EXAMINATION 1 VERSION C
"Competitive Supply and Demand"
September 23, 2015

INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators or calculators with alphabetical keyboards are NOT permitted. Numerical answers, if rounded, must be correct to at least 3 significant digits. Point values for each question are noted in brackets. Maximum total points are 100.

I. Multiple choice: Please circle the one best answer to each question. [1 pt each, 12 pts total]

(1) The assumption in economics that people are rational means that people
a.   ignore "soft" concerns like friendships and charity.
b.   do the best one can with what they have.
c.   make sacrifices today for a better future.
d.   use math to make decisions.
e.   maximize their income.

(2) The *marginal benefit* of a gallon of water is
a.   the benefit of the first gallon of water consumed.
b.   the benefit of the last gallon of water consumed.
c.   the total benefit of all gallons of water consumed.
d.   the average benefit of all gallons of water consumed.

(3) The graph below shows Caleb's marginal cost (MC) and marginal benefit (MB) from exercise. If Caleb is rational, he will choose to exercise
a.   20 minutes.
b.   40 minutes.
c.   60 minutes.
d.   80 minutes.
e.   100 minutes
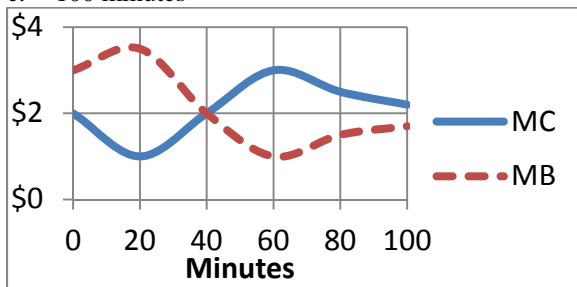
(4) "Increasing employment should take priority over equalizing income" is an example of
a.   a positive statement.
b.   a normative statement.
c.   both of the above.
d.   none of the above.

(5) Is the production function below characterized by diminishing returns to labor input?
a.   Yes, for all levels of labor input.
b.   No, not for any levels of labor input.
c.   Yes, but only after 4 hours of labor input.
d.   Yes, but only before 4 hours of labor input.
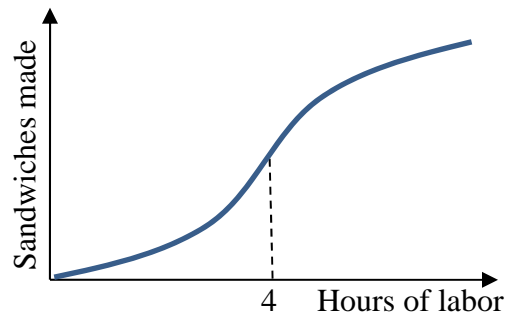
The next two questions refer to the following graph of a country's production-possibility curve.
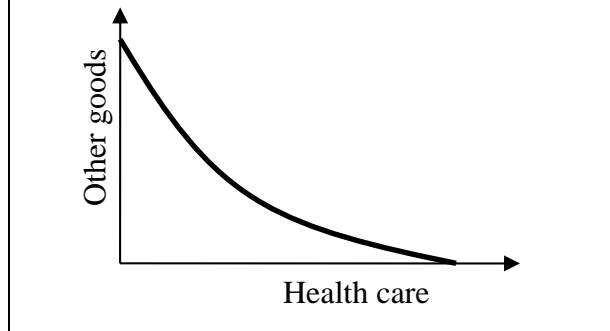
(6) By definition, what is held constant along this production-possibility curve?
a. The country's total inputs.
b. The prices of health care and other goods.
c. Output of health care.
d. Output of other goods.
e. None of the above.

(7) As more health care is produced, the opportunity cost of the last unit of health care
a. decreases.
b. increases.
c. first increases, then decreases.
d. remains constant.

(8) Garden A can produce 20 units of tomatoes or 20 units of lettuce. Garden B can produce 30 units of tomatoes or 60 units of lettuce. Which garden has a comparative advantage in tomatoes?
a. Garden A.
b. Garden B.
c. Both gardens.
d. Neither garden.

(9) Monetary exchange is more common today than bartering because
a. bartering requires a "double coincidence of wants."
b. bartering is often illegal whereas anything can be legally bought and sold with money.
c. bartering is a lost art.
d. monetary exchanges are subject to less tax.

(10) If the price of gasoline rises, demand for hybrid cars will shift right, because hybrid cars and gasoline are
a. inferior goods.
b. complementary goods.
c. substitute goods.
d. normal goods.

(11) A rise in consumers' income will shift the demand for hotel rooms to the right, because hotel rooms are
a. inferior goods.
b. complementary goods.
c. substitute goods.
d. normal goods.

(12) In February, the price of roses rises and the quantity sold increases. This could be caused by a
a. rightward shift in the demand for roses.
b. rightward shift in the supply of roses.
c. leftward shift in the demand for roses.
d. leftward shift in the supply of roses.

II. Problems: Insert your answer to each question in the box provided. Use margins and graphs for scratch work. Only the answers in the boxes will be graded. Work carefully—partial credit is not normally given for questions in this section.

(1) [Percent change, midpoint formula: 2 pts] Suppose the average apartment rent in Des Moines is $900 and the average apartment rent in Chicago is $1500. Compute the percent difference using the midpoint method.

%

(2) [Percent change of product: 4 pts] Total spending on beef equals the price per pound times the number of pounds purchased. Suppose the price decreases by 3 percent and the pounds purchased increases by 2 percent.

   a. Does spending on beef *increase* or *decrease*?

   b. By approximately how much?

%

(3) [Production functions: 8 pts] A crew of technicians repairs and refurbishes computers. Complete the table by computing the crew's average product and marginal product, placing your answers in the unshaded cells of the third and fourth columns below. Then answer the question at the bottom.

Number of technicians	Number of computers serviced	Average Product	Marginal Product
0 technicians	0 computers		
			computers per technician
2 technicians	20 computers	computers per technician	
			computers per technician
4 technicians	32 computers	computers per technician	
			computers per technician
6 technicians	36 computers	computers per technician	

[2 pts] Is the crew's production function characterized by *diminishing returns* to their labor input? Answer "YES" or "NO."

(4) [Comparative advantage, gains from trade: 17 pts] Country A and Country B can each produce wheat and petroleum. They each face a tradeoff between these two products because of limited workforces. Their production possibility curves are shown below.
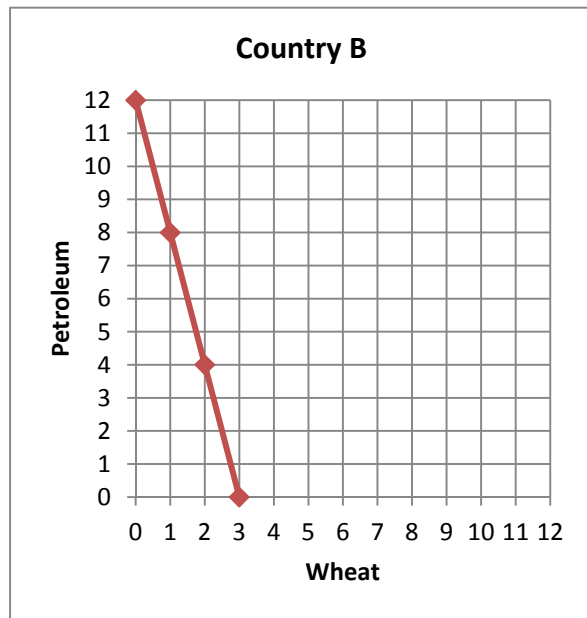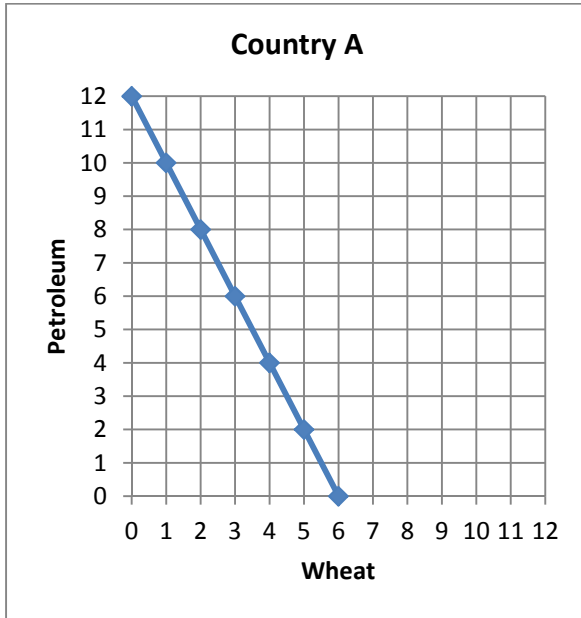
a. What is Country A's opportunity cost of producing a unit of wheat?

b. What is Country B's opportunity cost of producing a unit of wheat?

c. What is Country A's opportunity cost of producing a unit of petroleum?

d. What is Country B's opportunity cost of producing a unit of petroleum?

e. Which country has a comparative advantage in producing wheat?

f. Which country has a comparative advantage in producing petroleum?

units of petroleum
units of petroleum
units of wheat
units of wheat

g. [3 pts] Fill in the blanks: *Both* countries can consume combinations of products *outside* their individual

   production possibility curves if _____ exports *six* units of petroleum to

   _____, which exports _____ units of wheat in return.

h. **Plot** the trade that you propose in part (g) on the graphs above. For each country, plot the starting point representing **production before trade**, and the ending point representing **consumption after trade**.

(5) [Market equilibrium: 12 pts] Suppose seven buyers and seven sellers engage in a market similar to the exercise we did in class. Each buyer may buy at most one unit and each seller may sell at most one unit, but no one is forced to trade. Assume that buyers and sellers are each trying to maximize their personal surplus (or "gains from trade"). Surplus for each buyer equals the buyer's value of the good minus the price paid. Surplus for each seller equals the price received minus the seller's cost of the good. Surplus of persons who do not trade are zero. Buyers' values and sellers' costs are given in the following table.

Buyer	Value	Seller	Cost
Bob	$14	Sue	$ 1
Barb	$13	Steve	$ 1
Ben	$12	Sam	$ 2
Bailey	$10	Sven	$ 2
Brian	$ 8	Sarina	$10
Brittany	$ 6	Sam	$11
Brandon	$ 4	Sophia	$12
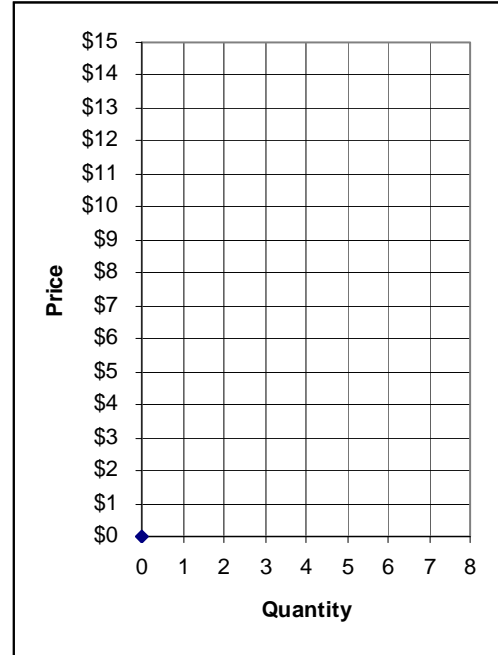
Suppose with some experience, the market settles on a single price. All trades are made at that price. (You can use the graph at right for scratch work.)

a. If the price were $13, would there by *excess demand, excess supply*, or *neither*?

Now consider the market equilibrium.

b. What is the equilibrium price? Give an answer to the nearest whole dollar. | $

c. How many units of the good will be sold in this market? | units

d. Compute the total revenue received by sellers (which equals the total spending by buyers). | $

e. Compute the combined total surplus (or gains from trade) of all buyers and sellers. (Check your answer carefully! No partial credit for being "close"!) | $

f. Who enjoys higher surplus in this particular market, the *buyers* or the *sellers?* Or is buyers' total surplus *equal* to sellers' total surplus?

(6) [Shifts in demand and supply: 15 pts] Analyze each of the following markets according to the accompanying imaginary scenario.

a. Consider the market for **natural gas**. Suppose we have an unusually cold winter. (Most homes in the Midwest are heated with natural gas.)
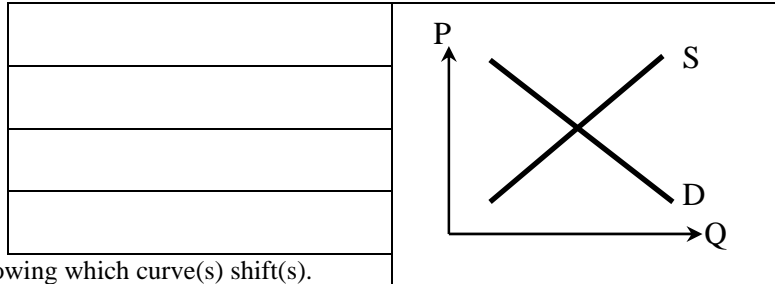
Does demand shift *left*, shift *right*, or remain *unchanged* ?
Does supply shift *left*, shift *right*, or remain *unchanged* ?
Does the equilibrium price *increase, decrease,* or *cannot be determined* ?
Does the equilibrium quantity *increase, decrease,* or *cannot be determined* ?
Sketch a graph of this scenario at right, showing which curve(s) shift(s).

b. Consider the market for **gasoline**. Suppose new government environmental regulations raise the cost of producing gasoline.
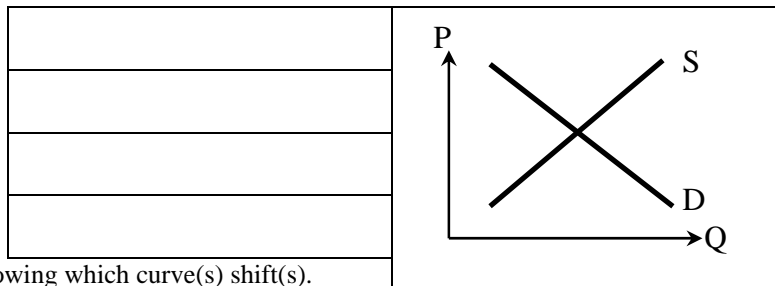
Does demand shift *left*, shift *right*, or remain *unchanged* ?
Does supply shift *left*, shift *right*, or remain *unchanged* ?
Does the equilibrium price *increase, decrease,* or *cannot be determined* ?
Does the equilibrium quantity *increase, decrease,* or *cannot be determined* ?
Sketch a graph of this scenario at right, showing which curve(s) shift(s).

c. Consider the market for **coal**: Suppose new safety regulations raise the cost of digging coal. Simultaneously, the price of natural gas falls sharply.
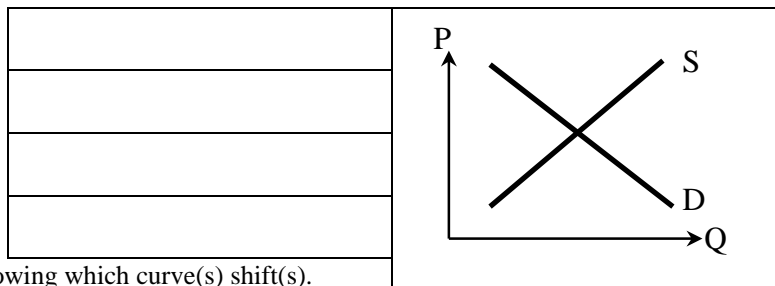
Does demand shift *left*, shift *right*, or remain *unchanged* ?
Does supply shift *left*, shift *right*, or remain *unchanged* ?
Does the equilibrium price *increase, decrease,* or *cannot be determined* ?
Does the equilibrium quantity *increase, decrease,* or *cannot be determined* ?
Sketch a graph of this scenario at right, showing which curve(s) shift(s).

(7) [Consumer surplus, producer surplus: 22 pts] The market for baseball caps is depicted in the graph below.
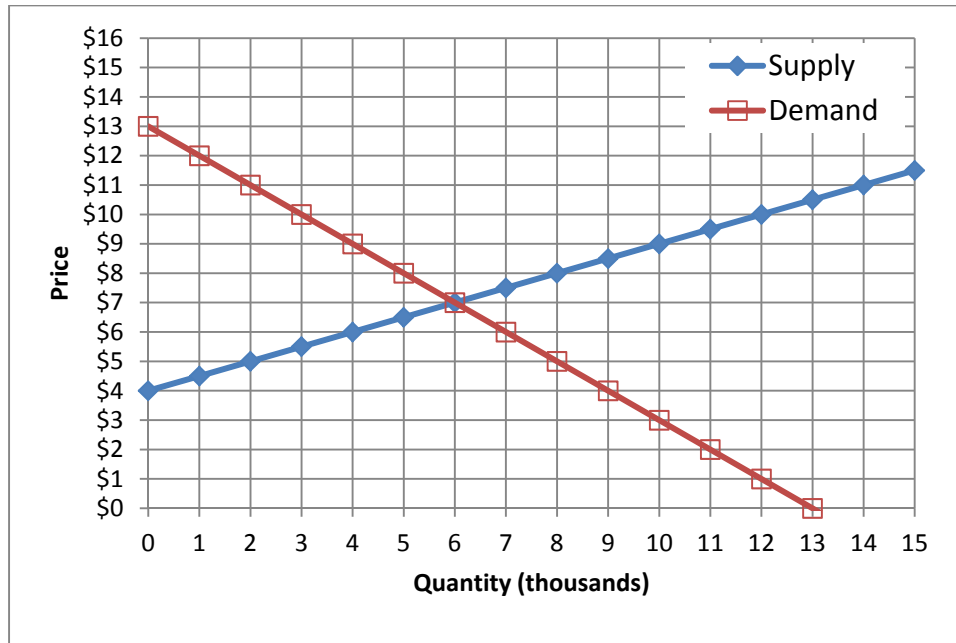
Suppose the price in this market were $10 for some reason.

a. Would there be *excess demand, excess supply*, or *neither*?

b. How much?

thousand

c. Would the price tend to *rise, fall*, or remain *constant*?

Now suppose the market is in equilibrium.

d. Give the equilibrium price.

$

e. Give the equilibrium quantity.

thousand

f. How much are consumers willing to pay for the 5 thousandth baseball cap?

$

g. How much consumer surplus do they enjoy for the 5 thousandth baseball cap?

$

h. What is the marginal cost to producers of the 2 thousandth baseball cap?

$

i. How much producer surplus do they enjoy for the 2 thousandth baseball cap?

$

j. Compute total consumer surplus.

$	thousand

k. Compute total producer surplus.

$	thousand

(8) [Consumer surplus, producer surplus: 4 pts] Consider the market for toasters as depicted in the graph below.
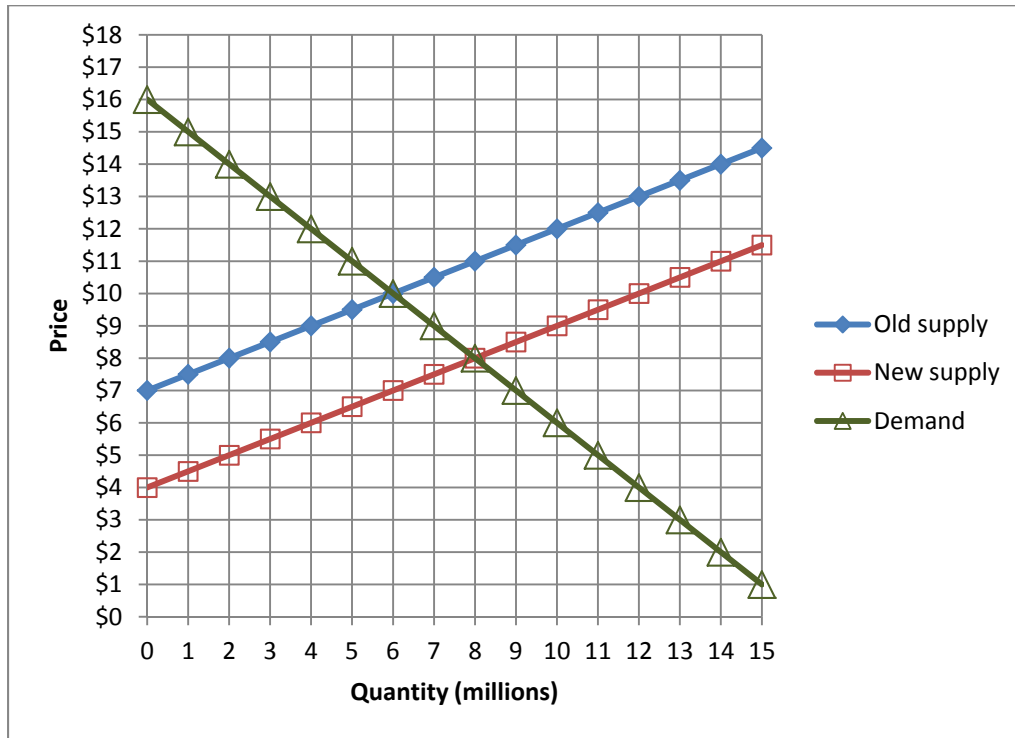
Suppose supply shifts from the "old supply" curve to the "new supply" curve.
   a. Are consumers *better* off or *worse* off as a result of the supply shift?

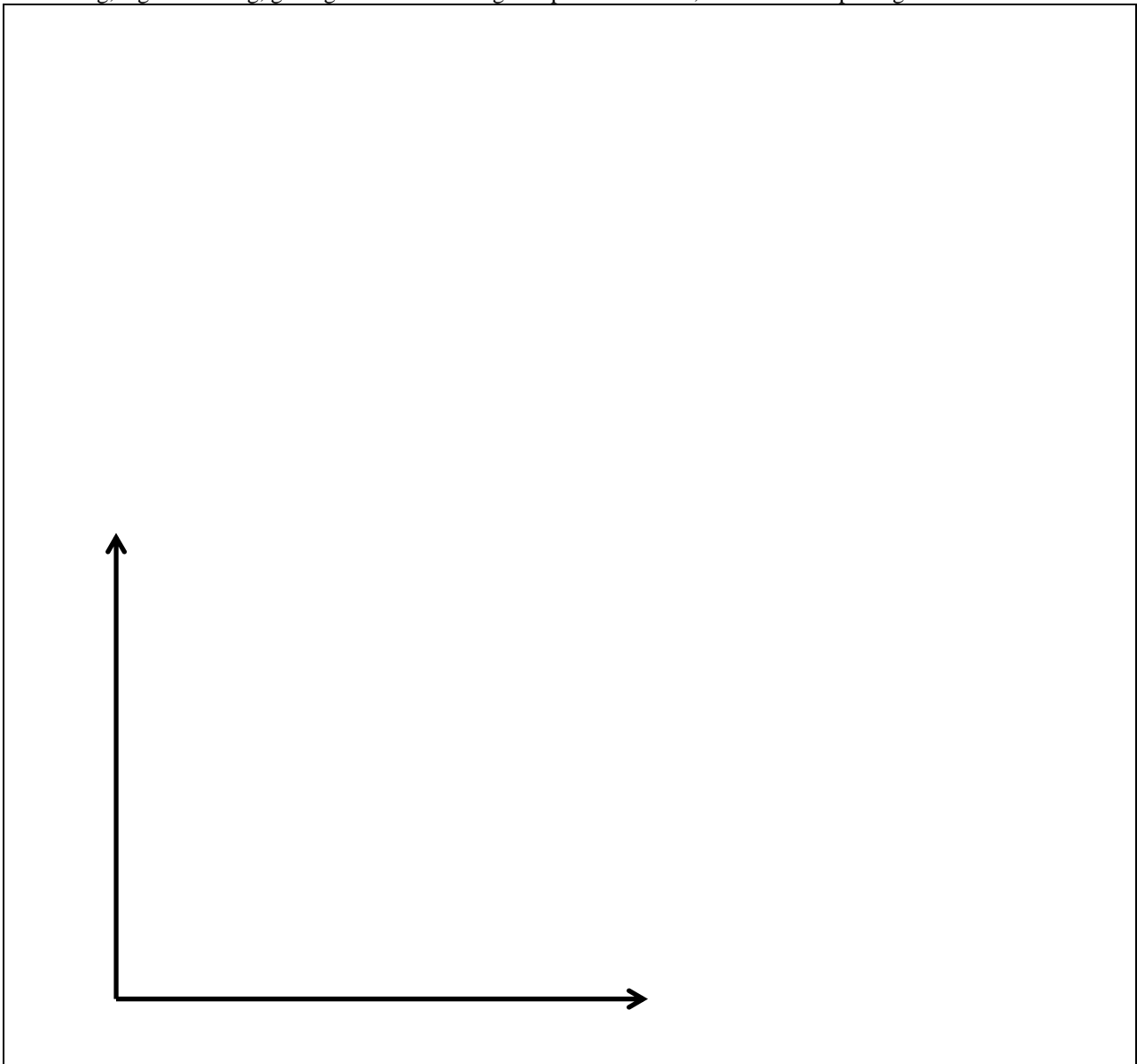   b. By how much? (Compute the change in consumer surplus.)

$ _____ million

III. Critical thinking: Write a one-paragraph essay answering *one* question below (your choice). [4 pts]

(1) Consider the following statement. "The United States produces more cars and more corn than Mexico. Therefore, the United States cannot benefit from trade with Mexico in these goods." Assume the first sentence is correct. Do you agree or disagree with the second sentence? Justify your answer.

(2) A reader wrote to the Des Moines *Register* in August 2015: "The grocery stores are charging higher prices for eggs claiming a shortage because of the bird flu. So why is that every time I've been shopping that the shelves are all well stocked? You'd think if there really was a shortage the shelves would be empty, right? Someone's got some 'splaining to do." Use a supply-and-demand graph to explain why, in a free market for eggs, bird flu does *not* result in empty shelves (that is, excess demand).

Please circle the question you are answering. Write your answer below. Full credit requires correct economic reasoning, legible writing, good grammar including complete sentences, and accurate spelling.

[end of exam]