ECON 001   Name (Print): _____

Fall 2017

Final Exam   Recitation Section: _____

December 18, 2017

Time Limit: 120 Minutes   Name of TA: _____

- This exam contains 14 pages (including this cover page) and 17 questions. Check to see if any pages are missing.

- The exam is scheduled for 2 hours.

- This is a closed-book, closed-note exam, no calculator exam.

- Answer each multiple choice question by writing the correct answer on the line at the right margin of the corresponding question. Make sure that your answer is clearly written or it will be marked incorrect.

- Write your answers to the short answer questions in the spaces provided below them. If you don't have enough space, continue on the back of the page and state clearly that you have done so.

- Do not remove any pages or add any pages. No additional paper is supplied

- Show your work when applicable. Use diagrams where appropriate and label all diagrams carefully.

- You must use a pen instead of a pencil to be eligible for remarking.

- This exam is given under the rules of Penn's Honor system.

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 _____

Question	Maximum	Grade
MC (Q1-14)	39	
1st SA (Q15)	21	
2nd SA (Q16)	24	
3rd SA (Q17)	16	
Total	100	

Multiple Choice Questions (best 13 out of 14: 39 points)

1. (3 points) Mark Zuckerberg, the CEO of Facebook, is running late to an important meeting that will will increase his paycheck by $1 million if he attends it, and take up $5,000 worth of his time. He sees a $100 bill on the ground. Reaching down to pick it up will cost him $2,000 of his time, and will make him miss the meeting. What is his opportunity cost of reaching down to pick up this bill?

   A. $997,000   B. $993,100   C. $7,000   D. $3,100

   1. _____

2. (3 points) In the Paradise City, Jack and Annie produce plates and cups with their labor and some raw materials. Each day, Abe can produce either 200 plates or 100 cups, while Sarah can produce either 100 plates or 200 cups. Suppose that the outside world offers them a trade at a trading ratio of x plates/cup. Under which values of x would they take this trade?

   A. Only when $x \leq 0.5$ B. Only when $x \geq 2$ C. Only when $0.5 \leq x \leq 2$
   D. They are likely to take this trade at any value of x listed above

   2. _____

3. (3 points) The market for corn has a linear upward sloping supply and a linear downward sloping demand. The government has decided to enact a per unit tax on the market for corn. A more inelastic Demand curve would result in:

   A. A larger decrease in quantity after the tax   B. A smaller change in the price received by sellers
   C. A smaller change in the price paid by buyers   D. A larger deadweight loss

   3. _____

4. (3 points) Assume that the market for apples has a downward sloping demand and an upward sloping supply. Otherwise noted, assume there are no externalities in the market. Consider the following cases:

   I. The government imposes a per unit tax on apple sellers.

   II. The government imposes a price ceiling in the market for apples.

   III. Apple consumption creates a positive externality and the government imposes a per unit subsidy on apple sellers.

   In which of the cases could the market produce at the efficient quantity?

   A. Only I   B. Only II   C. Only III   D. Only I and II   E. Only I and III
   F. Only II and III   G. All of them   H. None of them

   4. _____

5. (3 points) A firm in a perfectly competitive industry is producing in the short run $q = 5$ and the price in the market is $10. The firm decides to exit the industry in the long run. Based on this, which of the following statements is correct?

   I. AVC at $q = 5$ is less than or equal to $10

   II. ATC at $q = 5$ is less than or equal to $10

   A. I only   B. II only   C. Both I and II   D. Neither I nor II

   5. _____

6. (3 points) Larry's Laptops Inc. is a perfectly price discriminating monopolist that produces laptops with a marginal cost of $MC = Q$. Larry's Laptops faces a demand curve characterized by the following equation: $P = 1500 - 2Q$. Which of the following statements is/are true?

   I. Larry's Laptops' marginal revenue curve is given by $MR = 1500 - 4Q$.

  II. Larry's Laptops charges $P = \$500$ for every laptop sold.

 III. Larry's Laptops charges $P = \$900$ for every laptop sold.

A. Only I   B. Only II   C. I and III   D. All of the above   E. None of the above

6. _____

7. (3 points) Suppose it is the year when the iPhone M (1,000) has finally come out, and Apple is now a monopoly in the smartphone industry. After careful analysis, you conclude that the cost of producing one iPhone M is $MC = 12Q$ and that Apple faces a demand of $P = 200 - 4Q$ (where P is in dollars and Q is in millions). How many iPhones M should Apple produce as a profit-maximizing monopoly? What price should they charge per phone?

A. $12,500,000$ iPhones M at \$150 each   B. $12,500,000$ iPhones M at \$100 each
C. $10,000,000$ iPhones M at \$160 each   D. $10,000,000$ iPhones M at \$120 each

7. _____

8. (3 points) NVIDIA and AMD are the two largest companies that produce GPU (graphics processing unit). They can maximize their joint total profit If they collude to produce a low quantity. However, they have incentives to deviate from a collusion agreement. Below is a matrix of their profit when they produce at different quantities. In each cell the row player gets the first payoff, and the column player gets the second payoff.

		AMD	
		Low quantity	High quantity
NVIDIA	Low quantity	$40, 40$	$20, 50$
	High quantity	$50, 20$	$30, 30$

   I. In the Nash Equilibrium, both companies produce at high quantity

  II. The Nash Equilibrium is a dominant strategy equilibrium

 III. The Nash Equilibrium is the only outcome that is not Pareto efficient

A. Only I   B. I and II   C. I and III   D. I, II and III

8. _____

9. (3 points) Consider an economy with only two goods, wheat and milk. Which of the following statements must be true?

A. The income effect increases milk consumption when the price of wheat increases
B. The substitution effect increases wheat consumption when the price of milk decreases
C. Both goods are normal
D. At least one good is normal

9. _____

10. (3 points) Assume that you can either spend your income on apples or bananas, and that you only consume these two goods. Suppose that bananas are an inferior good and that apples are a normal good. If there is an increase in the price of bananas, which of the following statements is correct?

A. The substitution effect will lead to a decrease in the consumption of apples
B. The income effect will lead to an increase in the consumption of bananas
C. If bananas are a Giffen good, the substitution and income effect combined will lead to an overall decrease in the consumption of bananas
D. If bananas are an ordinary good, the substitution and income effect will lead to an overall increase in the consumption of bananas
E. None of the above

10. _____

11. (3 points) The market for for warehouse workers in Amazonland is perfectly competitive, with a demand $w = 10 - L$ and a supply $w = 1 + 2L$, where L is in thousands of workers and w in dollars. The government of Amazonland sets a minimum wage of \$6 per worker. What wage per worker will a warehouse owner pay?

A. \$3   B. \$6   C. \$7   D. \$8

11. _____

12. (3 points) A monopsonistic labor market is currently in equilibrium. Suppose that the government implements a minimum wage above the monopsony equilibrium wage level. Which of the following outcomes is/are possible?

   I. Employment increases

  II. Employment decreases

 III. Employment remains the same

A. Only I   B. Only II   C. II and III   D. I and III   E. All of the above

12. _____

13. (3 points) People in an economy can produce bicycles. Suppose leisure is a normal good. A decrease in retirement age will _____ the unemployment level and _____ the quantity of bicycles sold. Here we compare the new equilibrium with the old one.

A. decrease; decrease   B. increase; decrease   C. not change; decrease
D. decrease; increase   E. increase; increase   F. not change; increase

13. _____

14. (3 points) Which of the following must reflect a move toward a more equal distribution of income?

   I. The gini coefficient increases by 10%

  II. A policy that decreases every citizen's income tax by 1%

 III. A non taxable transfer of \$1,000 from the government to every household

A. None of the above   B. Only I   C. Only II   D. Only III
E. I and II   F. II and III   G. I, II and III

14. _____

Short Answer Questions (61 points total)
To get any point you must show your work.

15. Consider the market for labor underlying the candy manufacturing industry in the city of Philadelphia. Assume that the labor market is perfectly competitive, with a downward sloping demand and an upward sloping supply. The labor supply is given by Supply : $w = L + 2$, where w is the wage per hour worked and L is the number of employees in thousands. The marginal product of labor is given by $MP_L = 10 - 0.5L$. The market for candies is in equilibrium and the price of a candy is \$2.

    (a) Based on the information given, can leisure be a normal good? Explain.

    (b) Find the equilibrium wage and the level of employment. Is there unemployment? If yes, how many people? Is the market outcome efficient? Explain why or why not.

    (c) The demand for candies goes up. How does this change in the market for candies affect the underlying labor market? Describe the change in words *(more space on the next page)*, and show it on the graphs below. What happens to equilibrium wage, employment, and unemployment? *We do not expect a numerical answer.*
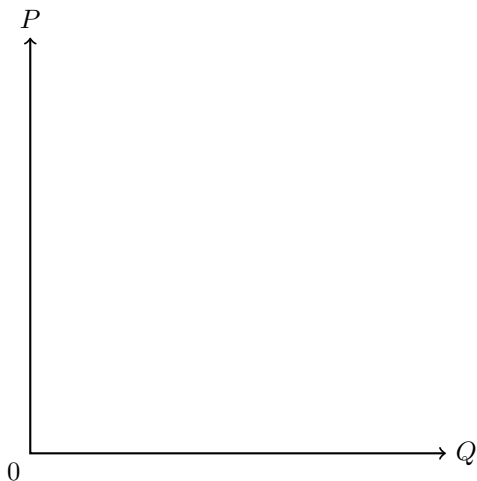
P

0 — Q

Figure 1: **Market for candies**
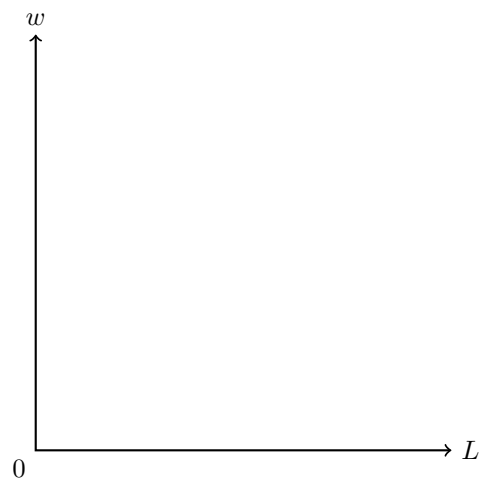
w

0 — L

Figure 2: **Market for candy workers**

Now and for the remainder of the question, suppose that the market for candy manufacturing workers is actually composed of a single employer (a monopsony). Suppose that the labor supply and demand are still the same as in part (b), which yields the following marginal cost of labor: $MC_L = 2L + 2$.

(d) On the graph below, draw the demand, supply and marginal cost of labor in such a case. Make sure to label all intercepts. Explain why the marginal cost of labor is higher than the supply for labor.

w

0 $\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ L (thousands)
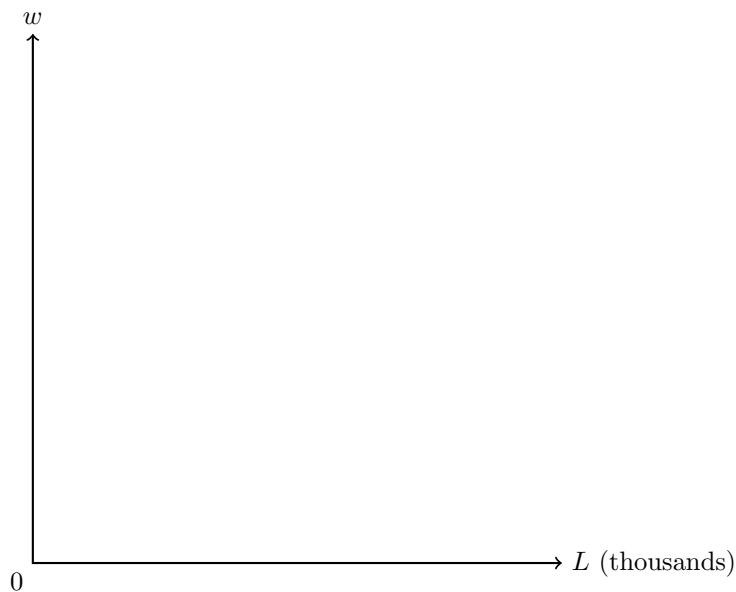
(e) Find the monopsony wage w_m and level of employment L_m, and label them on the graph in part (d). What is the unemployment level? Show your work.

(f) Realizing that the workers' wage is too low under the monopsony, the government is considering imposing a minimum wage at $w = 10$. With that minimum wage, what would be the employment level, the wage, and the unemployment level? Would that minimum wage make workers better off (compared to part(e))?

(g) Seeing the government imposition of the minimum wage, the representative of candy manufacturing workers says: "although I am happy with this minimum wage, in a monopsony workers always benefit from an increase in the minimum wage". Do you agree or disagree with this statement? Why or why not?

16. Assa loves Chinese food and only goes to the food truck "Yuekee". He spends $400 on eggplant tofu and coke every month. Each serving of eggplant tofu costs $5 dollars and a can of coke sells at $2.

(a) Suppose Assa buys 125 cans of coke every month.
   - Draw a graph with his budget line and label it BL_1. Make sure to label intercepts.
   - Draw a standard indifference curve consistent with Assa's choice and label it IC_1.
   - Label Assa's optimal consumption point A on the graph. Make sure to label A's coordinates.
   - What is the marginal rate of substitution (MRS) at point A?

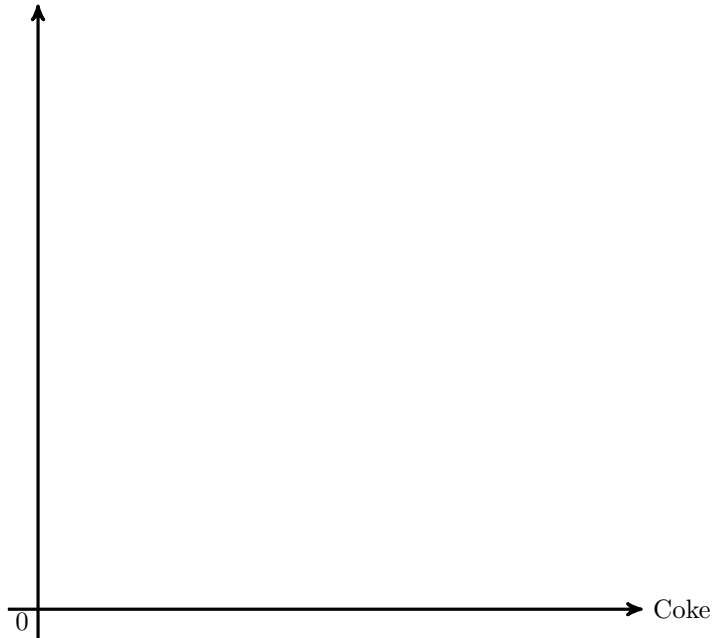Eggplant tofu

0   Coke
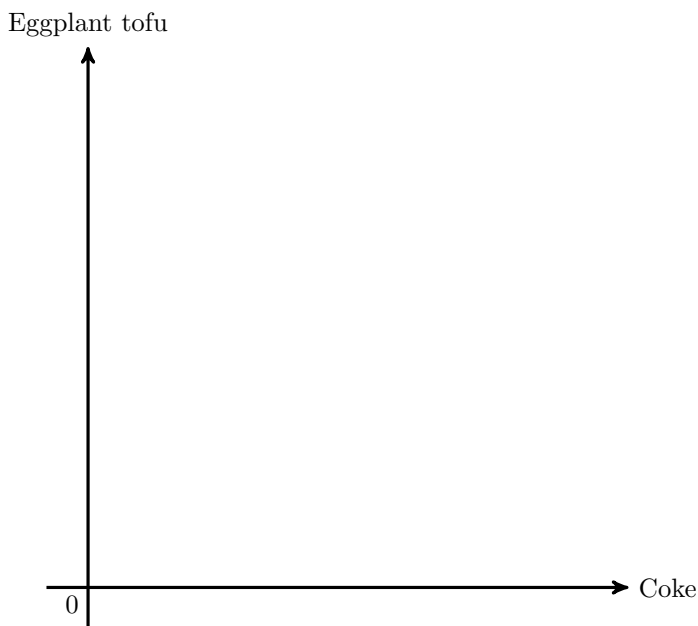
(b) The new government realizes that university students are important and passes a bill to reduce the tax on students' wages. Now Assa has $500 to spend at Yuekee and consumes 150 cans of coke.

   i.
   - Draw the new budget line on the graph from part (a), and label it BL_2. Label intercepts.
   - Draw a standard indifference curve consistent with Assa's choice and label it IC_2.
   - Label the new consumption point B on the graph. Make sure to label B's coordinates.

   ii. Consider the impact of the bill on Assa's consumption of coke and eggplant tofu. Is the income effect greater or smaller than the substitution effect? Determine whether each of these goods is a normal or an inferior good for Assa. Explain.

(c) Assume that the bill is repealed, so Assa is back to his initial budget of $400 and his budget line BL_1. Moreover, Pennsylvania passes a tax on soft drinks which increases the price of coke from \$2 to \$4. As a result, Assa now consumes 75 cans of coke. On the graph below:

- Draw BL_1, label point A and draw IC_1 as in part (a).
- Draw the new budget line after the price change. Label it BL_3. Make sure to label intercepts.
- Label the new consumption point C on the graph. Make sure to label coordinates.

Eggplant tofu

0   Coke

(d) Let us decompose the change in consumption into substitution effect (SE) and income effect (IE).

- What is the substitution effect of the increase in the price of coke on Assa's consumption of coke and eggplant tofu? *Use words. We do not expect a graphical answer.*

- Using your answer to part (b)ii., what is the income effect of the increase in the price of coke on Assa's consumption of coke and eggplant tofu? *Use words. We do not expect a graphical answer.*

- On the graph from part (c), draw a "phantom" budget line and place a "phantom" consumption point that would capture the distinction between susbtitution and income effect, consistently with your answer to parts (d)i and (d)ii. Clearly label this point P.

(e) Now assume that eggplant tofu and coke become perfect complements for Assa. Assa's budget is $400 and prices are \$5/serving of eggplant tofu and \$4/can of coke, so his budget line is BL_3.

    i. Assume that Assa's optimal consumption point is D, shown on the graph below. Draw Assa's budget line BL_3 and the corresponding indifference curve IC'.
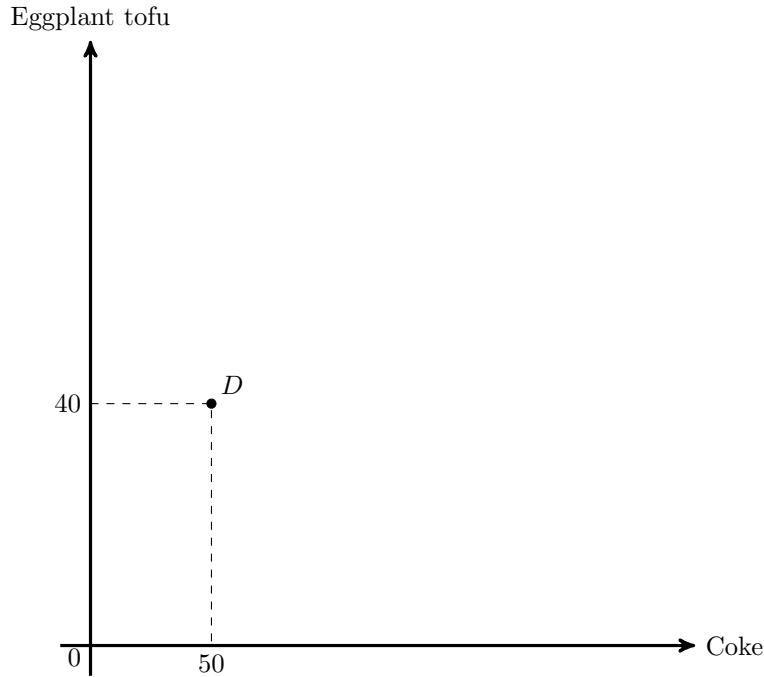
Eggplant tofu

    ii. Suppose the price of eggplant tofu increases to \$10/serving. On the graph from part (e)ii., show Assa's new budget line BL_4, and his new consumption bundle E. Where would the phantom point P be on the graph, in relation to point D and/or E? Explain. *We do not expect you to graph substitution and income effect in this part.*

17. Rick and Morty, the only inhabitants of Planet Earth, have found intergalactic security drones that can guard their house from any threats. Their individual marginal benefits (MB) are given by:

   - Rick: $MB = 30 - 3Q$
   - Morty: $MB = 50 - 2Q$

   The cost of producing each drone is constant at $MC = \$40$.

   (a) State and explain the two characteristics of a public good.

   (b) On the graph below, draw the marginal cost MC, as well as Rick's and Morty's marginal benefits. Label Rick's MB_r and Morty's MB_m. Make sure to label all intercepts.

   (c) How many drones would each of them produce individually?

(d) The objective in this part is to find the socially efficient quantity of drones.

    i. Find the combined (social) marginal benefit SMB of Rick and Morty for three different quantities: $Q_1 = 5$, $Q_2 = 10$, $Q_3 = 15$.

    ii. Using your reasoning from part (c)i., draw the social marginal benefit from drones on the graph from part (b) and label it SMB. Make sure to label the intercepts.

    iii. What is the socially efficient quantity of drones?

(e) Now, suppose that the production of security drones is privatized: Gearhead Inc. becomes a monopoly in the production of security drones, facing a market demand equal to the SMB you found in part (d)ii., and producing at the marginal cost $MC = \$40$. How many drones will Gearhead Inc produce? Is this market efficient? Explain.