ECON 001 Fall 2017
A. Duchene
Midterm 1
October 3, 2017
Time Limit: 60 Minutes

Name (Print): _____

Recitation Section: _____

Name of TA: _____

- This exam contains 9 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 the multiple choice questions by circling the correct answer. Make sure that your answer is clearly circled 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) Sophie is deciding whether to go the movies or study for her Econ 1 midterm. She has already purchased the $10 unrefundable movie ticket. Going to the movies will cost her $8 in popcorn and soda. She values the movies at $22. If Sophie instead stays home and completes practice exams, she will gain $15 in studying value, and can sell her movie ticket to a friend for half of face value. What is Sophie's opportunity cost of going to the movies?

   A. $8.

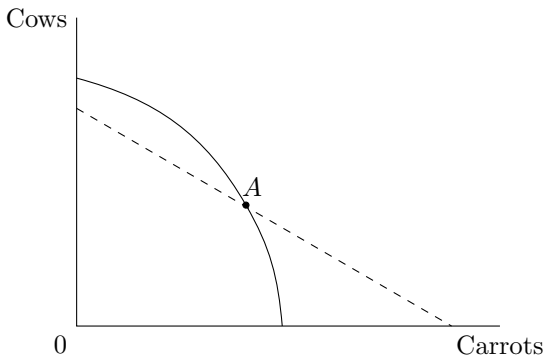
   B. $18.

   C. $28.

   D. $38.

   Solution: C

2. (5 points) John has a farmland that can be used to grow either cows or carrots. the figure below shows his PPF. The dashed line is the CPF he would have *if* he chose to produce at point A.



   John maximizes his consumption possibilities if he produces:

   A. At point A.

   B. At a point higher than A on the PPF (producing more cows and fewer carrots than at A).

   C. At a point lower than A on the PPF (producing more carrots and fewer cows than at A).

   D. Neither of the answers above it true.

   Solution: B

3. (5 points) Adam, Brendan, Carlos and David live on the Fruit Island. They can pick apples or grapes. The following table shows the number of hours they can work each day and how many hours are needed to produce each unit (10 pounds) of the fruits:

	Adam	Brendan	Carlos	David
Hours	8	6	4	6
Picking apples (hour/unit of apples)	3	2	3	1
Picking grapes (hour/unit of grapes)	2	1	3	2

_____ has an absolute advantage at picking apples; _____ has a comparative advantage at picking grapes.

A. David; Brendan.

B. David; Adam.

C. Carlos; Adam.

D. Adam; Brendan.

Solution: A

4. (5 points) Assume that a new trend of Gluten free diets reduces the demand for bread. At the same time, new health regulations increase the cost of production for bakeries. What is expected to happen to the price of bread, assuming downward sloping demand and upward sloping supply in that market?

A. The price will increase.

B. The price will remain the same.

C. The price will decrease.

D. There is not enough information to determine the effects on the price.

Solution: D

5. (5 points) Ice cream and yogurt are substitutes in consumption, and both are normal goods. Both ice cream and yogurt are produced with cow milk. Which of the following will certainly NOT lead to an increase in the equilibrium quantity of ice cream?

A. Increase in consumer income

B. A baby boom in the cow population

C. A technological improvement in the production of yogurt

D. Successful advertising campaign on the health benefits of ice cream cones

Solution: C

6. (5 points) Emma's linear downward sloping demand curve for pizza has the same slope as Eric's; however, it lies to the right of Eric's. The same increase in the price of pizza will cause:

A. Emma to incur a greater loss of consumer surplus than Eric will.

B. Eric to incur a greater loss of consumer surplus than Emma will.

C. Emma and Eric to incur the same loss of consumer surplus.

D. Emmas demand curve to shift closer to Eric's.

Solution: A

7. (5 points) The demand for hot dogs at the Phillies Stadium is given by a linear downward sloping demand. As the price of hot dogs increases, what happens to the price elasticity of demand for hot dogs in the Phillies Stadium?

   A. It increases.

   B. It decreases.

   C. It stays the same.

   D. We require more information about the demand curve.

Solution: A

8. (5 points) The supply for calculators is $P_S = 2 + 2Q_S$ and the demand is $P_D = 10 - 2Q_D$. If there is a price floor implemented at \$4, what is the deadweight loss?

   A. $DWL = \$4$

   B. $DWL = \$2$

   C. $DWL = \$1$

   D. There is no DWL.

Solution: D

9. (5 points) Suppose demand is downward sloping, supply is perfectly inelastic and the market is in equilibrium. The government introduces a tax on consumers. Which of the following is true after the change?

   I. Consumers are worse off.

   II. The market outcome becomes inefficient.

   A. Only I.

   B. Only II.

   C. Both of them

   D. Neither of them.

Solution: D

Short Answer Questions
60 points total

10. Suppose there are two economies, North Dakota and South Dakota. Neither economy trades. Only Nancy lives in North Dakota while only Sam lives in South Dakota. North and South Dakota produce and consume two goods – apples and oranges. Assume the production technologies exhibit constant opportunity costs. Each person can produce the following quantities of each good in one day, if they devote all their time to the production of that good.

	Apples	Oranges
Nancy	2	4
Sam	3	3

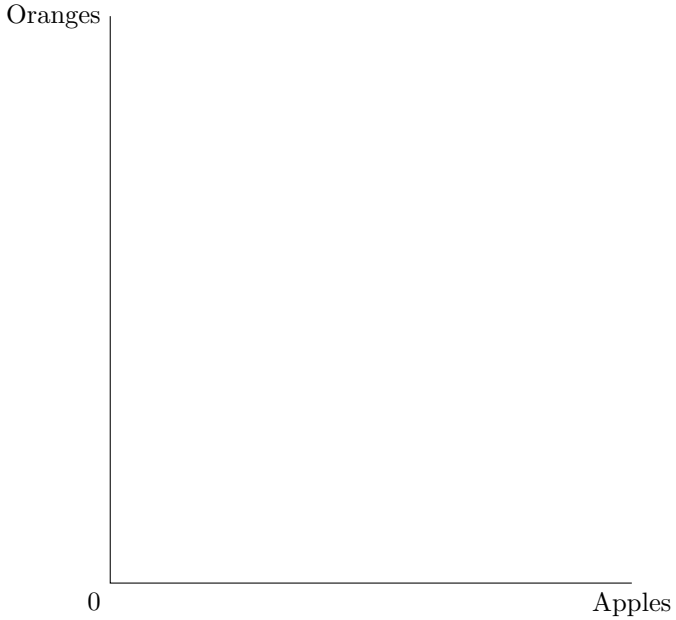
(a) Compute the opportunity costs for Nancy and Sam in the following table, specifying the units for each opportunity cost.

	Opportunity cost of an apple	Opportunity cost of an orange
Nancy		
Sam		

Solution:

	Opportunity cost of an apple	Opportunity cost of an orange
Nancy	2 oranges	0.5 apple
Sam	1 orange	1 apple

(b) Draw the daily PPF for South Dakota (where Sam lives) with apples on the x-axis and oranges on the y-axis. Be sure to label intercepts and slope.

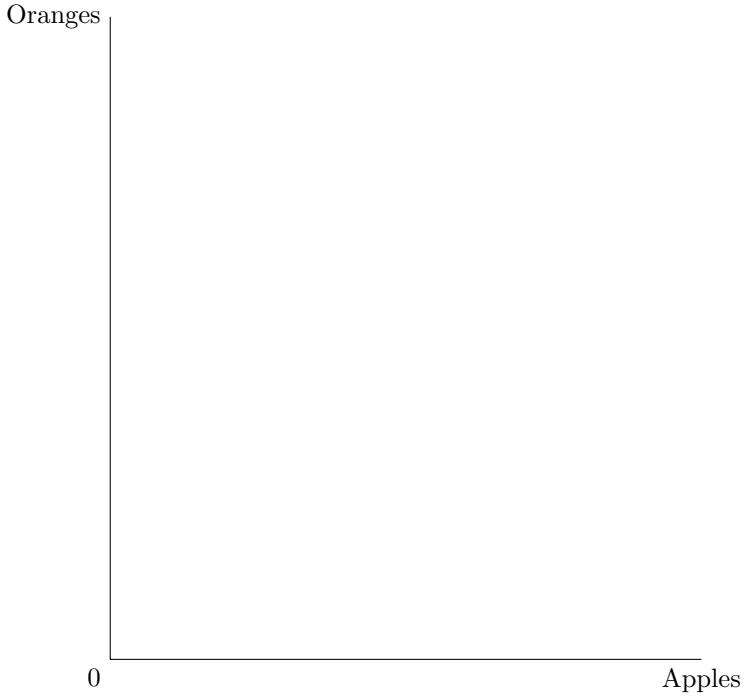


Solution: Straight line with y-intercept at 3 and x-intercept at 3, a slope of -1.

(c) Being the only person in South Dakota, Sam is lonely. He decides to clone himself, creating Sam 2. Sam 2 is identical to Sam in every way, including in how many apples and oranges he can produce. In a cruel twist of fate, Sam 2 dislikes spending time with Sam, so Sam is still lonely and they produce separately. Could Sam and Sam 2 benefit from trading with each other? Why or why not?

Solution: No. There are no gains from trade because Sam and Sam 2 have exactly equal opportunity costs.

(d) Putting aside years of animosity, North and South Dakota decide to combine into one "Super Dakota". The new combined economy consists of both Sam and Nancy. Draw the joint PPF for "Super Dakota" in the graph below. Be sure to label all intercepts, kinks, and slopes.

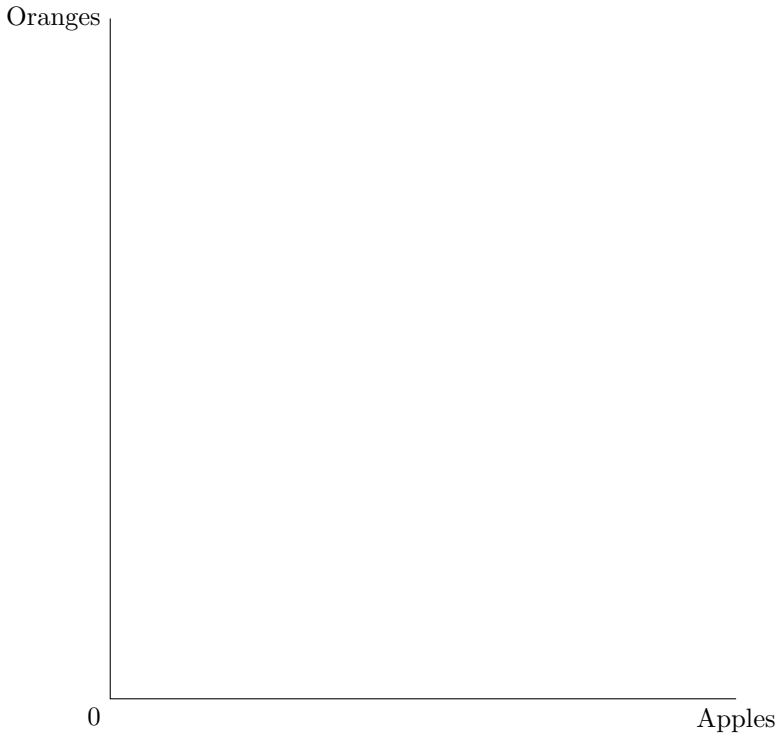


Solution: Joint PPF with points at (5, 0), (0, 7), and (3, 4). Slope of first portion is -1 and slope of second portion is -2.

(e) Suppose that "Super Dakota" wants to produce 4 apples and 2 oranges. How many apples and oranges is Sam producing? How many apples and oranges is Nancy producing? Explain.

Solution: The point (4,2) is on the second portion of the joint PPF. Sam has a comparative advantage in apples so he is specializing in apples and produces 3 apples and 0 orange. There is one more apple to be produced in order to reach 4 apples, and since Sam is already at his maximum number of apples, Nancy produces 1 apple. As a result she gives up 1 orange and produces a total of 2 oranges.

(f) "Super Dakota" opens up its economy and engages in trade at the world price of 1 orange per apple. On the graph below, draw the same joint PPF as in part (d), as well as the CPF. Be sure to label all intercepts and slopes.



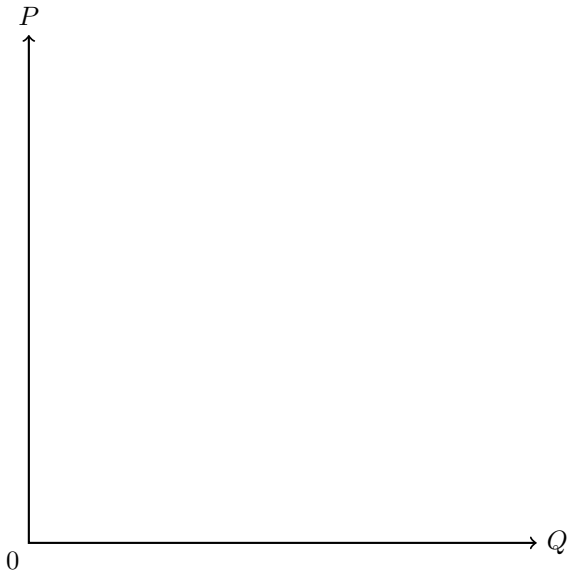
Solution: The CPF is a straight line tangent with the PPF on the first portion of the PPF and has intercepts (7, 0) and (0, 7).

(g) Suppose that before trade was available, "Super Dakota" produced 4 apples and 2 oranges as in part (e). Now "Super Dakota" trades, but Nancy and Sam want to keep consuming exactly 4 apples. In that case, are they able to consume more oranges than before? Explain both numerically and graphically.

Solution: Yes! There are gains from trade in this portion of the graph. Numerically, they can now produce 3 apples and 4 oranges and trade 1 apple for 1 orange, so that they end up consuming 4 apples and 3 oranges. Graphically, the CPF is above the PPF at 4 apples.

11. Consider the market for dark chocolate. The quantity supplied is given by the equation $Q_S = 4P - 40 \Leftrightarrow P = 10 + 0.25Q_S$ and the quantity demanded is given by the equation $Q_D = 50 - 2P \Leftrightarrow P = 25 - 0.5Q_D$.

(a) In the graph below, draw the supply and demand curves and label the equilibrium point. Be sure to label all intercepts and coordinates. What is the equilibrium price and quantity for dark chocolate?



Solution: The equilibrium quantity and supply is found where $Q_S = Q_D$, which gives P^*15 and $Q^* = 20$.

(b) Calculate the producer surplus, consumer surplus and total surplus in equilibrium. Is the equilibrium efficient? Explain.

Solution: The consumer surplus (CS) is equal to $0.5(25 - 15) * (20) = 100$. The producer surplus (PS) is equal to $0.5(15 - 10) * (20) = 50$. Therefore, the total surplus (TS) is equal to consumer surplus + producer surplus $= 100 + 50 = 150$. The outcome is efficient: at the intersection of supply and demand, total surplus is maximum.

(c) The government is worried about many chocolate factories outsourcing their production to Mexico because of cheaper labor. In order to make the dark chocolate market more attractive to sellers, it decides to impose a price floor at \$25. What is the impact of this policy on total surplus? Explain.

Solution: A price floor at \$25 leads to a quantity demanded $Q_D = 0$, so total surplus is 0 and the no quantity is sold on the market for dark chocolate. Total surplus is 0.

(d) One consequence of the \$25 price floor on dark chocolate is an increase in the quantity of milk chocolate demanded from 20 to 30. Using this information and the equilibrium price you found in part (a), find the cross-price elasticity of demand between dark and milk chocolate. What is relationship between milk and dark chocolate? Show your calculations.

Solution: The cross-price elasticity of milk chocolate is positive, which indicates that the two goods are substitutes since an increase in the price of dark chocolate leads to a subsequent increase in the quantity demanded for milk chocolate. $\varepsilon = \frac{\%\Delta Q_{milk}}{\%\Delta P_{dark}} = \frac{(30-20)/25}{(25-15)/20} = \frac{20}{25} = 0.8$

(e) Suppose the government removes the price floor so the market for dark chocolate is back to equilibrium. Moreover, the market for milk chocolate has exactly the same supply and demand equations as the market for dark chocolate and is also in equilibrium. Dark chocolate contains a higher percentage of cocoa than milk chocolate, which contains a higher percentage of sugar than dark chocolate. Consider the two events described in parts (e.i) and (e.ii) separately.

i. A severe drought in Brazil, the largest producer of sugarcane, damages the sugar crop. What is the effect of the drought on the price of dark and milk chocolate? Will this effect greater for dark chocolate or milk chocolate? Explain.

> **Solution:** The damage to the sugarcane crop creates a shortage of sugar, which will cause the supply of to shift inward and the price to increase. Since the production of milk chocolate requires more sugar than the production of dark chocolate, we would expect the increase in price for milk chocolate to be greater.

ii. A scientific study shows that cocoa is a "superfood" that improves heart heath and brain functioning. What is the effect of this study on the market for dark and milk chocolate? Will this effect be greater for dark chocolate or milk chocolate? Explain.

> **Solution:** The study showing the health benefits of cocoa will increase the demand for chocolate, causing demand to shift outward and price to increase. Since dark chocolate has a higher percentage of cocoa than milk chocolate, we would expect the increase in price for dark chocolate to be greater.

(f) According to an article in the Wall Street Journal, chocolate is resilient but not recession-proof. Suppose that during an economic recession, the demand for milk chocolate increases while the demand for dark chocolate decreases. In terms of income elasticity, what kinds of goods are dark and milk chocolate? Explain.

> **Solution:** Dark chocolate is a normal good, since a decrease in leads to an increase in the quantity demanded. Milk chocolate is an inferior good, since a decrease in income leads to an increase in the quantity demanded.