Econ 001: Final Exam   (Dr. Stein) answer Key
May 1st, 2013

Instructions:

- **This is a 120-minute examination.**
- **Please see instruction on the back page of the exam.**
- **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.**
- Calculators are not allowed on this exam.

Part I:
Multiple Choice Questions (4 points each/48 points total).
Please write your answers in blue book 1.

1. Ellie's Tuesday morning class was cancelled! She now must decide how to spend her extra-time.
    She has three, mutually exclusive, options for activities: go to the library and study for her Econ final, which costs her nothing and which she values at $15, go to a movie, which costs her $5 and which she values at $30, or have lunch with a friend, which costs her $15 dollars and which she values at $55.
    What is the opportunity cost of having lunch with her friend?

    a. 0
    b. 10
    c. 25
    d. 35
    e. 40
    f. 45
    g. 50

2. Audrey has noticed that the market price for roses has decreased by 5%. Being a fantastic economist, she concludes from this fact that:

    a. the supply of roses has decreased.
    b. the supply of roses has increased.
    c. the demand of roses has not changed.
    d. she needs more information to analyze the market.

3. The government is attempting to help consumers by imposing a maximum price of 25 cents per apple. The president (you're a member of his cabinet) asks you to estimate the deadweight loss of this policy.
You know that without the policy the price of apples would have been 35 cents and 2000 <u>more</u> apples would have been produced.
Assuming straight-line demand and supply curves (with slopes of 1), what do you tell him?

    a. 50 dollars
    b. 100 dollars
    c. 200 dollars
    d. 400 dollars

4. First Lady, Michelle Obama, is pushing for a subsidy of healthy foods such as apples. She states that such a policy will have the following effects:

    I. make apples more affordable.
    II. encourage more people to buy apples.
    III. make society better off.

If being healthy is good not only for the consumer but for society at large, which claims do you agree with? (Assume a downward sloping demand and upward sloping supply).

    a. Only I.
    b. Only II.
    c. Only III.
    d. Only I. and II.
    e. Only II. and III.
    f. All three claims are correct under this assumption.

5. Alice and her friends, the Mad Hatter and the March Hare, produce tea cups and hats with their labor and some raw materials.
   If they produce only hats, then they can produce 15 in a day, and if they produce only tea cups, then they can produce 20 in a day.
   Suppose that the outside world offers them a trade at a price of X hats/teacup.
   Under which values would they take this trade?

   a. Only if X is less than 3/4
   b. Only if X is bigger than 4/3
   c. Only if X is between ¾ and 4/3
   d. They are likely to take this trade at any value of X listed above.

6. Evan consumes two goods: Instant Soup and coffee. Coffee is an inferior good.
   If the price of Instant Soup goes down, while the price of coffee and income remain the same, which of the following statements must be true?

   I. Evan will buy more Instant Soup.
   II. Evan will buy more Coffee.
   III. Evan will buy the same amount of Coffee.

   a. I only
   b. II only
   c. III only
   d. I and II only
   e. II and III only
   f. I and III only
   g. I, II and III
   h. None of these statements must be true

7. Audrey claims that Fresh Grocer is a monopolist, controlling the market for groceries on Penn's campus.
Jonathan says that the market for groceries is instead monopolistically competitive.
Which of the following supports Jonathan's claim?

   a. Audrey knows that Fresh Grocer's marginal revenue is downward sloping.
   b. Audrey knows that the market for groceries is inefficient.
   c. Jonathan buys milk at both Wawa and at Fresh Grocer, but his choice depends on what other products he wants to purchase that day.
   d. Both firms have short run profits.

8. Jose sells corn in a competitive industry. Recently, he hired a financial analyst to analyze his firm's performance. The analyst recommends that Jose continues to operate, but warns him that he will be operating at a loss.
The analyst must have concluded that the firm's

   a. Average Revenues exceed Average Total Costs.
   b. Average Revenues exceed Average Variable Costs.
   c. Marginal Cost equals Average Total Cost.
   d. Both a and b are correct.

9. Between 2000 and 2013 the price of walnuts has increased.
Which of the following scenarios could explain this?

   I. A health study came out in 2011 extolling the benefits of eating walnuts and the market in 2013 is not yet in a long run equilibrium.
   II. The market for walnuts is in a long run equilibrium in both years, but between 2000 and 2013 a higher price of walnuts increased the rental price of land for growing walnuts.

   a. Only I.
   b. Only II.
   c. Both I. and II.
   d. Neither I. or II.

10. The market for pancake chefs is characterized by the following equations:

D_L: w = 1000 – 2L
S_L: w = 0.5L

The minimum wage in this market is equal to the current equilibrium wage.
What is the minimum wage?

a. W_{min}=100
b. W_{min}=200
c. W_{min}=400
d. None of the above.

11. The market for pancake chefs is characterized by the following equations:

D_L: w = 1000 – 2L
S_L: w = 0.5L

The minimum wage in this market is equal to the current equilibrium wage.
We know that the price of pancakes has recently changed, and as a result, there is unemployment of 100 workers in the market for pancake chefs.
How has the price changed?

a. The price of pancakes is now double the original price
b. The price of pancakes is now ½ of the original price
c. The price of pancakes is now 1/3 of the original price
d. The price of pancakes is now 3 times the original price
e. A change in the price of pancakes would not cause unemployment in this case.

12. President Obama is pushing for an initiative to fund pre school education for all children. He says: we pay the cost up front but this investment is worthwhile as it has a high return over the lifetime.
Obama is more likely to be correct:

a. The higher is the interest rate.
b. The lower is the interest rate.
c. He is correct for all interest rates greater then zero.
d. There is no interest rate where this investment is economically sound.

13. A regressive tax will:

     I. decrease the Gini coefficient
    II. move the Lorenz curve closer to the 45 degree line
   III. be a larger part of the income of the rich vs. the poor.

    a. Only I
    b. Only II
    c. Only III
    d. Only I and II
    e. Only II and III
    f. Only I and III
    g. All three statements are correct
    h. None of the statements are correct.

Answer Key:
1. e
2. d
3. c
4. f
5. d
6. a
7. c
8. b
9. c
10. b
11. b
12. b
13. h

This is still Part I: Please answer in blue book 1.
Q1. (**21 points**)
Please show your work!

Unemployment in the US is finally starting to fall. We will use the market for waiters in New York to analyze the case.

   a. Draw a typical supply & demand graph for New York waiters. Assume that at any wage the substitution effect of higher wages dominates the income effect. Mark the equilibrium wage. What is the level of employment and unemployment at the equilibrium wage rate?

   b. We are told that there is unemployment in this market and that waiters are paid a minimum wage. Add a minimum wage that is consistent with this claim. Show the unemployment on your graph.

   c. As the American economy improves consumers have increased their average spending on meals out. How will this affect the market for waiters? Explain any shifts in the supply & demand for labor. Show graphically the new employment & unemployment at the minimum wage. Assume there is still unemployment.

   d. Now assume that the change in c reduced unemployment to zero despite having a minimum wage. Show this case graphically.

   e. The Obama administration is planning to raise the minimum wage rate. Why is this likely to cause unemployment among New York waiters but not among professors of economics? Explain using the terminology we learn in class. (Assume both markets have similar shaped supply curves.)

a. Answers:
Typical graph. The equilibrium wage marked w*. Employment is L*. There is no unemployment.

Points: 4
Graph: 1
Equilibrium wage: 1
Employment:1
Zero unemployment: 1

b. Answers:
$W_{min} > W^*$

Unemployment is the difference between L$_s$ and L$_d$ at W$_{min}$

Points: 4
Setting minimum wage above w*:2
Correctly marking unemployment: 2

c. Answers:
The higher price for meals out, P$_x$, makes the demand for waiters rotate out because D$_L$ = MRP$_L$ = MP$_L$*P$_x$.
Employment is equal to L$_d$'(W$_{min}$) > L$_d$(W$_{min}$).
Unemployment is equal to (Ls(W$_{min}$) − L$_d$'(W$_{min}$))

Points: 6
Demand for labor rotates (holding X- intercept fixed) (1) out (1): 2
Employment market correctly: 2
Unemployment market correctly: 2
(If answered as if this is a wage ceiling maximum 2 out of 6)
d. Answers:
Demand for labor needs to rotate enough that the minimum wage is no longer binding.

Points: 3

e. Answers:
The minimum wage is not binding for professors of economics while it is for waiters because the marginal revenue product of professors of economics is higher than the marginal revenue product of waiters.

Points: 4
Connecting to MRP: 2
Understanding that the demand for professors is higher because their MRP is higher: 1
Understanding that therefore the minimum wage is not binding in this case: 1

Part II: Please answer in blue book 2.
Q2. (**21 points**)
A military coup deposes the leader of North Korea, and the new reform-minded government invites a team of development economists, led by you, to consult on how to reform the economy.
First on the agenda is re-structuring the economy to build infrastructure to most effectively deliver cable television to Pyongyang. Your economists estimate that the marginal cost of delivering cable television is 0$, and that it has a fixed cost of 1,000$ to lay the infrastructure. Furthermore, they estimate that demand is given by P = 1000 - Q and if one firm produces the good the marginal revenue is given by MR = 1000 - 2Q.

    a. You recommend to the leader of the military junta giving LG Telecom, a South Korean company, exclusive rights to supply cable services to Pyongyang. Find the price and quantity of service that LG Telecom will provide.

    b. What is the marginal cost and the marginal benefit at this price and quantity? Why is this not an efficient outcome? What is the efficient outcome?

    c. The leader of the junta furiously protests. He heard that competitive markets led to efficient outcomes, but here you are proposing an inefficient policy. He's about to drop you into the shark tank when Alberto, an economist on your team, intervenes and proposes an amendment: LG Telecom will be paid some money per subscriber. How much money does Alberto propose that LG Telecom be paid per customer in order to reach the efficient outcome and how did he arrive at that number?

Suddenly an objection to this policy is raised: watching cable television is known to reduce mental and physical activity. This will impact economic activity nation-wide and cause society a negative impact of X dollars per customer.

    d. What is the social marginal cost of proving cable television under this new assumption (write it as an expression of X)?

    e. What is the efficient outcome under this new assumption (write Q^{eff} as a function of X)?

    f. Nick, another economist on your team, exclaims in joy: "I have measured the size of X and I am delighted to say that there is no need to subsidize the monopoly at all. It will provide the efficient outcome even without a subsidy!" How big is X for Nick to be correct?
    g. The leader of the junta wants to reward Nick for his brilliance by giving him the equivalent of the Dead Weight Loss that would have been generated by following Alberto's suggestion. How big should this reward be? Is this award efficient? Equitable?

a. Answers:
Setting MC=MR we get 0=1000 - 2Q or $Q^M = 500$; $P^M = 1000-Q^M=500$;

Points: 2
$Q^M = 500$: **1**
$P^M = 500$: **1**

b. MC = 0; MB = 500
This is not an efficient outcome as MB>MC (see part b)
The efficient outcome is where MB=MC or 100-Q=zero $Q^{eff}=1000$

Points: 4
MC = 0: **1**
MB = 500: **1**
Not efficient:**1**
$Q^{eff}=1000$: **1** (1/2 for set up, 1/2 for answer)

c. Answers:
The payment, s, must be such that MR=MC'=MC-s at Q=1000, where s is the per unit subsidy.
Setting up 1000-2*1000=0-s we solve for s=1000 <u>per unit.</u>

Points: 3
Set up: **2**
s=1000: **1**
(if divided 1000 by 100 to get a per unit subsidy of 1: 1 out of 3 points)

d. Answers:
   SMC = PMC + X= X

Points: 2
Set up: **1**
Answer: **1**

e. Answers:
MSC=MB➔
X = 1,000 – Q ➔ Q = 1,000 – X

Points: 3
Set up: **2**
Answer: **1**
f. Answers:
We know from part a that the firm will produce $Q^M=500$. For this to be efficient we must have 500=1,000-X or X = 500

Points: 2

Set up: 1
Answer: 1

g. Answers:
The DWL at Q=1000 would have been (1000-500)*500/2=125,000
Giving this money to Nick is efficient as it does not reduce the size of the pie but is rather just a re-allocation of it, giving Nick a nice big chunk.
I am inclined to say that Nick deserves this. He is a very nice TA and wrote this question, so I believe it is equitable. But you may disagree with this last point.

Points: 5
Calculating DWL: 2
Efficient: 2
Equitable or not: 1

TEAR OFF THIS PAGE AND HAND IT IN WITH YOUR BLUE BOOKS!!
Part III: Short Answer Questions 3.
Q3. (**10 points**)

This question asks you to analyze contributions to WHYY, our local public radio station. You have been hired as a consultant for their upcoming membership drive. During that drive people will be asked to make a donation to be come "members" of the public radio station. There are no monetary benefits of becoming a member.

a. What are the characteristics of a pure public good? Is a radio station such a good?

As a consultant to WHYY you are concerned that there will be free-riding in the membership drive. You decide to use your knowledge of game theory to explain the free-rider problem. You write out the following two games for two prospective members, Lucy and Mark-Anthony (M-A):

Game A:

		Lucy	
		Donate	Not Donate
Mark-Anthony	Donate	Lucy: 8 M-A: 8	Lucy: 10 M-A: 3
	Not Donate	Lucy: 3 M-A: 10	Lucy: 4 M-A: 4

Game B:

		Lucy	
		Donate	Not Donate
Mark-Anthony	Donate	Lucy: 8 M-A: 8	Lucy: 2 M-A: 3
	Not Donate	Lucy: 3 M-A: 2	Lucy: 10 M-A: 10

b. Find the Nash Equilibrium(S) of each game.

c. Does either game have a dominant strategy for any of the players? If so, which?

d. Does either game lead to a Pareto efficient outcome? Explain.

e. Which of the two games is more suited as a description of the free rider problem? Why?

Answers:
a. A pure public good is non-rival (MC = 0) and non-excludable (you can't prevent other people from benefiting of it).

Yes, radio station is such a good.
Points: 2. One for each characteristic.

b. Game A: there is a unique NE where both Mark-Anthony and Lucy do not donate. Game B: there are two NE, one where both Mark-Anthony and Lucy donate and one where both Mark-Anthony and Lucy do not donate.
Points: 3. 1 for each NE.

c. In Game A, Not Donate is a dominant strategy for both players.
Points: 2 (1 for each game)

d. Game B leads to the Pareto efficient outcome where both Mark-Anthony and Lucy do no donate. Any deviation from the outcome causes at least one of the two to be worse off.
Points: 2 <u>(Let's discuss partial credit)</u>

e. Game A is more suited as a description of the free-rider problem because if Lucy donates, Mark-Anthony takes advantage of that and chooses to not donate, and vice-versa.
On the contrary, in game B, if one of them donates, the other one chooses to donate as well.
Points: 2 (1 for each game)

Your Name: _____

TA: _____

This is the Back Page

- This is a 120-minute examination.
- You will need 2 blue books.
- Write answers to MC questions and short answer 1 in blue books #1
- Write answers to short answer 2 in blue books #2
- Write answers to short answer 3 on the exam itself and hand in that page.
- 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.**
- Calculators are not allowed on this exam.

My signature certifies that I have complied with the University of Pennsylvania's Code of Academic Integrity in completing this examination.

Please sign here _____ **date** _____