

Name _____

Economics 111: Intermediate Microeconomics
Spring 2005
Practice Midterm 2 Answer Key

You have 1 hour and 20 minutes. Only clarifying questions are allowed. Do not cheat. Do not panic. Enjoy the exam.

Questions 1 to 5 are multiple choice. Circle the correct answer. (5 points each correct answer).

1. In his analysis of "The economics of legalizing drugs," the Armchair Economist mentions 5 principles of cost-benefit welfare analysis. Which of the following is not one of them:

- a. Tax revenues are not a net benefit.
- b. Revenues from illegal activities are not a benefit. ✓
- c. A cost is a cost, no matter who bears it.
- d. A good is a good no matter who owns it.
- e. Voluntary consumption is a good thing.

2. A Cobb-Douglas productions function $y = x_1^\alpha x_2^\beta$, with $\alpha, \beta > 0$, displays decreasing returns to scale if the following is true:

- a. $\alpha + \beta = 1$.
- b. $\alpha + \beta < 1$. ✓
- c. $\alpha + \beta > 1$.
- d. $\alpha < 1$ and $\beta < 1$.
- e. $\alpha > 1$ and $\beta > 1$.

3. If the production function is $y = \min\{x_1, x_2\}$ and the prices of inputs are w_1 and w_2 , the minimum cost function is:

a. $C(w_1, w_2, y) = (w_1 + w_2)y$. ✓

b. $C(w_1, w_2, y) = \frac{y}{(w_1 + w_2)}$.

c. $C(w_1, w_2, y) = \frac{y^2}{(w_1 + w_2)}$.

d. $C(w_1, w_2, y) = \sqrt{w_1 w_2 y}$.

e. $C(w_1, w_2, y) = 2w_1 w_2 y$.

4. As Armchair Economist says, taxes are bad because they can be avoided (at a cost). A tax would not be bad in which of the following cases?:

a. Supply is perfectly elastic.

b. Supply is perfectly inelastic.

c. Demand is perfectly elastic.

d. Demand is perfectly inelastic.

e. **b or d**. ✓ (There was a typo in the practice midterm)

5. There is a given amount of farmland available in the US. Who would end benefiting from a subsidy for farmers that rent land?

a. The farmers since the government pays a % of their rent.

b. The owners of land since the supply of land is fixed. ✓

c. Both.

d. Neither since taxes and subsidies are inefficient.

e. None of the above.

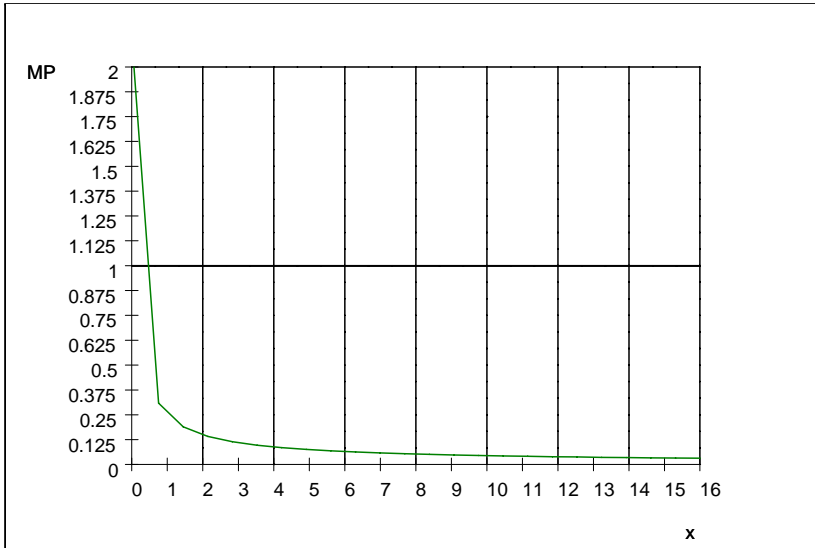
Name _____

6. (25 points) Consider the following production function: $f(x) = x^{\frac{1}{4}}$.

a. Find the marginal productivity function. Is it decreasing?

$MP = \frac{1}{4}x^{-\frac{3}{4}}$ which is decreasing in x .

b. Graph the marginal productivity function.



c. Assume that p and w are given. Write profits as a function of the level of input and find the optimal amount of input x^* . How does x^* depend on p and w ?

$$\pi = px^{\frac{1}{4}} - wx$$

$$\text{FOC: } \frac{d\pi}{dx} = p\frac{1}{4}x^{-\frac{3}{4}} - w = 0$$

Then, $x^* = \left(\frac{p}{4w}\right)^{\frac{4}{3}}$ which is increasing in p and decreasing in w .

d. Using the previous solution find the supply function. How does y^* depend on p and w ?

$$y^* = \left(\frac{p}{4w}\right)^{\frac{1}{3}}$$
 which is increasing in p and decreasing in w .

Name _____

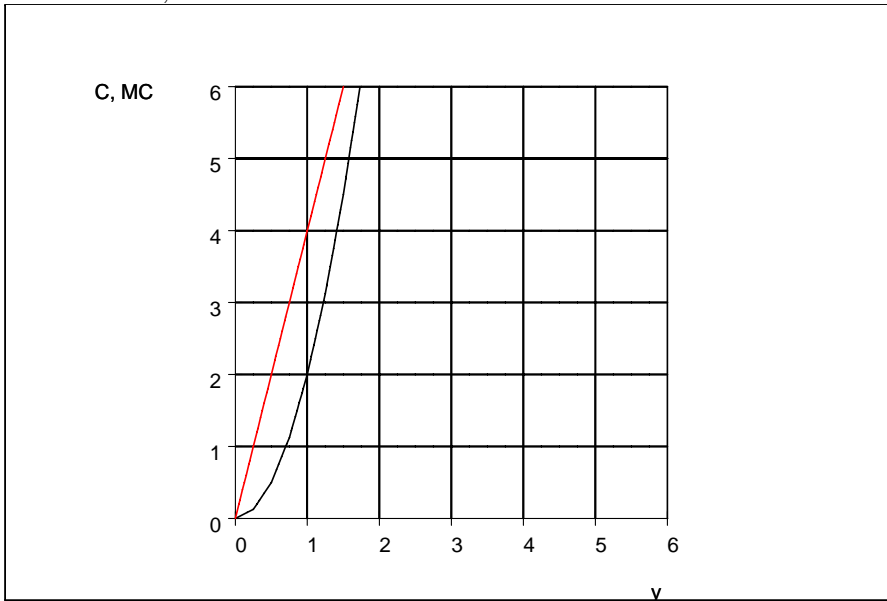
7. (25 points) Consider the following production function: $f(x) = x_1^{\frac{1}{4}}x_2^{\frac{1}{4}}$.

a. Find the minimum cost function. How does it depend on w_1 , w_2 and y ?

$$C(w_1, w_2, y) = 2w_1^{\frac{1}{2}}w_2^{\frac{1}{2}}y^2$$

b. Graph the minimum cost and marginal cost functions (assume $w_1 = w_2 = 1$).

Black C, Red MC.



c. Find the optimal amount of output y^* (given w_1 , w_2 and p).

In the optimum, $P = MC$:

$$p = 4w_1^{\frac{1}{2}}w_2^{\frac{1}{2}}y \text{ and, then, } y^* = \frac{p}{4w_1^{\frac{1}{2}}w_2^{\frac{1}{2}}}.$$

Name _____

8. (25 points) Suppose that the market for widgets can be described as follows:

Supply: $S(p) = p - 1$ for $p > 1$.

Demand: $D(p) = 10 - \frac{1}{2}p$.

a. What is the perfect competitive equilibrium price and quantity?

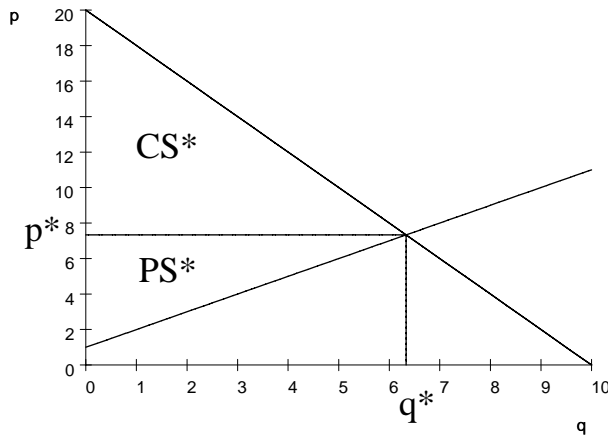
$S(p) = p - 1 = D(p) = 10 - \frac{1}{2}p$ implies: $p^* = \frac{22}{3}$ and $q^* = \frac{19}{3}$. (We will have nicer numbers in the exam...)

b. What is the consumer surplus, producer surplus and deadweight loss? Show all these graphically.

$$CS^* = \frac{(20 - \frac{22}{3})\frac{19}{3}}{2} = 40.111$$

$$PS^* = \frac{(\frac{22}{3} - 1)\frac{19}{3}}{2} = 20.056$$

$$TS^* = CS^* + PS^* = 40.111 + 20.056 = 60.167$$



Under heavy lobby by widget producers, Congress passes the Patriotic Widget Act which establishes a minimum price per widget of \$8. All units not bought by the market will be bought by the government at \$8 and burnt.

c. What will be the quantity demanded by consumers at that price? What will the quantity supplied at that price? What quantity will be sold to the government?

$$D(8) = 10 - \frac{1}{2}8 = 6$$

$$S(8) = 8 - 1 = 7$$

The government will buy one unit.

d. What is now consumer surplus and the producer surplus? How much is the government expenditure? How much is the deadweight loss? Show all these graphically.

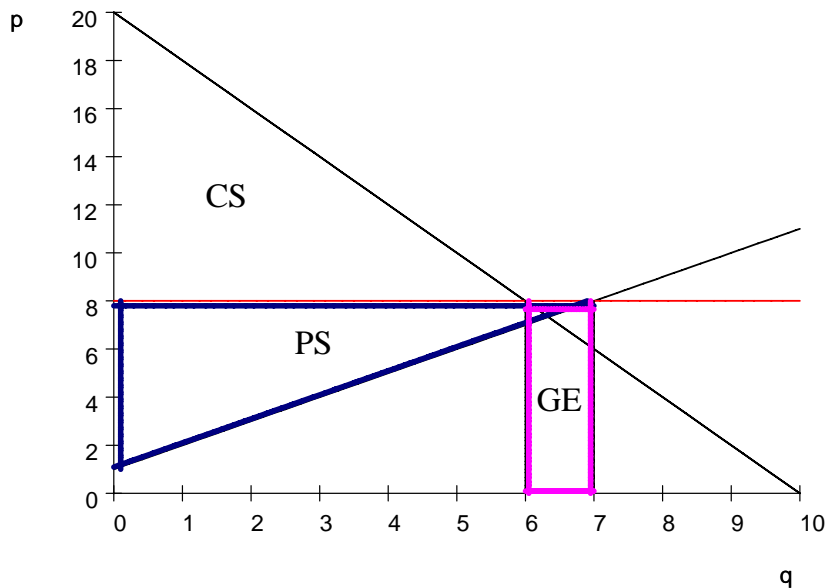
$$CS = \frac{(20-8)6}{2} = 36 \text{ which is lower than before.}$$

$$PS = \frac{(8-1)7}{2} = 24.5 \text{ which is higher than before.}$$

$$\text{Government Expenditure } GE = 1 * 8 = 8$$

$$TS = CS + PS - GE = 36 + 24.5 - 8 = 52.5$$

$$DWL = TS^* - TS = 60.167 - 52.5 = 7.667$$



DWL can be seen in the graph as the part of GE that does not contribute to PS

and the little triangle that before was CS and PS and now is all PS but financed by the government. (I graphed this wrong during office hours. sorry).

