

**Stern School of Business
New York University**

Microeconomics
B01.1303

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Problem Set 4

1. A consumer spends money on two goods, electricity Y and on “all other goods” X. Assume that the price of “all other goods” is $p_x = 1$. Con Edison offers electricity at \$0.10 per kilo-watt-hour (KWH). Suppose that the consumer has income $I = 1500$. His utility function is $U(x, y) = xy$, with marginal utilities $MU_x = y$, $MU_y = x$.

(a) How much electricity will the consumer use? How much money will he spend on other goods?

(b) As a conservation measure, the government proposes to tax electricity at \$ 0.05 per KWH, so that the consumers pay now \$0.15 per KWH. How much electricity will the consumer use now? How much money will he spend on other goods? What is the tax revenue of the government?

2. Suppose that a perfectly competitive firm faces a price of \$9 for its output, and has a marginal cost function

$$MC(q) = 3 + 2q.$$

(a) How many units will the firm produce? What does this depend on?

(b) What are the firm's profits?

3. A farmer in a perfectly competitive market produces wheat with cost function

$$C_1(Q) = Q^2 + 100.$$

(a) Derive and draw the MC, AVC and ATC curves.

(b) What are the short run and long run supply curves?

(c) What is her profit-maximizing output and level of profit if the price is \$25.00?

(d) Suppose that a new technology with cost function

$$C_2(Q) = 25Q$$

becomes available. Draw the MC, AVC and ATC curves for this technology. What are her short run and long run supply curves for the new technology?

(e) Under what conditions does the farmer want to use the new technology over the old one?