

MONOPOLY

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PRACTICE PROBLEM

The average and marginal cost of a bottle of Eternal Wine, which makes you younger, is \$10. There is no fixed cost. Total cost is then $TC = 10Q$. The demand for EW is

$$Q = 100 - \frac{1}{2}p. \quad (1)$$

1. Express price in terms of output. (Why? It shows Average revenue)

$$p = 200 - 2Q. \quad (2)$$

This shows that the demand curve is downward sloping.

2. What is the socially optimal level of EW?

Social optimum requires $p = MC$. That is,

$$200 - 2Q = 10, \text{ or } Q = 95. \quad (3)$$

3. Suppose David acts like a monopolist. What is his total revenue?

It is of utmost importance to express revenue in terms of **output**, not in terms of price, because the cost function is in terms of output. (Even if it is expressed in terms of price, one can solve the problem by expressing the cost function in terms of price. However, this would be a tedious process)

$$pq = (200 - 2Q)Q = 200Q - 2Q^2. \quad (4)$$

4. What is marginal revenue?

$$MR = \frac{d(TR)}{dq} = 200 - 4Q. \quad (5)$$

5. What is optimal output? Equating MR to MC, we get

$$200 - 4Q = 10, \text{ or } Q = 47.5. \quad (6)$$

6. What is the monopolist's optimal price?

$$p = 200 - 2Q = 105. \quad (7)$$

7. What is the firm's profit?

$$\pi = pQ - 10Q = (105 - 10)Q = 95 \times \frac{95}{2} = \frac{9025}{2}. \quad (8)$$