





## LONGER QUESTIONS [10 PTS]

Each question is worth 2 points. Show your work! (It's better to do work on the back of the page and put answers on the front.)

- (1) Suppose Will and Grace are stranded on a deserted island. Will has 20 gallons of drinking water and 15 chickens. Grace has 15 gallons of water and 30 chickens. At the initial allocation, Will's  $MRS_{water,chickens} = 5$  (i.e. Will would be just as well off if he gave away 5 chickens in return for 1 gallon of water). Grace's  $MRS_{water,chickens} = 1$ .
- (a) Suppose chickens and water are perfect substitutes. Graph the edgeworth box for this economy with Will's origin on the bottom left and chickens on the vertical axis. Label the origins, axes, and initial endowments. Using the given MRSs, draw and label Will and Grace's indifference curves at the point of the initial endowments and label the following regions:
- A=both Will and Grace are better off.
  - B=both Will and Grace are worse off.
  - C=Will is better off, Grace is worse off.
  - D=Will is worse off, Grace is better off.

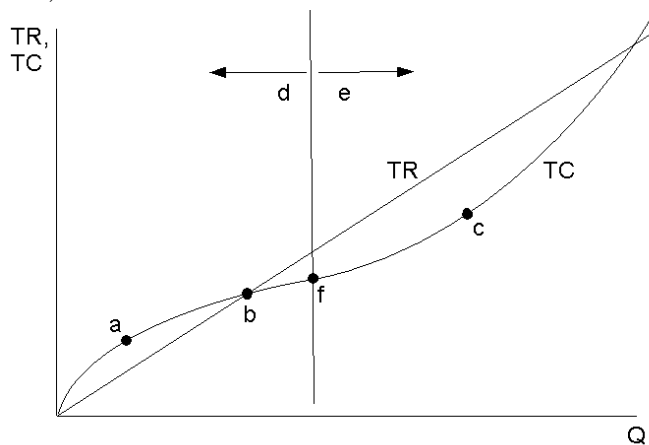
- (2) Consider an economy with a consumer and goods  $x$  and  $y$ . Suppose that the consumer's demand function for each good is:

$$\begin{cases} x = \frac{mp_y}{p_x} \\ y = \frac{m(1-p_y)}{p_y} \end{cases}$$

where:  $x$  denotes the consumer's demand for good  $x$ ,  $y$  denotes the consumer's demand for good  $y$ ;  $p_x$  is the price of good  $x$ ,  $p_y$  is the price of good  $y$ ;  $m$  denotes the consumer's income. Assume that the income and prices are all positive.

- (a) Calculate the cross price elasticity of demand for good  $x$  with respect to the price of good  $y$ , and then state whether good  $x$  is a substitute, or complement, or neither to good  $y$ .
- (b) Calculate the income elasticity of demand for good  $y$  and state whether good  $y$  is a(n) normal or inferior good.
- (3) Assume that a monopolist faces a demand function of  $Q = 60 - 2P$ , has a production technology of  $Q(L) = 2L^{\frac{1}{2}}$ , and pays a wage of 1. Find:
- (a) The firm's profit function, profit-maximizing quantity ( $Q^*$ ) and profits.
- (b) Draw curves for demand, supply and marginal revenue. Label equilibrium price and quantity.

- (4) The figure below shows a firm's total revenue and total cost curves. Tell us what is happening at points a–c (with respect to market power and/or profits) and (with respect to economies of scale and/or scope) in areas on the left (d), on the right (e), and on the line (at f).



- (a)  
 (b)  
 (c)  
 (d)  
 (e)  
 (f)
- (5) Consider an economy with two consumers 1 and 2, and two goods  $x$  and  $y$ . Assume that consumer 1's preference can be represented by a utility function:

$$U_1(x_1, y_1) = x_1^{\frac{1}{2}} y_1^{\frac{1}{2}},$$

and that consumer 2's preference can be represented by another utility function:

$$U_2(x_2, y_2) = \min(x_2, y_2)$$

where:  $x_1$  denotes consumer 1's demand for good  $x$ ,  $y_1$  denotes consumer 1's demand for good  $y$ ;  $x_2$  denotes consumer 2's demand for good  $x$ ,  $y_2$  denotes consumer 2's demand for good  $y$ .

Suppose that the price of  $x$  is \$1, the price of  $y$  is \$2, and that both consumers have an income of \$12. Find the **market demand** for each good and each consumer's utility from their consumption.