Econ 3012 - Final Exam

December 7, 2023

1. *Briefly describe the following in a way that a person who **has not studied economics or mathematics would understand**:*

    A. What is the "marginal rate of substitution"?

    B. Why does a firm choose to operate where marginal cost is equal to marginal revenue?

    C. What does it mean if a firm has "increasing returns scale"?

2. *Fill in the blank.*

    A. A monopolist can never be maximizing profit if demand is _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _.

    B. We say a consumer's preferences are rational is those preferences are *reflexive, complete,* and _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _.

    C. If a consumer is always willing to give up $\frac{1}{2}$ units of x_2 to get 1 unit of x_1 then the slope of their indifference curves is _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _.

3. In a market, demand is $Q = 200 - 40p$ and supply is $Q = 10p$.

A) What is the equilibrium price and quantity in this market?

B) What is the price elasticity of demand at the price you found in part A?

C) What is the equilibrium price and quantity if the government imposes a $t = \frac{5}{2}$ quantity tax?

D) What is the dead-weight-loss associated with this tax?

4. A firm has production function $x_1^{\frac{1}{2}} x_2^{\frac{1}{2}}$ the cost of x_1 per unit is $w_1 = \frac{1}{2}$ and the cost of x_2 is $w_2 = \frac{1}{2}$.

A) What is the marginal product for x_1? Does the firm have decreasing marginal product?

B) What are the firm's conditional factor demands for x_1 and x_2 for producing output q?

C) What is the firm's cost function?

5. A market's demand is $Q = 200 - 40p$. Each firm in the market has cost function $c(q) = q$.

A) What is the inverse demand?

B) If there is only one firm in this market (a monopolist), what is their profit function?

C) What quantity does a monopolist produce to maximize profit? How much does it earn?

Now assume there are two firms in this market that compete as Cournot oligopolists. Firm 1 produces q_1 and firm 2 produces q_2.

D) What is firm 1's profit function?

E) What is firm 1's best response function?

F) What quantities do the firms produce in a symmetric Nash equilibrium?

6. A consumer has demand $x_1 = \frac{m}{p_1 + p_2}$ and $x_2 = \frac{m}{p_1 + p_2}$.

A) Are these goods complements, substitutes, or neither?

B) At $p_1 = 1$, $p_2 = 1$ and $m = 30$, what is this consumer's demand? What about if p_1 increases to $p_1 = 2$.

C) Of the change in demand for x_1 in part B, how much is due to the substitution effect?

D) Of the change in demand for x_1 in part B, how much is due to the income effect?