

Economics 500: Microeconomic Theory
State University of New York at Binghamton
Department of Economics
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Problem Set #8

1. John's Lawn Mowing Service is a small business that acts as a price taker ($MR = P$). The prevailing market price of lawn mowing is \$20 per acre. John's costs are given by

$$TC = 0.1q^2 + 10q + 50$$

where q is the number of acres John chooses to cut a day.

- a. How many acres should John choose to cut in order to maximize profit?
 - b. Calculate John's maximum daily profit.
 - c. Graph these results and label John's supply curve.
2. Would a lump-sum tax affect the profit-maximizing quantity of output? How about a proportional tax on profits? How about a tax assessed on each unit of output?
3. A firm faces a demand curve given by

$$q = 100 - 2p$$

Marginal and average costs for the firm are constant at \$10 per unit.

- a. What output level should the firm produce to maximize profits? What are profits at that output level?
 - b. What output level should the firm produce to maximize revenues? What are profits at that output level?
 - c. Suppose the firm wishes to maximize revenues subject to the constraint that it earns \$12 in profits for each of the 64 machines it employs. What level of output should it produce?
 - d. Graph your results.
4. The production function for a firm in the business of calculator assembly is given by

$$q = 2(L)^{1/2}$$

where q is finished calculator output and L represents hours of labor input. The firm is a price taker for both calculators (which sell for P) and workers (which can be hired at a wage rate of w per hour).

- a. What is the supply function for assembled calculators ($q = q(p,w)$)?
- b. Show explicitly how changes in w shift the supply curve for this firm.