

HW 3: Production, Cost, Competition

1. A badminton set includes two rackets and one net. What is the long-run expansion path for a firm that assembles such sets (and no additional cost), if the firm buys rackets and nets at market prices? How does the expansion path depend on the relative prices of rackets and nets?
2. A bottling company uses two inputs to produce bottles of the soft drink Squish: bottling machines (K) and workers (L). The machine costs \$1,000 per day to run; and the workers earn \$200 per day. At the current level of production, the marginal product of the machine is an additional 200 bottles per day, and the marginal product of labor is 50 more bottles per day. Is this firm producing at minimum cost? If it is minimizing costs, explain why. If it isn't minimizing costs, explain how the firm should change the ratio of inputs it uses to lower its cost. (Be sure to discuss the conditions for minimizing cost.)
3. What is the long-run cost function for a production function where L and K are perfect substitutes, and each unit of q requires one unit of L or one unit of K (or a combination of the two that adds to one)? [Note: This production function can be written as $q = L + K$.]
4. If we plot the profit of a firm against the number of vacation days taken by its owner, we find that profit first rises with vacation days (a few days of vacation improves the owner's effectiveness as a manager the rest of the year), but eventually falls as the owner takes more vacation days. If the owner has usual shaped indifference curves between profit and vacation days, will the owner take the number of vacation days that maximizes profit? If so, why? If not, what will the owner do, and why?
5. If each competitive firm in an industry has the short-run cost function $C = 50 + 5q + q^2$, and the market price is \$35, what is the profit-maximizing output level for each firm? What is its total revenue? What is its profit? At what price does it shut down?
6. Many marginal cost curves are U-shaped. As a result, it is possible that the MC curve hits the demand or price line at two output levels. Which is the profit maximizing output? Why?
7. Each firm in a competitive market has a cost function of $C = 8 + 2q^2$. The market demand function is $Q = 24 - p$. Determine the equilibrium price, quantity per firm, market quantity, and number of firms.
8. If marginal cost is constant at \$5 for all firms, what is the value of producer surplus?
9. Suppose instead of a minimum wage, the government instituted a maximum wage (set below the equilibrium) in the unskilled labor market. Show the welfare effects of this cap on the market using a graph.
10. What are the positions on trade of Senator Kerry and President Bush? In answering this question, consider their behavior, not just their recent public statements (Senator Kerry's voting history and President Bush's actions in office to date). What reasons do they give for favoring or opposing free trade? [If you find it difficult to determine their positions, you're not alone.]