**Econ 102 – Summer 2012 Answers to Exam 1 – Professor Kelly**

**Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Section Day and Time:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**On this exam it is important that you show your work to get FULL CREDIT.**

**On this exam you should write any verbal answer using standard English grammar: that is, please write in complete sentences.**

The exam consists of 20 multiple choice questions worth 2.5 points for a total of 50 points, and three problems worth a total of 50 points.

Multiple Choice Score Your Score: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Question 1 – 15 points Your Score: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Question 2 – 15 points Your Score: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Question 3 – 20 points Your Score: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Total: 100 points Your Total: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

No calculators are allowed for the exam. Cell phones should be silenced and in your backpacks, away from your seat.

You will have 100 minutes to work. Good luck.

**I, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, agree to neither give nor receive any help on this exam from other students. Furthermore, I understand that use of a calculator is an academic misconduct violation on this exam.**

**Signed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**MULTIPLE CHOICE QUESTIONS (20 questions worth 2.5 points each)**

1. Determine which of the following statements is a positive statement.
   1. The economy will grow faster if tax rates are cut.
   2. A high tax on tobacco will significantly decrease cigarette smoking.
   3. People would have fewer children if tax deductions for having children were increased.
   4. All of the above statements are positive.
2. Which of the following statements might be scientifically tested using time series data?
   * 1. Obesity levels in the U.S. have increased over time compared to other OECD countries.
     2. Output and unemployment tend to move together.
     3. Higher income allows people to satisfy their needs better and one would expect that consumption would be higher in richer countries at a given point in time.
     4. Free lunches improve individual student performance.
3. I only
4. I and II
5. I, II, and IV
6. I, II, III, and IV
7. Shawn needs to read a book that is 374 pages long. Suppose the relationship for Shawn between hours spent reading and the number of pages read is linear. You also know the following information: yesterday, Shawn spent 2 hours reading 44 pages and today, he read 176 pages in 8 hours. If he continues to read at the same rate, how many hours total would it take for Shawn to read the entire book?
   1. 15 hours
   2. 19 hours
   3. 17 hours
   4. 21 hours

*For the following* ***four*** *questions, consider the scenario below:*

John and Lora are the only two individuals living on the island of Calypso. They own a garden with apple trees and berry bushes. Once a year they need to harvest their fruits. The following table shows how many berries and apples each individual can harvest **per hour**.

|  |  |  |
| --- | --- | --- |
|  | John | Lora |
| Berries | 200 | 100 |
| Apples | 50 | 75 |

1. Which of the following statements is true?
   1. Lora has the absolute advantage in harvesting apples, and John has the absolute advantage in harvesting berries.
   2. Lora has the absolute advantage in harvesting both apples and berries.
   3. John has the absolute advantage in harvesting apples, and Lora has the absolute advantage in harvesting berries.
   4. John has the absolute advantage in harvesting both apples and berries.
2. John's opportunity costs of harvesting 40 berries are
   1. 4 apples
   2. 10 apples
   3. 20 apples
   4. 40 apples
3. If John and Lora specialize,
   1. John should harvest apples and Lora should harvest berries.
   2. Lora should harvest apples and John should harvest berries.
   3. John should harvest both apples and berries.
   4. Lora should harvest both apples and berries.
4. Which of the following events will shift Lora and John’s joint PPF further out from the origin than their initial PPF?
5. An unknown insect infests Lora and John’s garden killing some of their trees and bushes.
6. Lora and John discover a new apple garden on their island.
7. Lora and John invent a tool that helps them pick up fruit faster.
8. Due to continuous rain, the apple trees produce more fruit while the berries start to rot before being harvested.
9. Two countries, Meka and Patia, each produce autos and ships. Their production possibility frontiers are shown in the graphs below. Which of the following is true about the countries' absolute and comparative advantages?



* 1. Meka has an absolute advantage in autos and a comparative advantage in ships.
  2. Patia has an absolute advantage in ships and a comparative advantage in ships.
  3. Meka has an absolute advantage in ships and a comparative advantage in autos.
  4. Patia has an absolute advantage in autos and a comparative advantage in ships.

1. If the economy is producing at a point below its production possibilities frontier, then
   1. a significant number of workers have little education.
   2. some resources are being wasted.
   3. technology must improve before output can increase.
   4. the opportunity cost of producing more output is greater than the value of the additional output that could be produced.
2. Holding everything else constant, if Amtrak starts a train service between Madison and Chicago and at the same time, prices for airplane fuel increase, the price of an airplane ticket from Madison to Chicago
   1. will go up.
   2. will go down.
   3. will be indeterminate.
   4. will not change.
3. Suppose coffee and donuts are complements and coffee and tea are substitutes. A shift to the right of the market demand curve for donuts could be caused by:
4. an increase in the price of coffee.
5. an increase in the price of dough used to make donuts.
6. an decrease in the price of chocolate used to glaze the donuts.
7. an increase in the price of tea.

Which of the following are correct?

* 1. I and II only.
  2. I and III only.
  3. II and IV only.
  4. IV only.

1. Assume tangerines and oranges are substitutes and both goods are normal goods. Each of the following will cause a decline in the demand for tangerines **EXCEPT**
   1. An increase in the price of tangerines.
   2. A decrease in the price of oranges.
   3. A decrease in the incomes of tangerine eaters.
   4. A decrease in the number of tangerine eaters.
2. Suppose apples and oranges are substitutes in consumption. Holding everything else constant, if an early frost damages a significant portion of Florida’s oranges, then
   1. The price of Washington State apples will increase.
   2. The price of Florida oranges will increase.
   3. The price of apple sauce will increase.
   4. All of the above statements are true.
3. The world price of a pound of T-bone steak is $9.00. Before the Isle of Meat Lovers (a small, closed economy) opened its beef market to trade with the rest of the world, the Isle of Meat Lovers price of a pound of T-bone steak was $12.00. After the Isle of Meat Lovers opened its beef market to trade with the rest of the world, the Isle of Meat Lovers started
   1. exporting T-bone steak and the price per pound in the Isle of Meat Lovers remained at $12.00.
   2. exporting T-bone steak and the price per pound in the Isle of Meat Lovers decreased to $9.00.
   3. importing T-bone steak and the price per pound in the Isle of Meat Lovers remained at $12.00.
   4. importing T-bone steak and the price per pound in the Isle of Meat Lovers decreased to $9.00.
4. Which of the following would **NOT** be a consequence of the U.S. economy opening its market to world trade and becoming an exporter of a given good?
   1. The price for the good paid by domestic consumers would increase.
   2. The price for the good received by domestic producers would increase.
   3. The loss in consumer surplus exceeds the gain in producer surplus in the domestic market.
   4. The gain in producer surplus exceeds the loss in consumer surplus in the domestic market.
5. Which of the following statements is **NOT** true?
   1. Free trade generally causes some individuals to be better off and some individuals to be worse off, but overall it benefits a country.
   2. Free trade generally alters the price domestic consumers have to pay for a good.
   3. Free trade generally benefits a country both when it exports and when it imports.
   4. Free trade generally benefits a country when it exports but harms it when it imports.

*For the next* ***THREE*** *questions, consider the following scenario:*

The table below shows the demand and supply schedules for computers in the small economy of Norway.

|  |  |  |
| --- | --- | --- |
| Price  (in $) | Quantity Demanded of Computers  (in millions) | Quantity Supplied of Computers  (in millions) |
| 1,000 | 3,200 | 800 |
| 1,500 | 2,800 | 1,200 |
| 2,000 | 2,400 | 1,600 |
| 2,500 | 2,000 | 2,000 |
| 3,000 | 1,600 | 2,400 |
| 3,500 | 1,200 | 2,800 |

1. In the absence of trade, Norway’s equilibrium price and quantity equal
   1. $1,500 and 2,800 computers
   2. $2,000 and 1,600 computers
   3. $2,500 and 2,000 computers
   4. $3,500 and 2,000 computers
2. If Norway opens its computer market to trade with the rest of the world, foreign producers can supply computers to Norway at a price of $1500 per unit. Norway’s imports will now equal \_\_\_\_\_\_. Compared to what occurred in the absence of trade, Norway’s consumer surplus will \_\_\_\_\_and its producer surplus will \_\_\_\_\_\_.
   1. 1,600 computers, decrease, increase
   2. 1,600 computers, increase, decrease
   3. 1,200 computers, decrease, increase
   4. 1,200 computers, increase, decrease
3. Assume Norway opens it computer market to trade and that the world price of computers is $1500 per computer. To reduce imports, suppose that the government of Norway imposes a quota equal to 800 computers. Compared to what occurred under free trade, Norway’s consumer surplus will \_\_\_\_\_\_ and its producer surplus will \_\_\_\_\_\_.
   1. increase, increase
   2. increase, decrease
   3. decrease, increase
   4. decrease, decrease
4. Similar to import tariffs, import quotas tend to result in
   1. higher prices and reduced imports
   2. increased government revenue
   3. increased consumer surplus
   4. decreased producer surplus

**PROBLEMS (3 problems worth a total of 50 points)**

1. (15 points in all) Consider a market for goat cheese in the US. Suppose the demand and supply curves for goat cheese are given by the following equations where P is the price per pound of cheese and Q is the quantity in pounds of goat cheese:

Demand: QD = (−1/2)P + 5

Supply: P = Qs + 1

1. (2 points) What are the equilibrium price and quantity in the goat cheese market in the U.S.?
2. (5 points) Suppose that Harvard researchers find that eating goat cheese extends one’s life. As a result of these findings, the American people start buying twice as much goat cheese as before at each price level. What will be the new equilibrium price and quantity given this change and holding everything else constant?

Return to the initial situation (no discovery by Harvard researchers). Suppose that a group of immigrants come to the U.S. and join the market for goat cheese as consumers. The immigrants’ demand curve for goat cheese is given by QD = −P + 5.

1. (5 points) What is the new aggregate demand function?
2. (3 points) What are the new equilibrium price and quantity?

2. (15 points in all) In Norway, a small closed economy, the supply and demand for a pound of butter are given by the following equations:

Domestic Demand: P = 200 – 5Q

Domestic Supply: P = 40 + 3Q

The world price of butter is $70 per pound.

1. (2 points) Find the equilibrium price and quantity of butter when Norway’s economy is closed.
2. (3 points) In the space below, graph the domestic supply and demand curves for butter in Norway. Make sure you label every component of your graphs. Calculate the total consumer and producer surplus in the domestic market and shade the appropriate areas on the graph.
3. (3 points) Now Norway opens its butter market to trade with the rest of the world. Find the quantity demanded and supplied domestically. What is the total quantity of imports into Norway?
4. (3 points) Worried about the welfare of the domestic butter producers, the Norwegian president decides to protect the domestic butter industry by imposing a tariff of $15 for every imported pound of butter. Find the new quantity of imports.
5. (4 points) Graph the effect of the new tariff on the butter market. Calculate the new consumer and producer surplus, the revenue raised by the tariff, and the deadweight loss imposed on the market. Label the appropriate areas on the graph.

3. (20 points in all) Al and Carl both like to consume wine and bread and both are capable of producing wine and bread. Carl can make up to 60 loaves of bread per month. For each bottle of wine he makes, his bread output drops by a ½ loaf. Al can make up to 20 bottles of wine per month. For each loaf of bread he bakes, his wine output decreases by a ½ bottle.

a. (3 points) Draw Al’s monthly production possibilities frontier with bread on the vertical axis and wine on the horizontal axis.

b. Suppose Al is currently producing and consuming on his PPF, making 10 bottles of wine per month.

* + 1. (1 point) Mark this point in your graph of Al’s PPF.
    2. (1 point) How many loaves of bread does Al bake each month given his wine production?
    3. (1 points) What is Al’s opportunity cost of increasing his wine output by 1 bottle to 11 bottles per month?
    4. (1 point) What is Al’s opportunity cost of increasing his bread output by 1 loaf per month?

c. (3 points) Draw Carl’s monthly production possibilities frontier with bread on the vertical axis and wine on the horizontal axis.

d. Suppose Carl is currently producing and consuming on his PPF, making 20 bottles of wine per month.

* + 1. (1 point) Mark this point in your graph of Carl’s PPF.
    2. (1 point) How many loaves of bread does Carl bake each month given his wine production?
    3. (1 point) What is Carl’s opportunity cost of increasing his wine output by 1 bottle per month?
    4. (1 point) What is Carl’s opportunity cost of increasing his bread output by 1 loaf per month?
  1. (3 points) Draw Al and Carl’s combined PPF in the space below. Label everything on your graph-all the intercepts and all the “special points”.

* 1. (3 points) Calculate the terms of trade if Al and Carl trade. That is, at what prices will they trade?

**Answers to Multiple Choice Questions**

1. D
2. C
3. C
4. A
5. B
6. B
7. C
8. B
9. B
10. C
11. D
12. A
13. D
14. D
15. C
16. D
17. C
18. B
19. C
20. A

**Answers for Short Answer Questions:**

1.

a. Here we want to solve for the intersection point of the two curves.

We’ll want each equation solved for *p* (in slope intercept form).

The equation for the supply curve is ok. Rewrite the demand curve.

So we have: demand: and supply: 

We can find the equilibrium price and quantity by finding the intersection of the two curves.

Set the RHS equal to each other:  and solve for the equilibrium quantity: Q\*=3

Plug this value back into either the supply or demand equation to get equilibrium price: P\* = 4.

b. Now we have a shift in the demand curve. We need to find the equation of the new demand curve.

In this case it is useful to start with the demand equation solved for *q* as given above.

The original equation said: at price *p* the quantity demanded will be 

Now at each price *p* demand has doubled. This gives a new demand equation: 

Now to find the equilibrium (intersection) you may want to rewrite the demand equation: 

Find the equilibrium as before, using the new demand equation: 

Solve for the equilibrium quantity: 

Plug this value back into either the supply or demand equation to get equilibrium price: 

c.

|  |  |
| --- | --- |
| US residents | Immigrants |
| Demand:  🡺equivalent to | Demand:  🡺equivalent to |

Demand is a piece-wise function:

P

P

P

$10

$10

$10

$5

$5

$5

5

5

5

10

Q@

Q@

Q@

**Group 1**

**Group 2**

****

****

****

B (5/2, 5)

A (0, 10)

C (10, 0)





**Market**

For P>=5:

same as Group 1



 (or equivalent to ), if 

 (or equivalent to ), if <5

d. Supply is 

Solve for intersection point:

1. Solve the intersection of   
   Demand: (or equivalent to ), if , and   
   Supply:   
   Set two equations equal: , fails the criteria of . Thus the Demand and Supply curves do not cross at the upper part of the demand curve.
2. Solve the intersection of   
    Demand:  (or equivalent to ), if <5 and   
   Supply:   
   Set two equations equal: , satisfies the criteria of <5. Thus the equilibrium price and quantity is: P\*=22/5, Q\*=17/5

2.

a. Setting supply equal to demand, we have: 200 – 5Q = 40 + 3Q, so 160 = 8Q, so Q\* = 20, P\* = 100.

b.

CS = (1/2)\*100\*20 = $1000

PS = (1/2)\*60\*20 = $600



c. At world price=WP = 70, we can simply plug this price into our Demand & Supply curves to find the quantities supplied and demanded domestically. Thus we have:

70 = 200 – 5QD, so 130 = 5QD, so QD = 26.

70 = 40 + 3QS, so 30 = 3QS, so QS = 10.

Therefore, the total volume of imports is 26 – 10 = 16

d. With the tariff (T), we have WP + T = $85, and we can plug this value into our Demand & Supply equations.

85 = 200 – 5QDT, so 115 = 5 QDT, so QDT = 23.

85 = 40 + 3QST, so 45 = 3 QST, so QST = 15.

Therefore, the total quantity of imports is 23 – 15 = 8.

e. Tariff revenue is the orange rectangle, while DWL is the two small grey triangles. We compute each quantity as follows:

CS = (1/2)\*115\*23 = $1322.50

PS = (1/2)\*45\*15 = $337.50

TR = 15\*8 = $120

DWL = (1/2)\*15\*5 + (1/2)\*15\*3 = $37.50 + $22.50 = $60



3.

a.

**Graph 1 (not drawn to scale)**

**Note: Without trading, both players are producing and consuming on their individual PPFs.**

Wine (bottles)

Carl’s PPF

Al’s PPF

20

120

50

60

Bread (loaves)

60

60

10

20

60

Al’s No trade point

40

60

Carl’s No trade point

b. See graph 1 above

i. Refer to graph 1.

ii. 20 loaves of bread since the PPF’s equation is B=40-2W, where B=loaves of bread and W=bottles of wine.

iii. 2 loaves for each extra bottle of wine he makes. This is because Al’s PPF has a slope of 2 loaves per bottle everywhere.

iv. The inverse of the previous answer: 1/2 bottle of wine per loaf.

c. See graph 1 above.

d. Refer to graph 1.

i. Refer to graph.

ii. 50 loaves of bread since the PPF’s equation is B=60-1/2W, where B=loaves of bread and W=bottles of wine.

iii. 1/2 loaf for each extra bottle he makes. This is because Carl’s PPF has a slope of 1/2 loaf per bottle everywhere.

iv. The inverse of the previous answer: 2 bottles of wine per loaf.

e.

Wine (bottles)

120

Bread (loaves)

40

60

100

60

140

f. Between ½ and 2 bottles of wine per loaf of bread and ½ and 2 loaves of bread per bottle of wine.