ASSIGNMENT 3

Principles of Economics EC 110-001
June 21, 2007

Name: by writing my name i swear by the honor code

Read all of the following information before starting the Assignment:

- You are not allowed to share your work with other students in the class. This is an individual assignment.
- Show all work, clearly and in order, if you want to get full credit. I reserve the right to take off points if I cannot see how you arrived at your answer (even if your final answer is correct).
- Justify your answers algebraically whenever possible to ensure full credit. When you do use your calculator, sketch all relevant graphs and explain all relevant mathematics.
- Circle or otherwise indicate your final answers.
- Please keep your written answers brief; be clear and to the point. I will take points off for rambling and for incorrect or irrelevant statements.
- This assignment has 5 problems and is worth 100 points. It is your responsibility to make sure that you have all of the answers!
- This assignment is due Tuesday, June 26 in class.
- Good luck!

1. (*20 points*) PROBLEM 1: This question has 5 parts:

a. (*4 pts*) PART A: Explain how buyers' willingness to pay, consumer surplus, and the demand curve are related.

b. (*4 pts*) PART B: Explain how sellers' costs, producer surplus, and the supply curve are related.

c. (*4 pts*) PART C: How do the elasticities of supply and demand affect the deadweight loss of a tax? What happens to the deadweight loss and tax revenue when a tax is increased?

d. (*4 pts*) PART D: Discuss the shapes of a firm's total cost and production functions, respectively. What does the slope of each represent?

e. (*4 pts*) PART E: For a given price, explain how the firm chooses the level of output that maximizes profit. Does a firm's price equal marginal cost in the short run, in the long run, or both?

2. (*20 points*) PROBLEM 2: Mr. Powers loves donuts. The table below reflects the value Mr. Powers places on each donut he eats:

Value of	1^{st} donut	2^{nd} donut	3^{rd} donut	4^{th} donut	5^{th} donut	6^{th} donut
Price ($)	0.60	0.50	0.40	0.30	0.20	0.10

a. (*5 pts*) PART A: Use the information to construct Mr. Powers's demand curve for donuts. If the price of donuts is \$0.15, how many donuts will Mr. Powers buy? Find Mr. Powers's consumer surplus when the price is \$0.15. Indicate this on your graph.

b. (*5 pts*) PART B: If the price of donuts rose to \$0.35, how many donuts would he purchase now? What would happen to Mr. Powers's consumer surplus? Show this change on your graph.

c. (*5 pts*) PART C: Overall, the supply and demand for donuts are described by: $Q^S = 10P - 4$ and $Q^D = 4 - 6P$. Graph the supply and the demand curve. (Note: Clearly mark the intersection points of the two curves with the vertical axis). What is the equilibrium price and quantity? (Q is measured in millions of units.)

d. (*5 pts*) PART D: Calculate the consumer surplus, producer surplus, and total surplus at the equilibrium. If Dr. Evil (who hates donuts) seized absolute control of this economy and banned donuts, who would bear the larger burden - the buyers or consumers of donuts?

3. (*20 points*) PROBLEM 3: This problem has 5 parts. Suppose that you are given the following information about a market: $Q^S = 100 + 3P$ and $Q^D = 400 - 2P$.

a. (*4 pts*) PART A: From this information compute the equilibrium price and quantity.

b. (*4 pts*) PART B: Suppose that a tax T is placed on buyers, so that the new demand equation is: $Q^D = 400 - (2P + T)$. Solve for the new equilibrium. What happens to the price received by sellers, the price paid by buyers, and the quantity sold? (Note: Derive them in terms of T).

c. (*4 pts*) PART C: Solve for tax revenue as a function of T. Graph this relationship for T between 0 and 466.67. If $T = 15$, what is the tax revenue?

d. (*4 pts*) PART D: Solve for the deadweight loss as a function of T. Graph this relationship for T between 0 and 466.67. If $T = 15$, what is the deadweight loss?

e. (*4 pts*) PART E: Dr. Evil, the policymaker of this market, levies a tax of \$300 per unit. Is this a good policy? Why or why not? Can you propose a better policy?

4. (*20 points*) PROBLEM 4: Marbella Inc., makes energy drinks and then sells them on college campuses. Here is the relationship between the number of workers and Marbella's output in a given day:

Workers	Output	Marginal Product	Variable Cost	Fixed Cost	Total Cost	Average Variable Cost	Average Total Cost	Marginal Cost
0	0							
1	20							
2	50							
3	90							
4	120							
5	140							
6	150							
7	155							

a. (*4 pts*) PART A: Fill in the column of marginal products. What pattern do you see? How might you explain it?

b. (*4 pts*) PART B: A worker costs $100 a day, and the firm has fixed costs of $200. Use this information to fill in the column for variable, fixed, and total cost.

c. (*4 pts*) PART C: Fill in the column for average variable cost and average total cost. What pattern do you see?

d. (*4 pts*) PART D: Fill in the column for marginal cost. What pattern do you see? Compare the column for marginal product and the column for marginal cost. Explain the relationship.

e. (*4 pts*) PART E: Approximately draw the average variable cost, average total cost, and marginal cost curves. What is the relationship between the marginal cost curve and the average total cost curve? Between the marginal cost curve and the average variable cost curve? Explain.

5. (*20 points*) PROBLEM 5: The following table presents cost and revenue information for Soper's Port Vineyard:

Costs			**Revenues**				
Quantity Produced	Total Cost	Marginal Cost	Quantity Demanded	Price	Total Revenue	Marginal Revenue	Profit
0	100	-	0	120		-	
1	150		1	120			
2	202		2	120			
3	257		3	120			
4	317		4	120			
5	385		5	120			
6	465		6	120			
7	562		7	120			
8	682		8	120			

a. (*5 pts*) PART A: Calculate total revenue for each quantity. What is the total revenue from selling 7 units?

b. (*5 pts*) PART B: Calculate profit for each quantity. How much should the firm produce to maximize profit?

c. (*5 pts*) PART C: Calculate marginal revenue and marginal cost for each quantity. If you were to draw these two curves, where do you think they would cross? How does this relate to Part B?

d. (*5 pts*) PART D: Can you tell whether this firm is in a competitive industry? If so, can you tell whether the industry is in a long-run equilibrium?

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