

COMM 220 – PRACTICE PROBLEM SET 3

- Paul spends two hours to wait in line to buy a ticket to the Bon Jovi concert. The ticket costs Paul \$99.50. He could have used the two hours to tutor a student for \$20 an hour or work a part-time job which pays \$15 an hour. Paul's friend, Jonathan, is willing to pay him \$125 for his ticket. Attending the concert will take approximately three hours. Paul can work at the part-time job for the three hours.
 - What is Paul's economic cost of buying the ticket?
 - What is Paul's economic cost of attending the concert?
- A firm has a long-run total cost function of $C(q) = 20q - 0.8q^2 + 0.02q^3$.
 - Find the firm's ATC and MC functions.
 - At what output level is ATC minimized?
 - Graph the ATC and MC curves for $q = 1, 5, 10, 15, 20, 25, 30, 35$ and 40.
- Suppose a firm's production function is $q(L,K) = 50L^{0.5}K^{0.5}$, where q = the number of output, K = the number of capital input, and L = the number of labour input. The unit cost of labour is \$25, the unit cost of capital is \$100, and the unit cost of raw material is \$10.
 - Suppose the firm has a fixed capital input of 10:
 - Find the firm's total cost and average cost functions.
 - How many L is required to produce 2,000 units of output? What is the average cost per unit?
 - Suppose the firm can change its use of K and L to minimize the total cost of production:
 - Find the firm's optimal capital-labour ratio.
 - How many K and L are required to produce 2,000 units of output? What is the average cost per unit?
 - Suppose the unit cost of labour increases to \$30. What are the optimal quantities of K and L to produce 2,000 units of output? What is the average cost per unit?
- Suppose that there are ten firms in an industry. For six firms, $MC = 4q$ and minimum $AVC = 12$. The other four firms have $MC = 6q$ and minimum $AVC = 18$. What is the equation for market supply curve in the short run? Draw the supply curve for $P = \$12, \18 and $\$24$. (Hint: write quantity supplied as a function of price.)
- A competitive firm has short-run total costs given by: $C(q) = 0.024q^2 + 6q + 2535$
 - Find the firm's VC, FC, ATC, AVC, AFC, and MC.
 - At what range of prices will the firm earn a positive profit?
 - Suppose the market price of the product is \$30 per unit. What output level should the firm produce to maximize profit? What are the firm's producer surplus and profit at this output level?

6. A competitive firm has the short-run cost function: $C(q) = 300 + 80q - 6q^2 + 0.2q^3$
- (a) Find the firm's AC, AVC and MC functions. Sketch them on a graph using $q = 1, 5, 10, 15, 20, 25,$ and 30 .
 - (b) At what range of prices will the firm supply zero output?
 - (c) Identify the firm's supply curve on your graph in (a).
 - (d) At what price would the firm supply exactly 40 units of output?