic producers and 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.

A: With the quota, for $Q>15$ the supply rises with the domestic supply as shown below.



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*?

A: An increase in rainfall will shift the supply curve to the right (increase in supply). A change in rainfall does not change the demand curve (r does not appear in the equation). This will increase the equilibrium quantity and decrease the equilibrium price (moving along the unchanging demand curve).

b. Compute the derivatives of p* and Q* with respect to *r*.
A: $dp^*/dr = (-\partial S/\partial r)/(\partial S/\partial p + |\partial D/\partial p|) = -20/(100+150) = -0.08$.
$dQ^*/dr = (dQ_D/dp^*)(dp^*/dr) = (-150)(-0.08) = -12$.

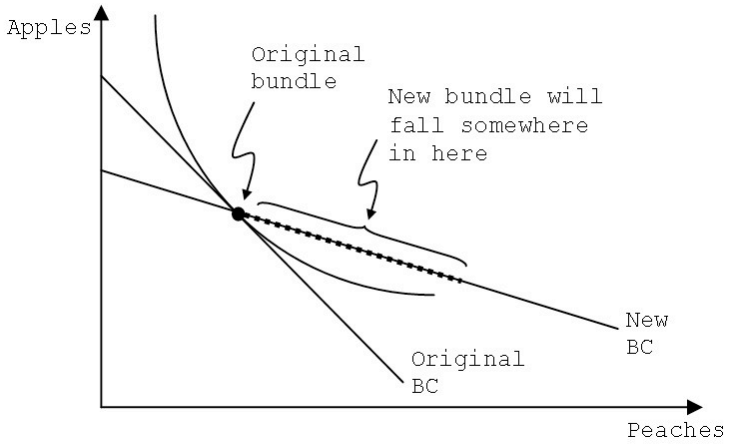
c. Sketch the supply and demand curves demonstrating the effect of an increase in disposable consumer income -- how does each curve shift (if at all)? What does the shift do to equilibrium price and quantity?
A: An increase in *I* will increase the demand for wheat (shift to the right). This increases equilibrium price and increases equilibrium quantity (moving along the supply curve).

d. Compute the derivatives of p* and Q* with respect to *I*.
A: $dp^*/dI = (\partial D/\partial I)/(\partial S/\partial p + |\partial D/\partial p|) = 10/(100+150) = 0.04$.
$dQ^*/dI = (dQ_S/dp^*)(dp^*/dI) = (100)(0.04) = 4$.

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.
a. Compute Jen's utility-maximizing bundle of goods.
b. 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.
c. 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).
d. 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?
A:
a. Jen will consume 40 units of housing and 200 units of food.
b. At a price of $5/unit, Jen will increase housing consumption to 80 and consume 200 units of food as before.
c. The cost to her employer is $5 times 80 = $400. Jen's utility is approximately 109 (utils/month).
d. Jen's optimal bundle when I=1000 is 333 units of food and 67 units of housing (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. T,F or U?

A:



False, it leaves you better off. The relative price change implies that the original bundle is no longer optimal, and improvements can be made by consuming less apples and more peaches.

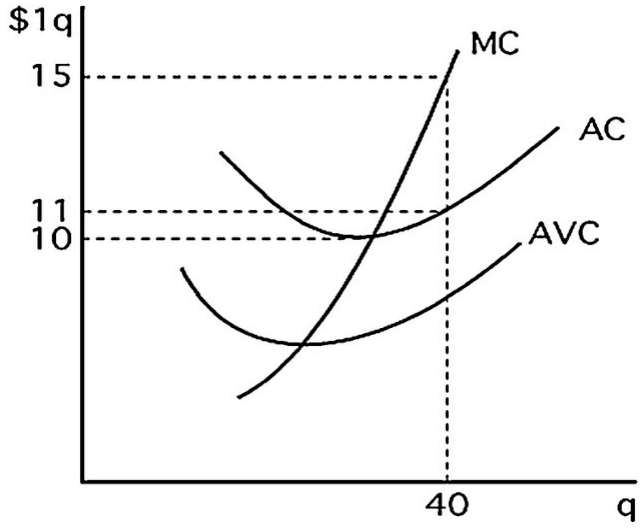
5. Homer's Donut Shoppe has the production function $q=10L+20L^2-5L^3$. What is the Shoppe's marginal product of labor (MPL)? Average product of labor (APL)? At what point is the APL maximized?

A: $MPL = dq/dL = 10 + 40L - 15L^2$

$APL = q/L = 10 + 20L - 5L^2$

APL maximized at $0 = d\,APL/dL = 20 - 10L \rightarrow L = 2$.

Or where APL = MPL, yielding same equation and result.



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?

A: Econ profit above p=11.

Shut down below p= 8 (approx, where AVC intersects MC)

Profit{p=15} = (p-AC)*q = (15-11)* 40 = 160.