

ECO 401-002, 003
Spring 2011
Problem Set #5

Due: Monday, March 21, 2011.

Use graph paper and large diagrams for questions 3 and 4!!

1. Two sisters contemplate forming an equal partnership and opening a shop in Lexington selling knick-knacks to tourists here to see the local horse industry. Both of them would work full time in the shop. One is a college drop-out and the other has her MBA degree. They come to different conclusions about the prospective economic profitability of such a venture. Is it possible for each of them to be correct, or does this mean that one of them has made a mistake in her calculations? Explain.
2. Problem 8.2, Besanko and Braeutigam.
3. A firm's long-run total cost curve is given by $TC(Q) = 1000Q - 30Q^2 + Q^3$. Plot the total cost curve over the range of output from $Q = 0$ to $Q = 25$. Derive expressions for ATC and MC. Illustrate these on a separate diagram. At what output is minimum efficient scale?
4. Refer to the production function given in problem set #4 for your lawn-care business. The per-hour rate that you pay to rent labor services (w) is \$6, and the per hour rate that you pay to rent machines (v) is \$6.
 - a) If you decide to mow and trim 4 yards per day, what combination of L and K will minimize costs? Illustrate your answer in a diagram that contains the isoquant for $Q=4$ and isocost lines that pass through or are tangent to the different input combinations that you might use to produce $Q=4$. Label these combinations (a).
 - b) Suppose that K is fixed at $K=4$. You decide to increase your daily output of yards mowed from 4 to 6. How much labor will you use and what will total costs be? Illustrate with another isocost line in your diagram and label the input combination (b).
 - c) K is still fixed at $K=4$, but now you decide to reduce output to two yards per day. What input combination will you use? What will total costs be?
 - d) Graph the three above points on your SRATC curve when K is fixed at $K=4$. Label the three points that correspond to (a), (b), and (c).
 - e) Suppose that you are planning on expanding your business. If both capital and labor are variable, what is the average cost of producing $Q=6$? $Q=8$? Illustrate your long-run average cost curve in the diagram you drew in (d), and label these two new points (e).

2 point bonus: Suppose that $w=\$6$ and $v=\$24$. What combination of L and K would minimize the cost of $Q=4$? To illustrate this, draw a new diagram similar to 4(a) above that shows the isoquant and isocost lines. (Hint: can you calculate MP_L and MP_K from the production function $Q=L^{.5}K^{.5}$?)