

ECON 001
Spring 2018
Midterm 1
February 13, 2018
Time Limit: 60 Minutes

Name (Print): _____
Recitation Section: _____
Name of TA: _____

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- This exam contains 8 pages (including this cover page) and 11 questions. Check to see if any pages are missing.
 - The exam is scheduled for 1 hour.
 - 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 other 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 (Q1-9)	40	
1st SA (Q10)	30	
2nd SA (Q11)	30	
Total	100	

Multiple Choice Questions (best 8 out of 9: 40 points)

1. (5 points) Tamara is planning to go on a trip over spring break to the Grand Canyon. She has already bought her plane ticket for \$200 and booked an Airbnb for \$350. However, she finds out that all of her friends are going to Orlando and decides to switch her plans to go with them. She gets \$300 of benefit from going with her friends, is able to cancel her Airbnb with a full refund, and spends \$75 to switch her flight from the Grand Canyon to Orlando. What is the opportunity cost of going to the Grand Canyon?

- A. \$575 B. \$775 C. \$375 D. \$200

1. **A**

2. (5 points) The US, England and France can each manufacture cars and airplanes. In one day, the US can make 10 cars and 20 airplanes, England can make 5 cars and 25 airplanes, and France can make 15 cars and 3 airplanes. Which of the following is true:

- I. France and England both have comparative advantage in cars
- II. The US has absolute advantage in both cars and airplanes
- III. If France is trading, then we know it will import airplanes
- IV. England has comparative advantage in airplanes

- A. III and IV B. IV C. I, II, IV D. II and IV

2. **A**

3. (5 points) Sunny island was previously a closed economy. The demand for sunglasses is $P = 100 - 3Q_D$, the supply for sunglasses is $P = 2Q_S$, where Q represents the number of pairs of sunglasses. Now Sunny island opens to global trade. The price of each pair on the global market is \$25. Should Sunny island import or export sunglasses? How many pairs of sunglasses do Sunny island residents consume now?

- A. Import; 25 B. Export; 25 C. Import; 12.5 D. Export; 12.5

3. **A**

4. (5 points) There are two types of housing in University City: on-campus housing which is exclusively for undergraduate students, and off-campus housing which is for both undergraduate and graduate students. Suppose the real estate market is initially in equilibrium and is producing at the allocatively efficient quantity. In 2018, Penn chooses to build a new dorm on high rise field, causing on-campus housing to get cheaper. At the same time, Penn chooses to admit 50% more graduate students to the class of 2022 who will need off-campus housing to live. What will happen to the price and quantity of off-campus apartments in University City?

- A. Price and quantity will decrease
- B. Price will decrease and quantity will increase
- C. Price will decrease and the effect on quantity is inconclusive
- D. The effect on price and quantity is inconclusive

4. **D**

5. (5 points) Urban Outfitters is considering a sale on pants. A consultant predicts that it will likely increase the number of sweaters sold and decrease the number of shirts sold. According to the consultant, which of the following could be correct ?

- A. Pants and sweaters are substitutes but pants and shirts are complements
- B. Pants and shirts are substitutes but pants and sweaters are complements
- C. Pants and sweaters are substitutes as are pants and shirts
- D. Pants and sweaters are substitutes but we can't tell about pants and shirts

5. **B**

6. (5 points) Bruce's Pharmaceuticals sells vitally important drugs in the pharmaceutical market where demand is perfectly inelastic. Assume this industry has a standard upward sloping supply curve. Due to breakthrough technology at Bruce's Pharmaceuticals and sharing this R&D with the rest of the drug industry, all firms can now produce drugs at much cheaper than before. Knowing this information, what would happen to the revenues of each firm?

- A. Revenues would fall
- B. Revenues would stay the same
- C. Revenues would rise
- D. Not enough information

6. **A**

7. (5 points) The price elasticity of demand for tickets for Broadway shows in New York City is estimated to be 0.5. Last year, income decreased by 10%. If ticket sales decreased by 20%, we can conclude that:

- A. Income elasticity for Broadway tickets is positive and Broadway tickets is a normal good
- B. Income elasticity for Broadway tickets is positive and Broadway tickets is an inferior good
- C. Income elasticity for Broadway tickets is negative and Broadway tickets is a normal good
- D. Income elasticity for Broadway tickets is negative and Broadway tickets is an inferior good

7. **A**

8. (5 points) The market for handbags faces an inverse demand curve of $P = 300 - Q$ and has a supply curve of $P = 4Q$. Lauri convinces the government to set a price floor of \$280 because she believes this regulation will help the whole industry. Given this information about the identical firms, what surplus or shortage per firm will occur within the handbag industry?

- A. Excess supply of 100 bags
- B. Excess demand of 100 bags
- C. Excess demand of 50 bags
- D. Excess supply of 50 bags
- E. Not enough information to conclude

8. **D**

9. (5 points) In 2017 Philadelphia introduced a tax of 1.5 cents per ounce on soda beverages to raise revenue for education. Assuming normal supply and demand curves, what can we expect to occur in the Philadelphia soda market?

- I. The price of soda paid by buyers will rise
 - II. Soda producers will earn more revenue
 - III. Consumers will purchase less soda
- A. All of the above
 - B. I and II
 - C. I and III
 - D. II and III
 - E. None of the above

9. **C**

Short Answer Questions (60 points total)

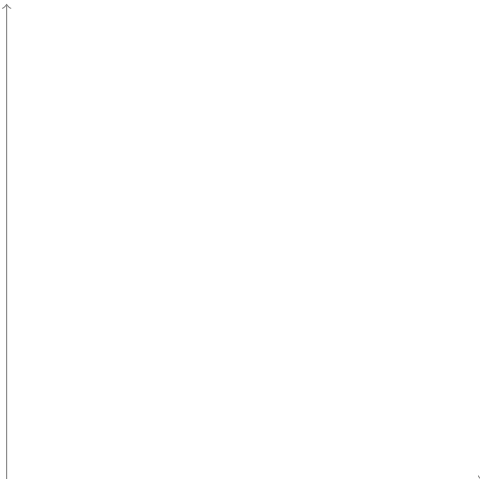
10. Prior to European settlement, Australia was inhabited by around 500 distinct 'nations' of Aborigines and Torres Strait Islanders. One such nation was the Ngunnawal people. Two commodities that were very important to their society was ochre for art and ceremonial use and carved wood for hunting and shelter.

(a) Suppose the Ngunnawal (N) people can mine ochre and make wood carvings at a constant opportunity cost. In one year, they can produce either 100 bricks of ochre, or 300 carvings.

- On the left graph, draw the Ngunnawal people's PPF (labelled PPF_N)
- On the right graph, draw the marginal cost of producing ochre (in terms of carvings) that is consistent with their PPF.

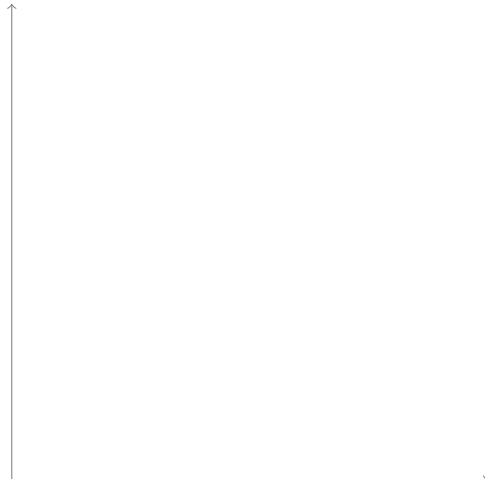
Be sure to label all intercepts.

Carvings per year



Bricks of ochre per year

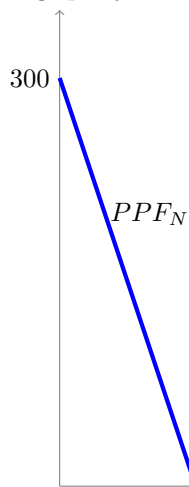
MC (carvings per brick of ochre)



Bricks of ochre per year

Solution:

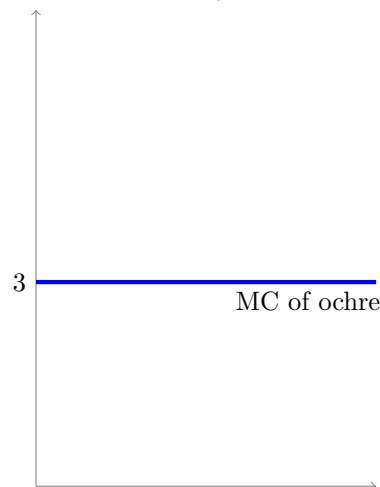
Carvings per year



100

Bricks of ochre per year

MC (carvings per brick of ochre)



3

MC of ochre

Bricks of ochre per year

Now consider the Wiradjuri (W) people, a neighbouring tribe to the Ngunnawal people, who produce 600 bricks of ochre, or 400 carvings in one year.

- (b) Who has an absolute advantage in producing ochre and who has an absolute advantage in producing carvings? Explain.

Solution: It is not specified whether the Wiradjuri produce these quantities with the same resources as the Ngunnawal, so there is not enough information to compare their productivities and determine who has an absolute advantage in what. If and only if they produced these quantities with the SAME resources, W would have an absolute advantage in both ochre and carvings production, as they could produce more of both goods per year with the same resources.

- (c) Who has a comparative advantage in producing ochre and who has a comparative advantage in producing carvings? Explain.

Solution: N's opportunity cost of 1 brick of ochre is 3 carvings, while W's opportunity cost of 1 brick of ochre is $2/3$ carvings. W has a lower opportunity cost of 1 brick of ochre and N has a lower opportunity cost of 1 carvings. Therefore, W has a comparative advantage in ochre production, and N has a comparative advantage in carvings.

- (d) A Ngunnawal representative travels to Wiradjuri territory and offers them a deal: "let my people specialize in carvings and then trade 1 brick of ochre for 1 carving with your people". Could this deal benefit the Wiradjuri? Why or why not?

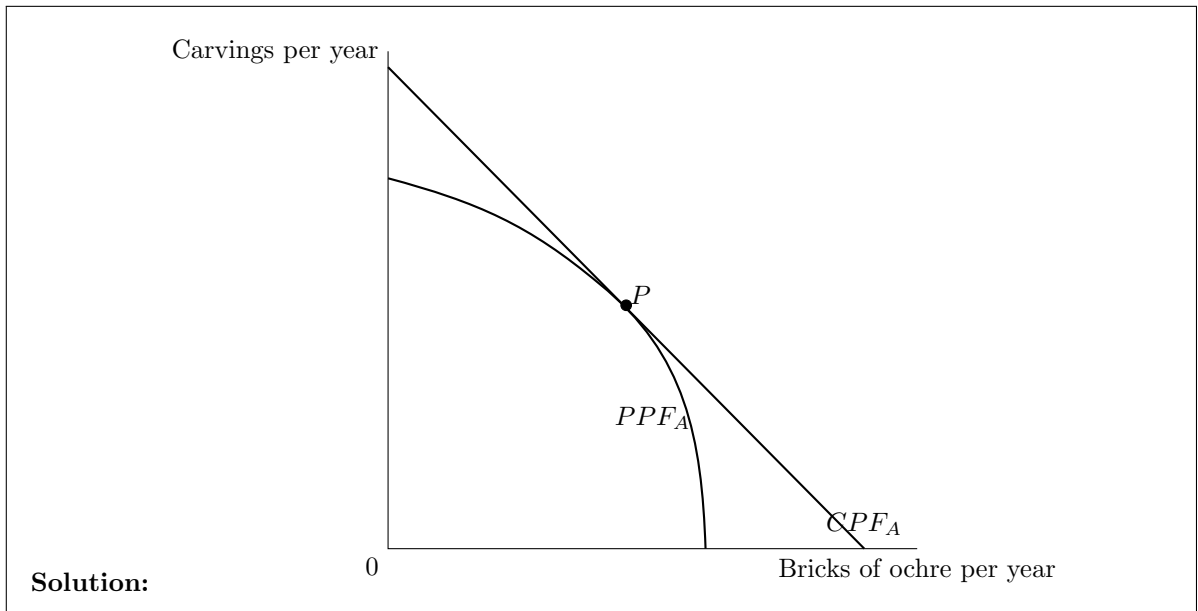
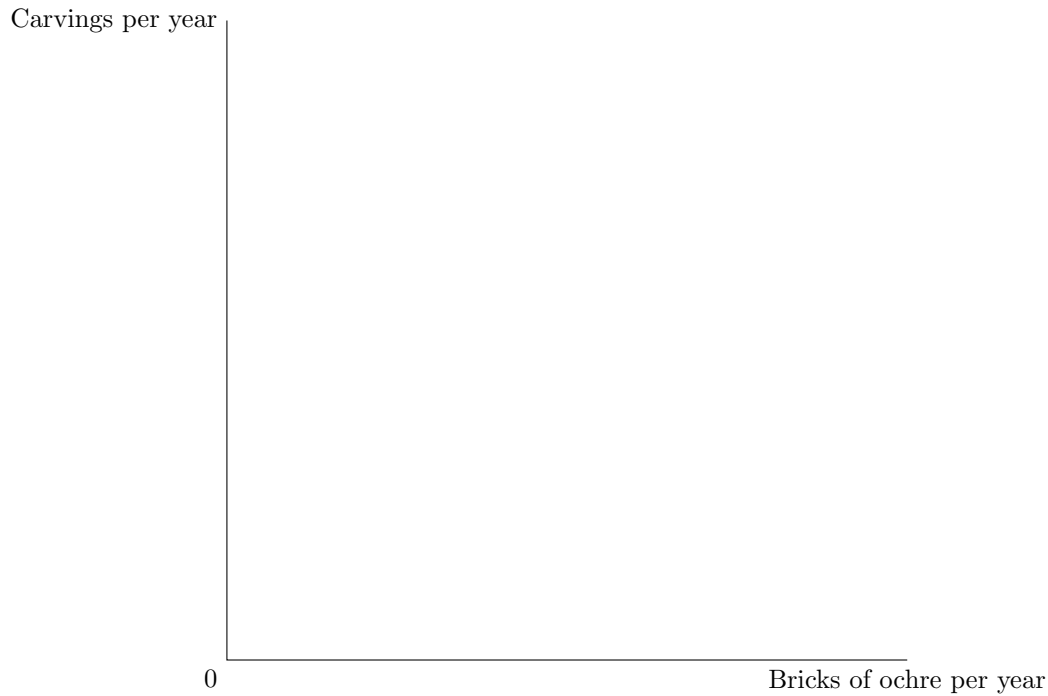
Solution: This deal could benefit the Wiradjuri as the price of 1 carving (1 brick of ochre) would be lower than their own opportunity cost (1.5 brick of ochre).

- (e) One of the Wiradjuri representative speaks up: "We want to add 400 carvings to our stocks by the end of the year. But you cannot give us more than 300 carvings, so it must be better to refuse your deal and produce all 400 carvings by ourselves". Do you agree with that statement? Why or why not?

Solution: If the Wiradjuri accept the deal, they can get at most 300 carvings from the Ngunnawal, in exchange for 300 bricks of ochre. In that case they are left with 300 carvings and 300 bricks of ochre. If they want to increase the number of carvings to 400, they will have to produce the additional 100 carvings by themselves. Their opportunity cost of 1 carving is 1.5 bricks of ochre, so to produce 100 carving they must sacrifice 150 bricks of ochre. As a result, they end up with 400 carvings and 150 bricks of ochre. With no deal, to produce 400 carving they would have to produce 0 brick of ochre. So the deal makes them gain 150 bricks of ochre, so they should accept it.

- (f) Now consider all of 500 different tribes inhabiting Australia and suppose they unify to cooperate effectively and efficiently.

- i. Draw the combined PPF for this economy, assuming that each of the 500 tribes has a different opportunity cost. (*No need to label intercepts*).



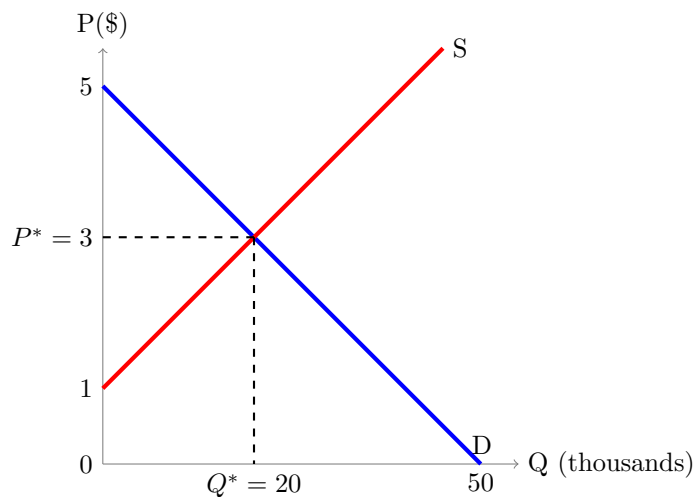
- ii. Suppose that when the European settlers arrive in 1788 they offer the unified Australia an exchange rate of 1 ochre brick for 1 wood carving. On the above PPF indicate the Australian Aborigine production point (P) and the CPF. If the unified Australia decides to trade, would the Ngunnawal people be producing wood carvings or mining ochre bricks? Explain.

Solution: N would be producing wood carvings, as their opportunity cost of carvings (1/3 of bricks of ochre per carving) is lower than the price being offered (1 brick of ochre per carving).

- 11. Pencilvester, a pencil manufacturer, hires two economic consultants, Rick and Morty, to analyze the market for pencils. They estimate that the market demand is given by $Q_D = 50 - 10P \Leftrightarrow P = 5 - 0.1Q_D$ and the market

supply is given by $Q_S = 10P - 10 \Leftrightarrow P = 1 + 0.1Q_S$ (where Q is in thousands of pencils).

- (a) In the graph below, plot the market demand and market supply of pencils. Make sure to label all intercepts. What are the equilibrium price P^* and quantity Q^* ?



Solution:

The equilibrium price is $P^* = \$3$ and the equilibrium quantity is $Q^* = 20$ (in thousands).

- (b) After an increase in the price of graphite, a major input in pencil production, the market supply of pencils decreases. Rick says it's good news for Pencilvester, as the pencil price will increase. But Morty disagrees, because pencil sales will decrease. Can you say whether Pencilvester's revenue will increase or decrease as a result of the lower market supply? Explain.

Solution: At the initial equilibrium, we are in the elastic part of the market demand, since the equilibrium price is $P^* > \$2.5$ and the equilibrium quantity is $Q^* < 25$. If supply decreases, the new equilibrium will still be in the elastic part of the demand curve. When demand is elastic, an increase in the price decreases sellers' revenues, because the quantity effect dominates the price effect.

Therefore, Pencilverster's revenue will decrease as a result of the lower market supply.

- (c) Morty studies the new situation and estimates the new supply equation to be $Q = 10P - 30 \Leftrightarrow P = 3 + 0.1Q$. Find the new equilibrium price P' and the new equilibrium quantity Q' .

Solution: The new equilibrium is such that the new supply and the demand curves intersect: $3 + 0.1Q = 5 - 0.1Q \Leftrightarrow 0.2Q = 2 \Leftrightarrow Q' = 10 \Rightarrow P' = \4 .

- (d) The government feels bad for pencil producers and decides to use a subsidy in order to restore the initial equilibrium quantity Q^* .

- i. What should be the per-unit subsidy? Show your work.

Solution: The per-unit subsidy should be such that supply shifts down and intersects demand at a quantity of $Q^* = 20$. So the subsidy must be equal to the vertical distance between the original supply curve and the new one: $s = \$2$. *Note that the per-unit subsidy can also be found by setting the supply equation with the subsidy as $P - s = 3 + 0.1Q - s$ and make it intersect the demand at a quantity $Q^* = 20$: $3 + 0.1Q^* - s = 5 - 0.1Q^* \Leftrightarrow s = 2$.*

- ii. What will be the price paid by buyers P_b and the price received by sellers P_s ? Show your work.

Solution: The price paid by buyers is determined by the intersection of the supply with subsidy and the demand curve: $P_b = \$3$. The price received by sellers is $P_s = P_b + s = \$5$.

- iii. What is the total cost of the subsidy for the government?

Solution: The government pays a subsidy of \$2 per unit and the quantity sold is 20,000, so the total cost for the government is equal to \$40,000.

- iv. Rick is very happy with the government's decision, and says "for once, a government intervention is efficient as it brings the market back to its initial equilibrium quantity". Do you agree or disagree? Why?

Solution: The government's subsidy is not efficient, as it increases the quantity above its efficient level which is the CURRENT equilibrium quantity Q' . Therefore, it will create a deadweight loss.