

Answer on Question #69501 -Economics - Microeconomics

There is only one David Garrett, the “David Beckham of Classical Music.” Suppose that Don has obtained the rights to all of Garrett’s recordings, and so he has a monopoly in the market for this music. It turns out that the market demand for Garrett’s CDs is given by $P = 120 - 0.2Q$, where P is market price and Q is the quantity demanded. Production of these recordings requires paying a fixed cost of \$1,000 to rent certain machinery, plus a per-unit payment of \$20.

1. What are Don’s profit maximizing output and price?
2. What are Don’s profits, total consumer surplus, and the total deadweight loss at this output and price?

Solution

1. Don’s profit maximization or cost minimization is achieved when marginal revenue is equal to marginal cost and the market price ($MR = MC$).

Marginal cost function is equal to the derivative of total cost function:

$$MC = TC'$$

Total cost function in this case is equal to

$$TC = 1,000 + 20Q$$

So,

$$MC = (1,000 + 20Q)' = 20$$

Marginal revenue function is equal to the derivative of total revenue function:

$$MR = TR'$$

Total revenue function in this case is equal to

$$TR = (120 - 0.2Q) \times Q = 120Q - 0.2Q^2$$

So,

$$MR = (120Q - 0.2Q^2)' = 120 - 0.4Q$$

Then

$$MR = MC, \quad 120 - 0.4Q = 20$$

$$Q = \frac{100}{0.4} = 250$$

$$P = 120 - 0.2 \times 250 = 70$$

2. Don’s profits are equal to

$$Pr = TR - TC = P \times Q - (1,000 + 20Q)$$

$$Pr = 70 \times 250 - (1,000 + 20 \times 250) = 11,500$$

Total consumer surplus is calculated graphically as the area of triangle ABC

From the demand function $Q=0$ when $P=120$, so consumer surplus is $\frac{1}{2} \times (120-70) \times 250 = 6,250$;

Total deadweight loss is $\frac{1}{2} \times (70-50) \times (500-250) + \frac{1}{2} \times (50-20) \times (500-250) = 6,250$

Answer

- 1. $Q=250, P=70$**
- 2. $Pr=11,500; Cs=6,250, DWI=6,250$**

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