

Econ 001: Final Exam (Dr. Stein) Answer Key  
Dec 17, 2007

**Instructions:**

- This is a 120-minute examination.
- Write all answers in the blue books provided. Show all work. Use diagrams where appropriate and label all diagrams carefully.
- Write your name and your Recitation Instructor's name in every blue book that you use.
- This exam is given under the rules of Penn's Honor system.
- All blue books, blank or filled, must be handed in at the end of this exam. No blue books may be taken from the room.
- The use of Programmable Calculators is in violation of Departmental rule. It is strictly forbidden!

**Check: The Exam has 2 parts.**

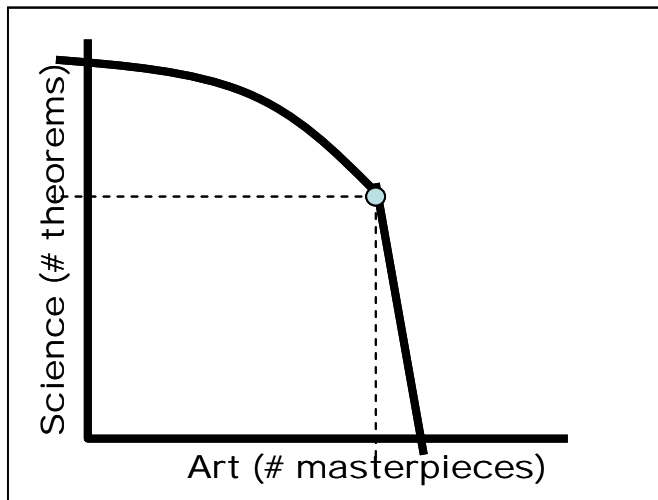
Part 1 consists of 14 multiple-choice questions. Please write your answers in blue book 1.

Part 2 consists of 2 short answer questions. Please use one book for Q1 & Q2.

Part 3 consists of 2 short answer questions. Please use one book for Q3 & Q4.

**Part I: Multiple Choice Questions (3 points each/42 points total):**

1. Man has 1000 units of genius that he can use to produce art masterpieces and science theorems. Man's PPF has the following shape:



The marginal opportunity cost of Art (in terms of theorems) will be:

- a. Negative
- b. First increasing and then constant
- c. First constant and then increasing
- d. First constant and then diminishing

2. The country of Sweetland can produce candies and shoes. We know that Sweetland exports candies to the rest of the world and import shoes. If we know the Production Possibilities Frontier (PPF) of Sweetland, what can we say about its Consumption Possibilities Frontier (CPF)?
  - a. We know the maximum amount of shoes that Sweetland can consume.
  - b. We know the maximum amount of candies that Sweetland can consume.
  - c. Both a and b are correct.
  - d. Neither a nor b are correct.
  
3. Suppose Sweetland has the absolute advantage in both goods around the world. Assume that Sweetlanders want candies and shoes and no other product. Which of the following is true?
  - a. Sweetland should not trade with other countries since it is the best in both goods; trade creates no benefit for its citizens.
  - b. Sweetland should export both goods to the rest of the world since it is the best in both goods.
  - c. Sweetland should export either shoes or candies but not both.
  - d. None of the above is true.
  
4. A common stereotype is that women buy more shoes than men. Suppose that you have the following information concerning the supply and demand for shoes (all units are in pairs):

Women's supply and demand for shoes:

$$Q_s(w) = -10 + P(w)$$

$$Q_d(w) = 50 - 2 P(w)$$

Men's demand for shoes:

$$Q_d(m) = 30 - P(m)$$

The supply curve for men's shoes is not given, but you are told that at equilibrium,  $P(w) = 2 * P(m)$ . That is, women's shoes cost twice the price of men's shoes. Which of the following is true?

- a. Women buy more shoes than men
- b. Men buy more shoes than women.
- c. They buy the same quantity of shoes.
- d. There is insufficient information to answer this question.

5. Which of the following could be an explanation of increase in price of Coke?
- Research suggests that Coke might cause cancer.
  - Coke builds a new factory in China that reduces the cost of producing coke.
  - Pepsi builds a new factory in China that reduces the cost of producing Pepsi (a substitute product).
  - Frito-Lay builds a new factory in China that reduces the cost of producing Frito-Lay chips ( a complementary product).
6. Target is trying to maximize sales revenues from holiday shoppers. The store is considering putting a discount of 30% on ties and/or shirts. You find that demand for ties is elastic but that the demand for shirts is inelastic. You do not think that a sale on one item will affect the other. You will recommend to:
- Put ties on sale.
  - Put shirts on sale.
  - Put both on sale.
  - Put neither on sale.
7. In a market with no externalities, subsidies will always:
- Increase producer surplus.
  - Increase consumer surplus.
  - Cause dead weight loss.

Which of the above statements is correct?

- I, II & III are correct
- I & II are correct, III is not.
- I & III are correct, II is not.
- I is correct, but II & III are not.
- III is correct, but I & II are not.
- None of the above.

8. William has 12 hours a day he could use either for leisure or to work to earn income. Suppose his wage decreases, but there is no other change. What will happen to the budget line?
- It will shift in, but the slope will remain the same.
  - It will shift in only on the income axis.
  - It will shift in only on the leisure axis.
  - None of the above is true.
9. Using the information above, suppose that when wages decrease, William chooses more leisure, which of the following is true?
- Leisure must be a normal good.
  - Leisure must be inferior.
  - If leisure is a normal good the substitution effect and income effect are in opposite direction.
  - Both a and c are correct.
10. Rebecca decides to allow Daniel to open and operate a lemonade stand on her front lawn for a flat fee of \$3 that includes the rental of the table as well as an unlimited supply of lemonade and cups. The lemonade stand was in business for 2 hours and during that time Daniel's total revenues were \$10. At the end of the time he pocketed \$7. Which of the following is true?
- Daniel's economic profits were \$7.
  - Selling lemonade made sense in the short run but may not make sense in the long run.
- Only I is true.
  - Only II is true.
  - Both I and II are true.
  - Neither statement is true.

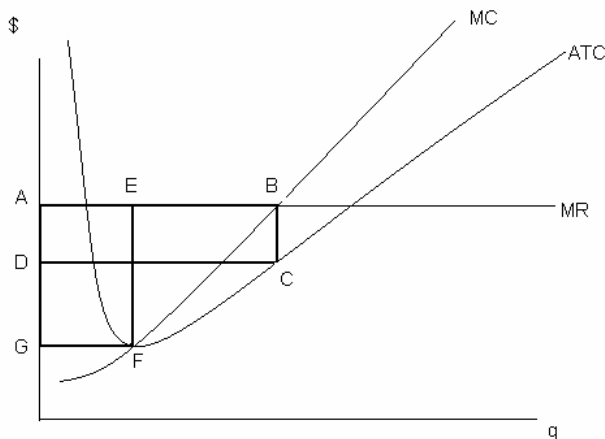
11. Suppose the detergent industry is perfectly competitive and all firms are identical. The market demand for detergent is given by  $P = 60 - Q/10$ , and each firm faces the same cost functions:  $TC = 100 + q^2$  &  $MC = 2q$ . If there are 20 firms in the industry, the short run industry supply curve is given by:

- a.  $Q_s = 10P$
- b.  $Q_s = 20P$
- c.  $Q_s = 10P - 60$
- d.  $Q_s = \text{None of the above.}$

12. Using the information from the previous question, how many firms will be in the short run & the long run?

- a. In the short run: 20; In the long run more than 20.
- b. In the short run: 20; In the long run less than 20.
- c. In the short run: 30; In the long run more than 30.
- d. In the short run: 30; In the long run less than 30.

13. Which of the following is the correct relationship between the horizontal rectangle (ABCD) and the vertical rectangle (AEFG)? Note: Picture Not Drawn to Scale.



- a.  $\text{area}(\square ABCD) > \text{area}(\square AEFG)$
- b.  $\text{area}(\square ABCD) < \text{area}(\square AEFG)$
- c.  $\text{area}(\square ABCD) = \text{area}(\square AEFG)$
- d. Not enough information

14. Which of the following statements is true:

I. Poverty as defined by the US census cannot, even theoretically, be decreased to zero.

II. A lower Gini ratio means lower inequality.

- a. I & II are true.
- b. I only.
- c. II only.
- d. Neither in true.

**Answer Key**

**1. b**

**2. d**

**3. c**

**4. b**

**5. d**

**6. a**

**7. f (or a)**

**8. b**

**9. c**

**10. d**

**11. a**

**12. a**

**13. a**

**14. c**

**Plus 3 points bonus.**

## Part II: Short Answer Questions 1&2.

Please use one Blue Book to answer Q1 & Q2.

### Q1. (18 points)

Club Wizzards, a bar and night club, operates on 38<sup>th</sup> & spruce street. There are many clubs in west Philly offering a variety of ambiences and choices.

a. What market structure is Wizzards operating in? Explain your choice.

**Answer:**

**Monopolistically Competitive as each club offers a differentiated product but there is free entry and exit.**

**Points: 3**

**Monopolistically Competitive: 1**

**Differentiated product: 1**

**Entry/Exit: 1**

For the rest of the question we will assume that the bar is in a competitive market and faces a completely elastic demand curve.

b. Draw the typical demand & marginal revenue facing Wizzards. Assume that the marginal cost of serving an additional customer is increasing. Add this to your graph.

**Answer:**

**Horizontal Demand & MR. Upward sloping MC.**

**Points: 3 (1 each).**

c. What output will Wizzards choose? Is this the efficient output? Answer & explain graphically.

**Answer: Produce where  $MC=MR$ . Efficient as  $MC=MB$**

**Points: 3**

**Produce where  $MC=MR$ : 1**

**Efficient: 1 point**

**$MC=MB$  (or no DWL): 1 point.**

d. The recent shootings in and outside the club remind us all that these clubs affect the whole neighborhood and not just the customers they serve. What economic terminology would we use to describe these effects?



**Answer:**  
**Negative Externality**

**Points:2**  
**Negative:1**  
**Externality:1**

e. How would you model this effect graphically? Re draw your graph from part b to show this. Would this change your answers to part c? Explain carefully.

**Answer:**  
**Shift up of MC curve.**  
**Now the firm's output is inefficient as  $SMC > MC = MB$ .**

**Points: 3**  
**Shift MC up: 2 points**  
**Inefficient: 1 (must have explanation)**

f. The University would probably like to close the club altogether. Redraw your graph in such a way that is consistent with closing the club being the efficient outcome. Do you think that is the situation in this case?

**Answer:**  
**MC must be so high that it intercepts the Y axis above the demand curve.**  
**The negative externality here is pretty big in terms of fear for both current and potential students so you could make an argument for closing the club on efficiency grounds.**

**Points:**  
**Graph: 3 points.**  
**Opinion: 1 point.**

**Q2. (14 points)**

Suppose there are 5 individuals living in a house. Each benefit from gas used to heat the house. Each individual's willingness to pay is characterized by  $P = 11 - Q$ , where  $Q$  is units of gas used to heat the house and  $P$  is the price per unit.

Each unit of gas purchased by any one individual is enjoyed by all members of the house.

The marginal cost of each unit of gas is constant at 10 and that the gas market is competitive.

- a. Suppose one member of the house, Edith, makes the heating decisions for the house and pays all costs. How much gas will Edith choose to purchase?

**Answer: 2 points.**

**Set  $D=MB=P$  or  $11-Q=10$  and we get  $Q=11-10=1$**

**Points: 2**

- b. Why is the quantity in part a) not efficient? Explain carefully.

**Answer:**

**For efficiency we want  $MC=SMB$ . Here 5 people benefit from the unit of gas and we get  $SMB=5*(11-1)=50>10=MC$ .**

**Points: 3**

**1 for here  $MC \neq SMB$**

**1 for intuitive explanation**

**1 for careful calculation**

- c. My suggestion is that the household purchase 9 units of gas. Do you agree with my suggestion? Explain why you do or do not agree.

**Answer:**

**Agree. At 9 units each consumer gets  $MB=11-9=2$ .**

**We therefore get  $SMB=5*2=10=MC$**

**Points: 3**

**1 for  $MB=2$ .**

**2 for  $SMB=MC$ .**

- d. Suppose Edith can be offered a per unit subsidy. How large should the subsidy be in order to encourage Edith to buy the efficient amount of gas? Explain your answer.

**Answer:**

**To get Edith to purchase 9 units the price must be 2 per unit ( $2=11-9$ ).**

**That means that the subsidy must be  $10-2=8$  per unit.**

**Points: 3. Must have method/explanation.**

- e. The remaining four members of the house are to vote on whether or not to implement the subsidy from part d), but each must pay  $\frac{1}{4}$  of the subsidy. Will they vote for the subsidy or not? Hint: use their consumer surpluses. Explain your work.

**Answer:**

**We can calculate the benefit for each member by the trapezoid under the demand curve up to  $Q=9$ . That is  $(11+2)*9/2=58.5$**

**Minus the subsidy of  $2*9$  we get  $58.5-18=40.5>0$ , so the subsidy makes them better off and they should vote for it.**

**Points:**

**3 points. The method is what earns the points.**

### Part III: Short Answer Questions 3&4.

Please use one Blue Book to answer Q3 & Q4.

#### Q3. (20 points)

This question asks you to analyze the labor market of cranberry pickers. Cranberries are sold in a competitive market at \$25/barrel and firms hire cranberry pickers in a competitive labor market. The supply of cranberry pickers is given by  $S_L: w=200+L$  and the demand  $D_L: w=800-2L$ .  $L$  denotes the number of workers hired and  $w$  denotes the weekly wage rate.

- a. Draw the supply and demand curve of labor. Why is the demand curve downward sloping? Explain.

**Answer:**

**Demand is downward sloping because firms hire labor up to the point where  $w=MRP=MP(I)*P$  (cranberries).  $MP(I)$  is downward sloping due to the law of diminishing marginal productivity and hence the demand will be downward sloping.**

**Points: 4**

**1 for derived or  $w=MRP$**

**1 for  $MRP=MP(I)*P$  (output)**

**1 for  $MP(I)$  diminishing**

**1 for law of diminishing marginal productivity.**

- b. Calculate the equilibrium wage rate and employment level and label them on the graph which you have drawn for part a.

**Answer:**

**Set  $200+L=800-2L$  we get  $L=200$  &  $w=400$ .**

**Points: 5**

**2 each.**

**Show on graph: 1**

- c. The union claims that the cranberry pickers are being underpaid and wants the government to impose a higher minimum wage rate of \$X per week. They realize this would lead to an unemployment level of 60 workers. Calculate X and show graphically the level of employment and unemployment on the same graph which you have drawn for parts a & b.

**Answer:**

**Set  $L_s-L_d=60$  or  $(w-200)-(800-w)/2=60$ .**

**We get  $w=440$   $L_s=240$   $L_d=180$  (note  $L_s-L_d=60$  as needed)**

**Points: 4**

**Set up: 1 point**

**W, Ld & Ls: 1 point each (Ld & Ls can be graphically)**

**If only did graphically: 2 points**

- d. The union is pleased with the wage rate of \$X found above but wishes to decrease the unemployment. It decides to offer a training program to increase the productivity of the workers. Show graphically how this could reduce unemployment and still ensure higher wages. No need for exact numbers here.

**Answer:**

**Increased productivity would increase demand for labor. If we shift it enough we get  $w=440$  without unemployment.**

**Points:3**

**Increased productivity would increase demand for labor:1**

**reduces unemployment:1**

**Shift in graph: 1**

- e. Suppose that there is no minimum wage and productivity has not improved. Nonetheless the union wants wages to be at X. Luckily a new study that shows the benefit of cranberry juice has increase demand for cranberries and as a result the price of cranberries has doubled. Will the union achieve the higher wages without unemployment? To get full credit you must answer numerically, but a graphical approximation will earn partial credit.

**Answer:**

**An increase in the price of the output will rotate demand for labor out and wages will increase.**

**To check numerically:  $w=2(800-2L)=1600-4L$**

**We now get equilibrium where  $1600-4L=200+L$  or  $1400=5L$   $L^{**}=280$  &  $w^{**}=480>440$ .**

**Points:4**

**Rotation out of demand curve: 1 point.**

**Correct numerically: 1 point**

**Correct L & W: 1 point.**

**Graphical intuition of L & w: 1 point**

**Q4. (6 points)**

George Naylor, our favorite Iowa corn farmer, is considering switching to hybrid corn seed BSS 131. To purchase this corn he will have to pay an additional \$10,000 today. Because this corn is stronger, he expects to have higher yields and earn \$12,000 more when he sells his corn a year from now.

- a. If the interest rate is 10%, what is the (additional) Net Present Value of using BSS 131?

**Answer:**

$$\text{NPV} = \text{PV} - \text{Cost} = 12,000 / (1.1) - 10,000 = \$909.09$$

**Points: 2**

**1 for set up**

**1 for answer**

- b. The recent credit crisis has made it more difficult to borrow money and the interest rate Mr. Naylor faces is higher. How will this effect his decision?

**Answer:**

**With higher interest rates PV is lower and so NPV is lower. With high enough interest rate the NPV will be negative and Mr. Naylor will choose not to invest in the new product.**

**Points: 2**

**1 for NPV lower**

**1 for link to decision.**

- c. What does this example tell us about the shape of the demand for capital?

**Answer:2**

**Demand downward sloping as lower interest rates make NPV larger and therefore more investments worth while.**

**Points: 2**

**1 for downward sloping.**

**1 for explanation linking NPV and downward demand.**