Answer key

Economics 308: Intermediate Microeconomics

Department of Economics, Finance and Legal Studies
University of Alabama
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Final

The exam is worth 100 points. Each question (eight questions on eight pages) is of equal value.

1. A Rawlsian welfare function counts only the welfare (utility) of the worst off agent (assume a world with at least 2 individuals). The opposite of the Rawlsian welfare function might be called the "Nietzschean" welfare function – a welfare function that says the value of an allocation depends only on the welfare of the best off agent. What mathematical form would the Nietzschean welfare function take? What kind of allocations represent welfare maxima of the Nietzschean welfare function?

The Nietzschean welfare function only depends on the best off agent. It may look like

$$welfare_N = \max[u_1, u_2]$$

and would be largest if we gave all goods to the individual who received the highest utility

2. Suppose you hire workers to collect and deliver roses to your economics professor's wife. Each worker earns $5 per hour, and can collect and deliver 5 roses per hour. You can add as many workers as you would like without a decrease in productivity since there is an infinite supply of roses. Draw the total cost, average cost and marginal cost curves for your workers.

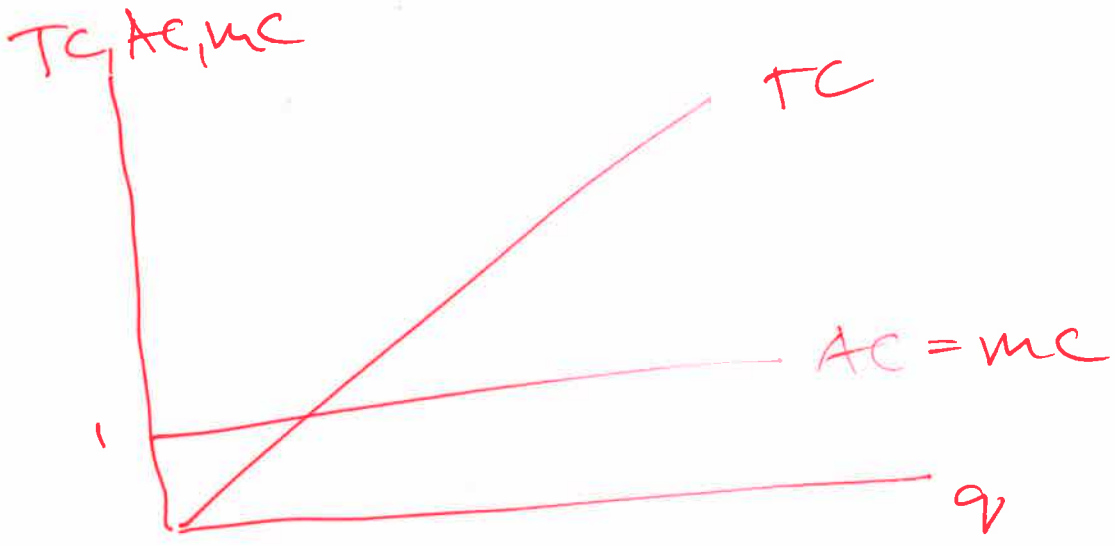
$w = 5$

$q = 5L \Leftrightarrow L = \frac{q}{5}$

$TC = wL = 5L = 5 \cdot \frac{q}{5} = q$

$AC = \frac{TC}{q} = \frac{q}{q} = 1$

$MC = \frac{\partial TC}{\partial q} = 1$



3. Suppose we know the demand curve for widgets is $P = 50 - Q$ and that the marginal cost for widgets is 10.
   (a) State the necessary condition for profit maximization (the one relevant to the information given)? Find Q given this condition.
   (b) State the necessary condition for revenue maximization? Find Q given this condition.

(a) $MR = MC$

$P = 50 - Q$

$MR = 50 - 2Q$

$MC = 10$

$10 = 50 - 2Q$

$Q = 20$

(b) $MR = 0$

$0 = 50 - 2Q$

$Q = 25$

4. True or False (Explain briefly and use an example and/or state assumptions if necessary)? Consider a consumer with utility function u(x,y) = 2x+y. If the price of x is twice the price of y, then the consumer would necessarily consume equal amounts of x and y.

False,

$MU_x = 2$ $\quad P_x = 2P_y$

$MU_y = 1$ $\quad P_y = P_y$

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

$$\frac{2}{2P_y} = \frac{1}{P_y} \quad \checkmark$$

This holds true for any combination of x & y. Given that these goods are substitutes & each give the same benefit per dollar. Any combination of x & y where the consumer spends all of their income will max u.

5. Consider a two good economy. Thinking in terms of elasticities, what will be the change in the quantity demanded of an inferior (but not Giffen) good x if:
   a. the price of x rises?
   b. income rises?
   c. the price of a substitute rises?

(a) $e_{Q,P} < 0$ for any non-Giffen good

(b) $e_{Q,I} < 0$ for an inferior good

(c) in a two good economy, if x is inferior, y cannot be its substitute

6. Consider the following production function: $q = K^{1/3}L^{1/3}+L^{2/3}$. Show whether this production function exhibits increasing, decreasing or constant returns to scale?

$$q(\lambda K, \lambda L) = (\lambda K)^{\frac{1}{3}}(\lambda L)^{\frac{1}{3}} + (\lambda L)^{\frac{2}{3}}$$

$$= \lambda^{\frac{1}{3}} K^{\frac{1}{3}} \lambda^{\frac{1}{3}} L^{\frac{1}{3}} + \lambda^{\frac{2}{3}} L^{\frac{2}{3}}$$

$$= \lambda^{\frac{2}{3}} K^{\frac{1}{3}} L^{\frac{1}{3}} + \lambda^{\frac{2}{3}} L^{\frac{2}{3}}$$

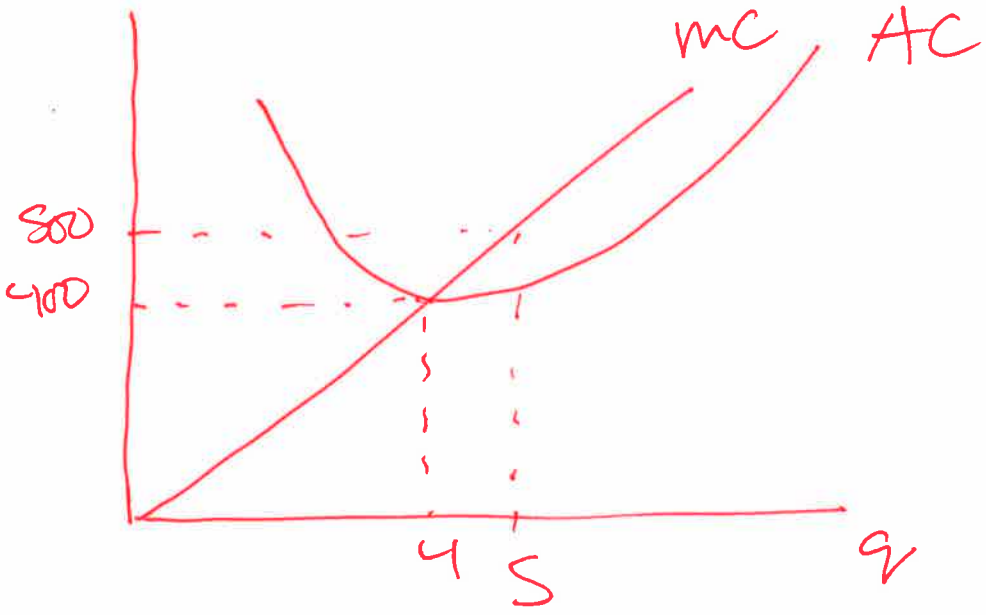
$$= \lambda^{\frac{2}{3}} (K^{\frac{1}{3}} L^{\frac{1}{3}} + L^{\frac{2}{3}})$$

$$= \lambda^{\frac{2}{3}} q$$

$\Rightarrow$ DRS

7. A stuffed-wombat manufacturer determined that the lowest average costs were achieved when four wombats were produced at an average cost of $400 each. If the marginal cost curve is a straight line that intersects the origin, what is the marginal cost of producing the fifth wombat (use a graph and explain briefly)?

AC, MC



because we know MC intersects AC when AC is at its minimum

8. Suppose there are two consumers in a market. The demand curve for consumer 1 is P=50-2Q and the demand curve for consumer 2 is also P=50-2Q. What is the market demand curve? If the market supply curve is given by P=10+Q, what are the market equilibrium price and quantity? Note: if you are unable to derive the results, show this process in graphical form for partial credit.

D_1: $P = 50 - 2Q$

D_2: $P = 50 - 2Q$

DD: $P = 50 - Q$

SS: $P = 10 + Q$

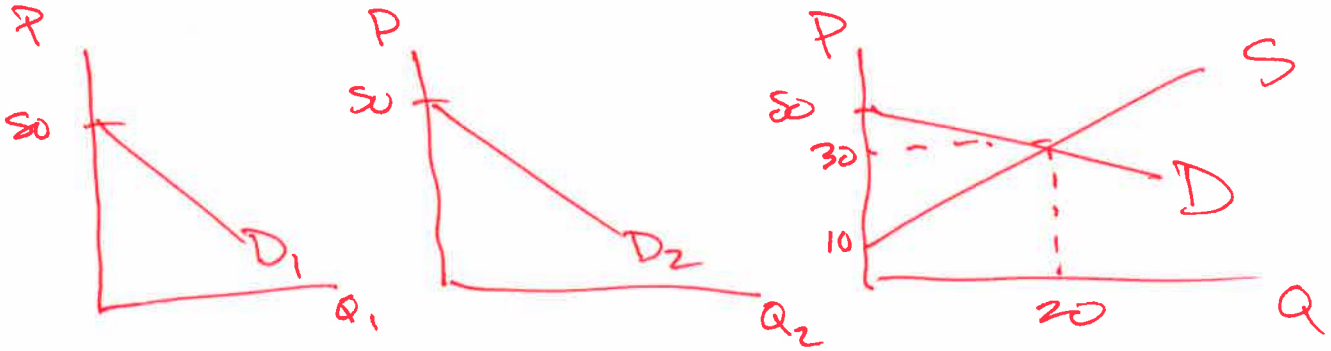
$50 - Q = 10 + Q$

$40 = 2Q$

$Q = 20$

$P = 50 - 20$

$= 30$



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