

Econ 301: Intermediate Microeconomics

Practice Final Examination, Winter 2008/2009

Instructions: Time permitted is 3 hours. The maximum points are 80. *Choose four sub-questions from Question 1 plus four from the remaining five questions. Indicate at the front of your exam book which questions you are answering.* Illustrate clearly each step involved in deriving your answers. Marks will not be awarded for answers unless accompanied by a clear explanation. Begin each answer on a new page. Calculators are not permitted, but language dictionaries are permitted. Question sheet to be returned.

1. (12 points) **Choose four out of the five sub-questions.**

Explain whether each of the following statements is true or false and provide a reason. All marks are assigned to explanations.

- (a) Demand curves for a Cobb-Douglas utility function can never cross the X or Y axis.
- (b) At any output level the short-run average total cost curve and the short-run average variable cost must slope in the same direction.
- (c) If the marginal product of each factor decreases as the amount of the factor used increases, then there must be decreasing returns to scale.
- (d) Suppose a profit-maximizing firm chooses to produce y units of output, given output and input prices. Then, it must be choosing the factor combination that minimizes production costs for y units of output, given the input prices.
- (e) If the demand curve is linear and downward-sloping, then its demand elasticity at any point equals the slope of the curve.

Choose four out of the following five questions. Indicate at the front of your exam book which questions you are answering.

2. (17 points) Consider the utility function $u(x_1, x_2) = x_1x_2^2$. Initially $p_1 = \$1$ and $p_2 = \$2$. Income is \$12.
 - (a) Derive the optimal consumption bundle.
 - (b) If the price of good 1 doubles to \$2 derive the new consumption bundle.
 - (c) Decompose the change in consumption of good 1 into the income effect and the substitution effect, and illustrate your answer with a graph.
3. (17 points) Suppose the market demand for a good, D , consists of two consumers, 1 and 2, where their respective individual demands for good are: $D_1(p) = 200 - 4p$ and $D_2(p) = 125 - 2.5p$.
 - (a) On one diagram graph the individual demand curves as well as the resulting market demand curve. Mark the intercepts correctly.
 - (b) If supply is given by $p = 40$, find the amount purchased by each consumer. Illustrate your answer graphically.
 - (c) If instead the supply is given by $S(p) = 100$, find the equilibrium market price. Illustrate your answer graphically.
4. (17 points) Suppose that the demand curve is $D(p) = 100 - 2p$ and the supply curve is $S(p) = 20 + 2p$.
 - (a) Derive the equilibrium price and quantity.

Now, the government decides to implement a \$4/unit tax on the demander.
 - (b) What is the new equilibrium price that the demander pays? How is the tax burden shared between the demander and the supplier?
 - (c) What is the change in consumer's surplus after the policy change? What is the tax revenue for the government? What is the deadweight loss in welfare? Illustrate your answers on a graph.

5. (17 points) Geoffrey produces graffiti with the following technology: $f(K, L) = K^{\frac{1}{3}}L^{\frac{1}{3}}$, where L is number of hours per day he devotes to making graffiti and K is the amount of chalk. Each unit of labor costs \$1 and each unit of chalk costs \$4. In the short run, Geoffrey can only spend exactly an hour per day on graffiti.
- (a) Does this function have constant, increasing, or decreasing returns to scale? Explain.
 - (b) In the short run, what is his choice of amount of chalk to produce 1 unit of graffiti per day, in order to minimize his costs?
 - (c) In the long run, how much of each input should be used if Geoffrey wishes to produce 1 unit of graffiti per day, again, in order to minimize his costs?
6. (17 points) Consider a firm with total cost function of the type $c(q) = q - 0.6q^2 + 0.1q^3$.
- (a) What are the fixed costs and variable costs for the firm?
 - (b) Derive expressions for the average total cost and marginal cost functions.
 - (c) At what output level does the average total cost function attain a minimum? What is the value of marginal cost at this output level?