

Microeconomics I

2st Mini-test

Year 2012/2013

Name:

Student number:

Class:

Suppose that Ms. Ana Ramos is the only producer of bottled water in New York. To produce bottled water, she faces a cost function of $TC(Q) = 100 - .5Q + .125Q^2$

Demand for bottled water is $Q_{NY}^D = 150 - 2P$

a) Determine Ms. Ramos' optimal level of output, price, and profit. Plot and calculate the consumer and producer surplus.

b) The New York City government decides to impose a unit tax of \$36 per bottle. What is Ms Ramos's new optimal output and price? If the government is worried about consumer welfare, is this a good tax to implement?

c) Due to a trade agreement, Ms Ramos can sell her water bottles on the (perfectly competitive) international market, where the price of bottled water is \$40 per bottle.

Will Ms Ramos chose to export? How many water bottles will Ms Ramos sell in each market? What price(s) will she charge and what will be her level of profit?

Solution:

a) $P = 75 - .5Q$
 $\pi = 75 - Q + .5 - .25Q = 0$
 $Q = 60.4$
 $P = 44.8$
 $\pi = \$2180.10$
 $PS = \$2204.60$
 $CS = \$912.04$

b) Seller now receives: $P_s = 75 - .5Q - 36$
 $\pi = (39 - .5Q)Q - (100 - .5Q + .125Q^2)$
 $FOC: 39 - Q = -.5 + .25Q$
 $Q = 31.6$
 $P_D = 59.6$ but $P_s = 23.6$
 $\pi = 635.74$
 $CS = 243.32$
 $Tax\ revenue = 36 * 31.6 = 1137.60$

If the government is worried about equality, then this tax does equalize surpluses, though it leaves everyone worse off (except the government).

c) Monopolist Problem:

$$\pi = (.75 - .5Q_D)Q_D + 40Q_I - (100 - .5Q_D - .5Q_I + .125(Q_D + Q_I)^2)$$
$$FOC: \frac{\partial \pi}{\partial Q_D} = .75 - Q_D + .5 - .25(Q_D + Q_I) = 0 \Rightarrow Q_D = 60.4 - .25Q_I$$
$$\frac{\partial \pi}{\partial Q_I} = 40 + .5 - .25Q_I - .25Q_D = 0 \Rightarrow Q_I = 162 - Q_D$$

Plugging in, we get:

$$Q_I = 127$$
$$Q_D = 35 \Rightarrow P_D = 57.5$$
$$Q = 162$$
$$\pi = \$3793$$