# EXAMINATION 1  VERSION B
## "Competitive Supply and Demand"
### September 20, 2017

INSTRUCTIONS:  This exam is closed-book, closed-notes.  Simple calculators are permitted, but graphing calculators, calculators with alphabetical keyboards, cell phones, and wireless devices 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, 13 pts total]

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

(2) Your *marginal benefit* your enjoy from eating ice cream is
a.   the average benefit of all scoops you eat.
b.   the benefit of the first scoop you eat.
c.   the benefit of the last scoop you eat.
d.   the total benefit of all scoops you eat.

(3) The graph below shows Amy's marginal cost (MC) and marginal benefit (MB) from cardio exercise at the gym.  Amy's rational choice is to exercise for
a.   20 minutes.
b.   40 minutes.
c.   50 minutes.
d.   60 minutes.
e.   70 minutes.
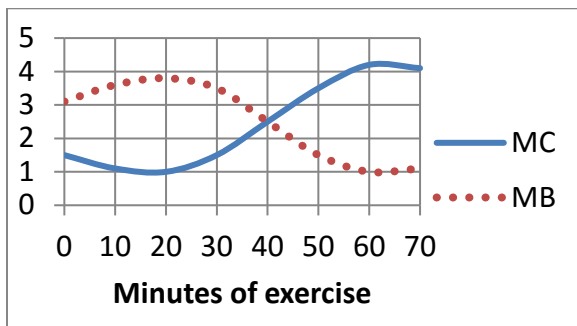


(4) The term "equilibrium" in economics describes a situation where
a.   all companies are the same size.
b.   all prices are equal.
c.   no one wants to change their choices.
d.   total costs exactly equal total benefits.

(5) "The government should discourage people from smoking" is an example of
a.   a positive statement.
b.   a normative statement.
c.   both of the above.
d.   none of the above.

(6) Economic or physical capital includes
a.   trucks and bulldozers.
b.   machinery and equipment.
c.   factories and office buildings.
d.   all of the above.
e.   none of the above.

(7) 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 5 hours of labor input.
d.   Yes, but only before 5 hours of labor input.
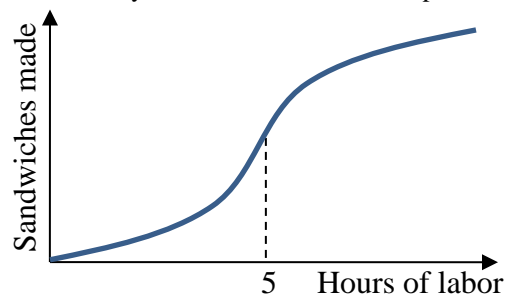
(8) Tasty Bakery makes bread and cupcakes, with the production possibility curve shown below.  As more cupcakes are produced, the opportunity cost of the last cupcake produced
a.   decreases.
b.   increases.
c.   first increases, then decreases.
d.   remains constant.
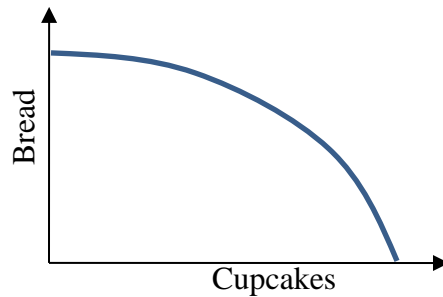


(9) Farm A can produce 100 units of corn or 100 units of soybeans per acre.  Farm B can produce 300 units of corn or 150 units of soybeans per acre. Which farm has a comparative advantage in corn?
a.   Farm A.
b.   Farm B.
c.   Both farms.
d.   Neither farm.

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

(11) The Law of One Price means
a.   efficient markets eliminate price dispersion.
b.   the total quantity buyers want to buy is negatively related to the price.
c.   a good cannot be resold.
d.   all sellers are required by law to quote the same price.
e.   the buyer and the seller in each transaction must agree on a price.

(12) A fall in the price of Android smart phones will shift the demand for Apple iPhones to the left, since Android phones and iPhones are
a.   complementary goods.
b.   substitute goods.
c.   normal goods.
d.   inferior goods.

(13) Excess demand in the market for wheat would cause the price of wheat to
a.   increase.
b.   decrease.
c.   oscillate up and down.
d.   remain constant.

**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 price of a hotel room in San Francisco is $220, and the average price in Los Angeles is $180.  Compute the percent difference using the midpoint method.

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(2) [Percent change of product: 4 pts]  Total spending on pears equals the price per pound times pounds purchased.  Suppose the price increases by 5 percent and pounds purchased decreases by 7 percent.

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

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   b. By approximately how much?

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| % |

(3) [Production functions: 7 pts]  A work crew performs oil changes on cars.  Complete the table by computing the work crew's average product and marginal product and placing your answers in the unshaded cells of the third and fourth columns below.  Then answer the question below.

| Number of workers | Oil changes performed | Average Product | Marginal Product |
|---|---|---|---|
| 0 workers | 0 oil changes |  |  |
|  |  |  | oil changes per worker |
| 2 workers | 12 oil changes | oil changes per worker |  |
|  |  |  | oil changes per worker |
| 4 workers | 20 oil changes | oil changes per worker |  |
|  |  |  | oil changes per worker |
| 6 workers | 24 oil changes | oil changes per worker |  |

Is the work crew's production function characterized by *diminishing returns* to their labor input?  Answer "yes" or "no."

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(4) [Comparative advantage, gains from trade: 17 pts]  Country X and Country Y can each produce sweatshirts and calculators.  They each face a tradeoff between these two products because of limited workforces.  Their production possibility curves are shown below.
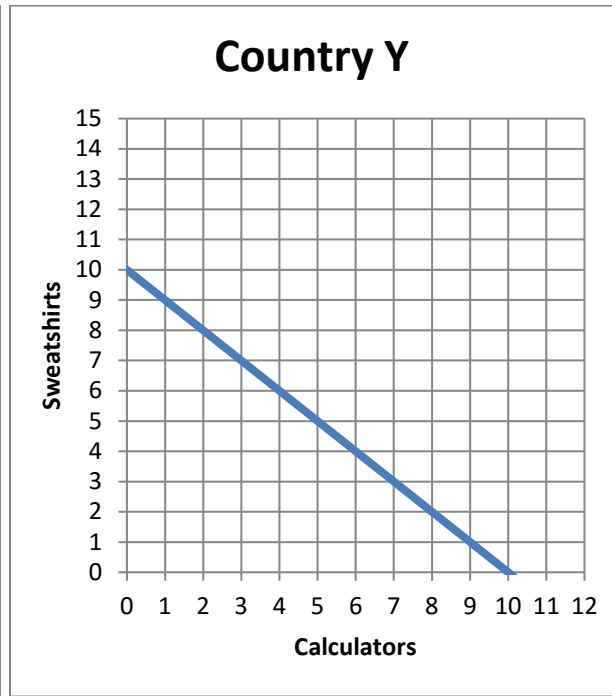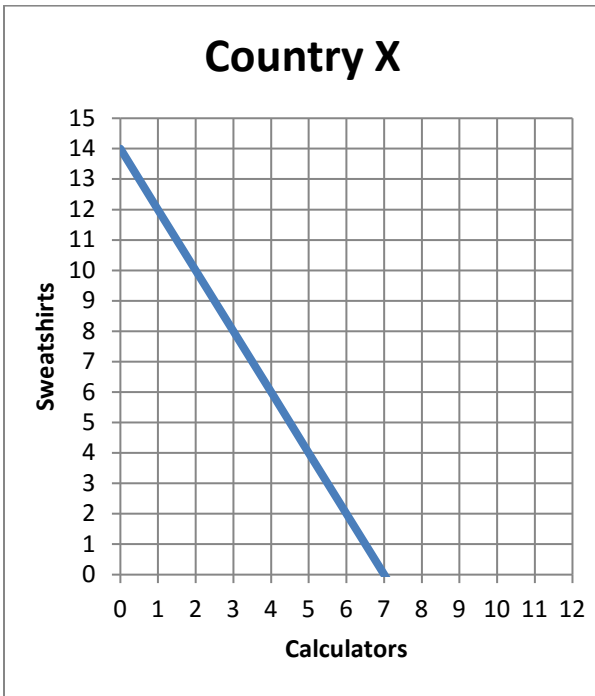
**Country X**



**Country Y**



a.  What is Country X's opportunity cost of producing a sweatshirt?

b.  What is Country Y's opportunity cost of producing  a sweatshirt?

c.  What is Country X's opportunity cost of producing a calculator?

d.  What is Country Y's opportunity cost of producing a calculator?

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

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

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

production possibility curves if _____ exports *two* calculators to

_____, which exports _____ sweatshirts in return.

h. **Plot** the trade that you propose in part (g) on the graphs above.  For each country, plot and label 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 | $13 | Sue | $ 1 |
| Barb | $13 | Steve | $ 1 |
| Ben | $12 | Sam | $ 2 |
| Bailey | $12 | Sven | $ 3 |
| Brian | $ 3 | Sarina | $ 5 |
| Brittany | $ 2 | Sam | $ 6 |
| Brandon | $ 1 | Sophia | $14 |
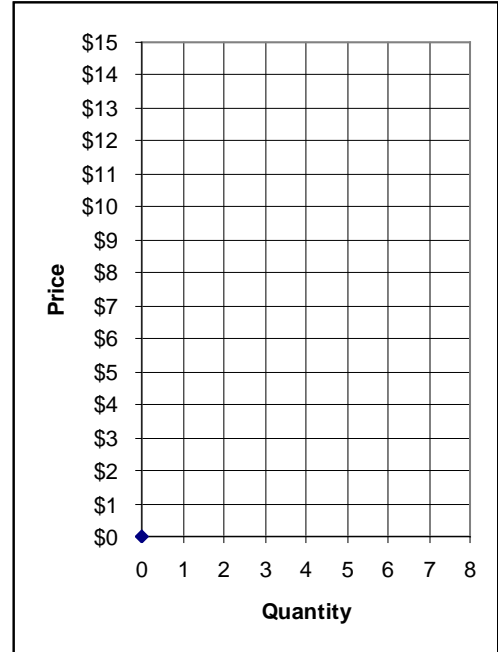
Suppose with some experience, the market settles on a single price. All trades are made at that price.  (You can use the graph at right for scratch work.)

a. If the price were $10, 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 ***high-efficiency light bulbs***.  Suppose new technology allows these bulbs to be manufactured at much lower cost.

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).

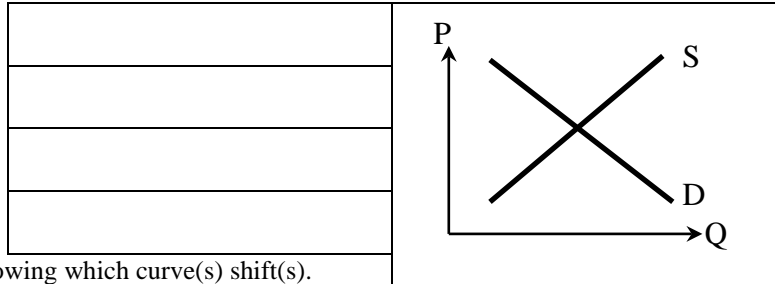b. Consider the market for ***sodapop***:  Consumers become more interested in avoiding junk food.

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 ***blueberries***:  A new government study reports that eating blueberries helps fight cancer and heart disease.  At the same time, new environmental regulations raise the cost of growing blueberries.
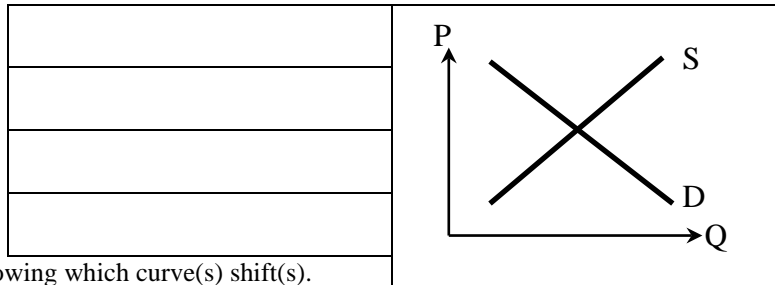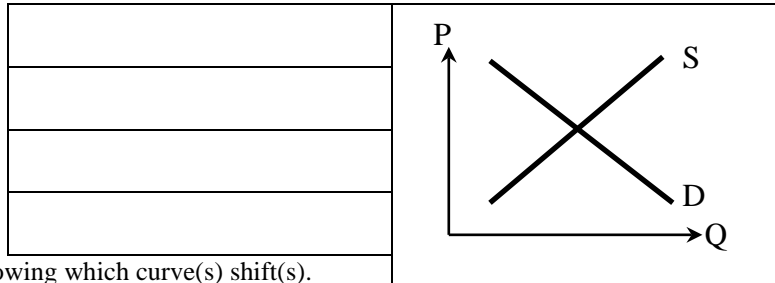
Does demand shift *left*, shift *right*, or remain *unchanged* ?
Does supply shift *left*, shift *right*, or remain *unchanged* ?
Does the equilibrium price *increase, decrease,* or *cannot be determined* ?
Does the equilibrium quantity *increase, decrease,* or *cannot be determined* ?
Sketch a graph of this scenario at right, showing which curve(s) shift(s).

(7) [Consumer surplus, producer surplus: 22 pts]  The market for staplers  is depicted in the graph below.



Suppose the price in this market were $8 for some reason.

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

   b.  How much?

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

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| thousand |
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Now suppose the market is in equilibrium.

   d.  What is the equilibrium price?

   e.  What is the equilibrium quantity?

   f.  How much are consumers willing to pay for the 3 thousandth stapler?

   g.  How much consumer surplus do they enjoy for the 3 thousandth stapler?

   h.  What is the marginal cost to producers of the 6 thousandth stapler?

   i.  How much producer surplus do they enjoy for the 6 thousandth stapler?

   j.  Compute total consumer surplus.

   k.  Compute total producer surplus.

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| $ |
| thousand |
| $ |
| $ |
| $ |
| $ |
| $              thousand |
| $              thousand |

(8) [Consumer surplus, producer surplus: 4 pts]  Consider the market for sandwich wraps as depicted in the graph below.
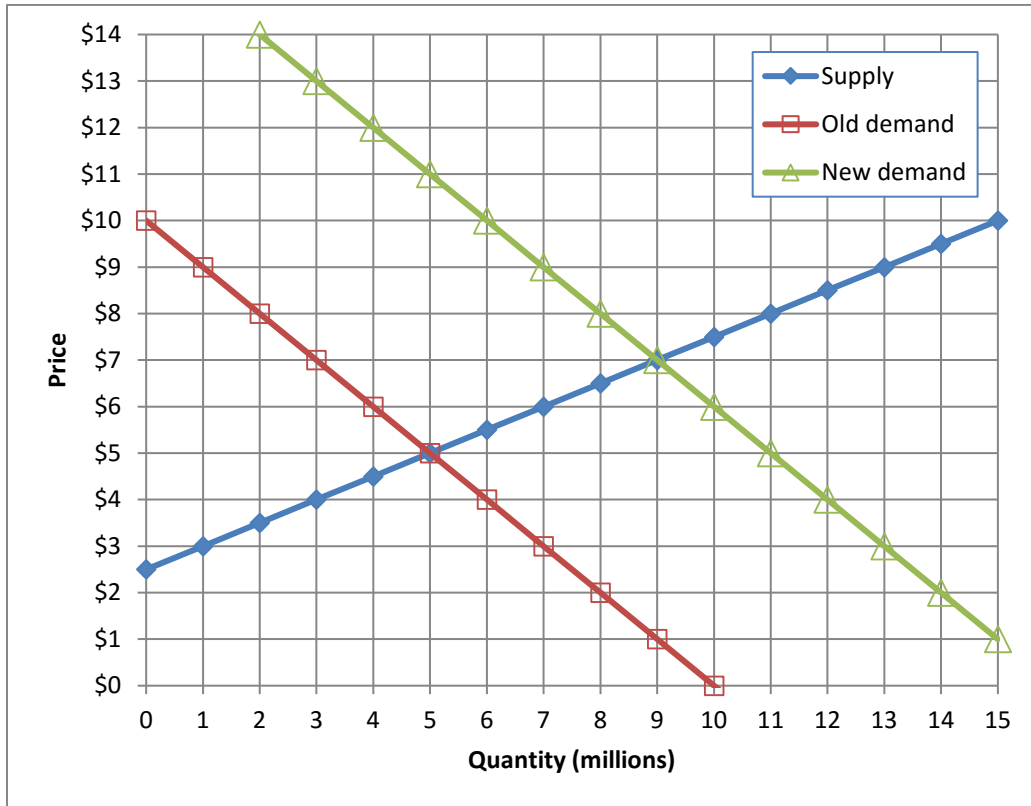


Suppose demand shifts, due to changing consumer tastes, from the "old demand" curve to the "new demand" curve.

a.  Are sandwich producers *better* off or *worse* off as a result of the demand shift?

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

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| $             million |

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

(1) The share of a consumer's total spending on food equals the price of food times the quantity of food, all divided by the consumer's total income.  Suppose the price of food increases by 5%, the quantity increases by 1%, and the consumer's income increases by 9%.  Does the share of spending on food *increase* or *decrease*?  By about how much?  Explain how you computed your answer.

(2) Suppose we want to compute the percent difference in the price of gasoline in Europe versus the United States. This can be done by three different methods:  using the U.S. price as the base, using the European price as the base, or using the midpoint formula.  Now the price of gasoline is much higher in Europe.  So which method would produce the largest percent difference?  Which method would produce the smallest percent difference? Why?

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]