Intermediate Micro In-Class Problems

Monopoly I

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The monopoly supplier of Rangyou Paomo in Xian has production costs of a constant ¥2 per unit. For a unit price of p, demand for Rangyou Paomo will be $100 - p^2$.

1. Write down the monopolist's profit as a function of p.
2. Compute the profit-maximizing price she should charge.
3. What is the elasticity of demand at the profit maximizing price? (*Note: if demand is given by $D(p)$, the elasticity of demand is given by the following:*)

$$\varepsilon(p) = -\frac{\partial D}{\partial p}\frac{p}{D(p)}$$

1 Preferences

More Monopoly

Consider a monopolist with production cost function $C(q) = 640 + 20q$, where q is the quantity produced. Let $D(p) = 50 - \frac{p}{2}$ be the demand-price relationship.

1. What is the elasticity of demand at the price $p = 20$.
2. At the price $p = 44$, if the monopolist wishes to raise revenue, should he raise or lower the price?
3. What is the monopolist's maximum profit?
4. What is the elasticity of demand at the profit-maximizing price?

Choosing Price vs. Choosing Quantity

Consider a monopolist facing a demand curve of the form $D = 50 - 3p$ where p is the unit price. Suppose the monopolist has a constant marginal cost of production of ¥3 per unit.

1. Instead of choosing a unit price p to maximize profit, our monopolist will choose a quantity q to maximize profit. Write down, as function of q, the price per unit the monopolist must charge to sell exactly q units. This object is called the **inverse demand curve**.
2. Write down, as a function of q, the monopolist's profit.
3. Write down, as a function of q, the monopolist's marginal revenue.
4. Use either the function you identified in part (2) or in part (3) to compute the profit-maximizing quantity. What is it?
5. For your own edification, check that you reach the same conclusion by choosing a profit-maximizing price insted.

Returns to Scale

Let $C(q)$ denote the total cost incurred to produce q units of Tsingtao. Decide which of the following cost functions exhibit constant, decreasing and increasing returns to scale.

1. $C(q) = 5q + 3$ for $q \geq 0$.
2. $C(q) = 2q^2 + 3q + 1$.
3. $C(q) = 5q - q^2$ for $q \leq 5$.
4. $C(q) = 5q^{\frac{1}{2}}$