

EXAMINATION 1 VERSION A
"Competitive Supply and Demand"
September 20, 2023

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) When we assume that people do the best they can with what they have, we are assuming that people are
- “competitive.”
 - “positive.”
 - “rational.”
 - “in equilibrium.”

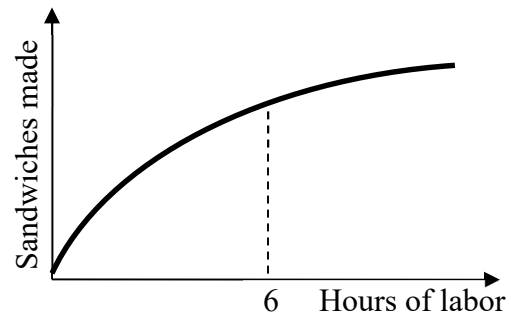
- (2) Rational choice implies eating donuts until the marginal benefit of the last donut
- is much greater than its marginal cost.
 - begins to exceed its marginal cost.
 - begins to fall below its marginal cost.
 - is much less than its marginal cost.

- (3) The term “equilibrium” in economics describes a situation where
- no one wants to change their choices.
 - total costs exactly equal total benefits.
 - all companies are the same size.
 - all prices are equal.

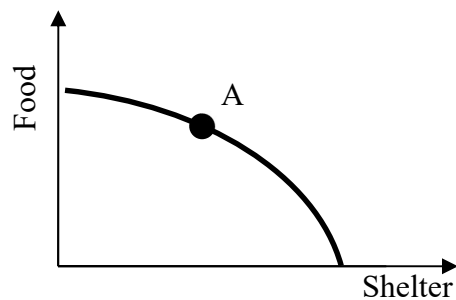
- (4) “The government should provide a job for everyone who wants one” is an example of
- a positive statement.
 - a normative statement.
 - both of the above.
 - none of the above.

- (5) "Economic capital" or "physical capital" includes
- corporate bonds.
 - computers and software.
 - shares of stock in corporations.
 - savings in bank accounts.

- (6) Is the production function below characterized by diminishing returns to labor input?
- Yes, for all levels of labor input.
 - No, not for any levels of labor input.
 - Yes, but only after 6 hours of labor input.
 - Yes, but only before 6 hours of labor input.



- (7) The graph below shows the production possibility curve for some country. The combination of outputs represented by point A
- is feasible and efficient.
 - is feasible but not efficient.
 - is infeasible.
 - cannot be determined from information given.



- (8) An efficient well-functioning market
- ensures that every potential buyer and seller makes a trade.
 - obeys the law of one price.
 - generates a variety of prices from which buyers and sellers may choose.
 - converges to a price such that consumer surplus equals producer surplus.
 - all of the above.
- (9) An increase in the price of oranges will
- shift the demand curve for oranges to the right.
 - shift the demand curve for oranges to the left.
 - rotate the demand curve for oranges so that it becomes steeper.
 - rotate the demand curve for oranges so that it becomes flatter.
 - move buyers along the demand curve for oranges up and to the left.
- (10) A rise in the price of ice cream will shift the demand for frozen yogurt to the right, assuming ice cream and frozen yogurt are
- complementary goods.
 - substitute goods.
 - normal goods.
 - inferior goods.
- (11) Corn oil is made from corn, so if the price of corn rises, then the
- demand for corn oil will shift left.
 - demand for corn oil will shift right.
 - supply of corn oil will shift left.
 - supply of corn oil will shift right.
- (12) Some people believe there is excess supply in the commercial real estate market. If they are right, then the price of commercial real estate can be expected to
- rise.
 - fall.
 - remain constant.
 - Price movements are not related to excess supply.
- (13) In July, the price of vegetables decreases and the quantity sold increases. This could be caused by a
- rightward shift in the demand for vegetables.
 - rightward shift in the supply of vegetables.
 - leftward shift in the demand for vegetables.
 - leftward shift in the supply of vegetables.

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) [Marginal cost: 2 pts] Suppose a one-liter bottle of sodapop costs \$1.50 and a two-liter bottle costs \$2.00. Compute the marginal cost of the second liter.

(2) [Percent change, midpoint formula: 2 pts] Suppose the average driver in City A uses 7 gallons of gas per week while the average driver in City B uses 9 gallons. Compute the percent difference using the midpoint formula.

(3) [Percent change of product: 4 pts] The bus company's revenue equals the price of a bus fare times the number of bus fares purchased. Suppose the price of a bus fare increases by 5 percent and the number of fares purchased *decreases* by 3 percent.

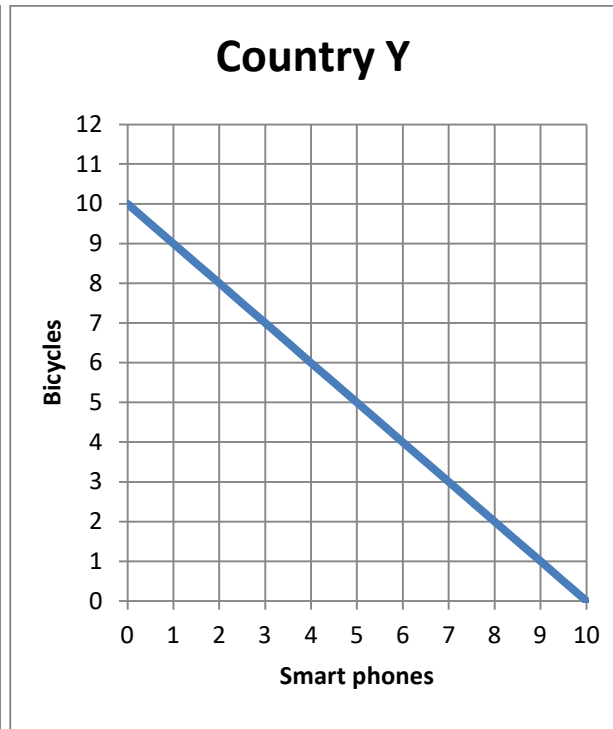
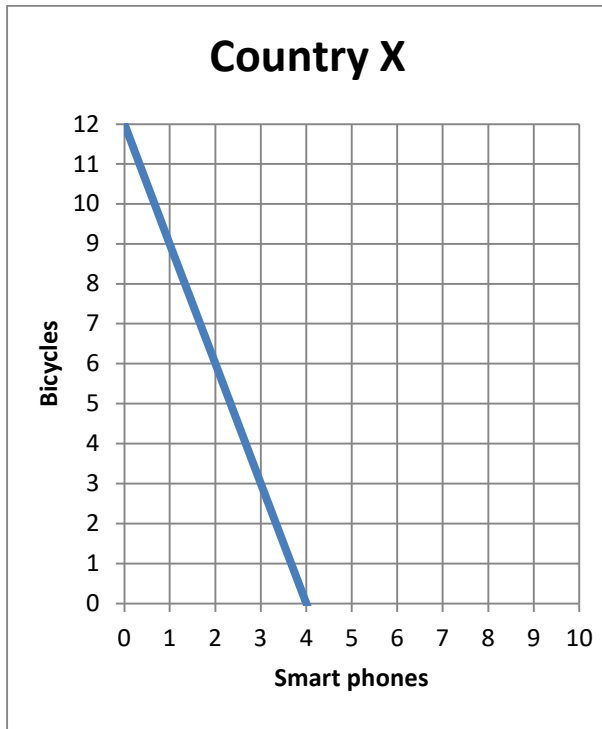
- a. Does the bus company's revenue *increase* or *decrease*?
- b. By approximately how much?

(4) [Production functions: 7 pts] A work crew washes 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.

<i>Number of workers</i>	<i>Cars washed per hour</i>	<i>Average Product</i>	<i>Marginal Product</i>
0 workers	0 cars		
			cars per worker
2 workers	4 cars	cars per worker	
			cars per worker
4 workers	12 cars	cars per worker	
			cars per worker
6 workers	24 cars	cars per worker	

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

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



- What is Country X's opportunity cost of producing a smart phone?
- What is Country Y's opportunity cost of producing a smart phone?
- What is Country X's opportunity cost of producing a bicycle?
- What is Country Y's opportunity cost of producing a bicycle?
- Which country has a comparative advantage in producing smart phones?
- Which country has a comparative advantage in producing bicycles?

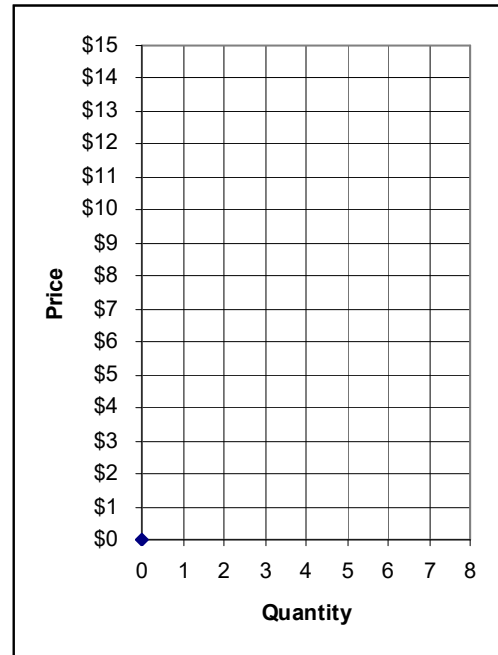
	bicycles
	bicycles
	smart phones
	smart phones

g. [3 pts] Fill in the blanks: *Both* countries can consume combinations of products *outside* their individual production possibility curves if _____ exports *three* bicycles to _____, which exports _____ smart phones 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**.

(6) [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	\$12	Sue	\$ 1
Barb	\$12	Steve	\$ 1
Ben	\$11	Sam	\$ 2
Bailey	\$11	Sven	\$ 2
Brian	\$10	Sarina	\$ 3
Betty	\$ 3	Sean	\$ 5
Bert	\$ 1	Sally	\$14



Suppose with some experience, the market settles on a single price. All trades are made at that price. (Hint: use the graph at right for scratch work.)

- a. If the price were \$8, would there be *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?
- 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?

\$	
	units
\$	
\$	

(7) [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 new horizontal hydraulic fracturing (fracking) technology lowers the cost of producing natural gas.

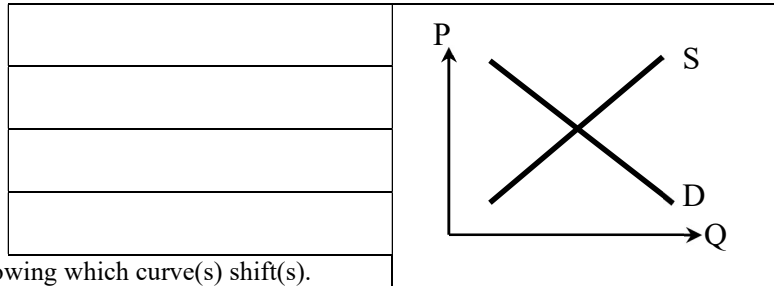
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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 **luxury cars**. Suppose a boom raises consumers' incomes.

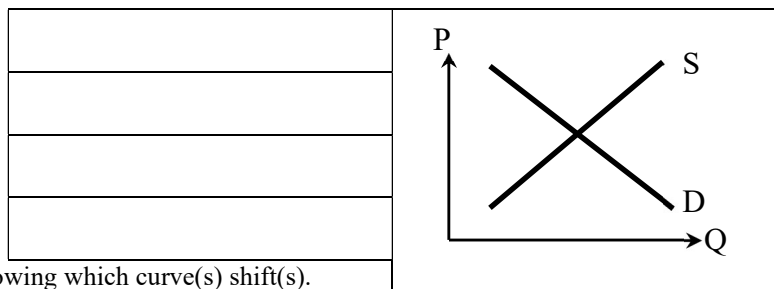
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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.

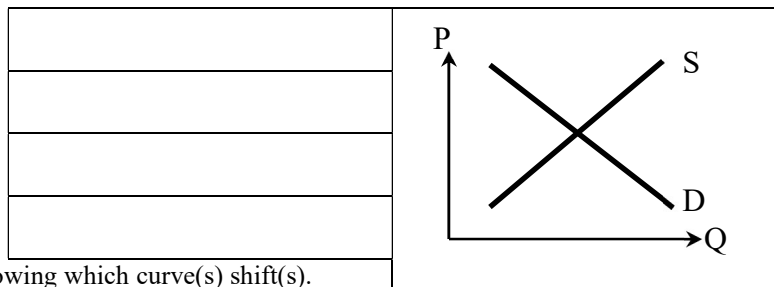
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Does supply shift *left*, shift *right*, or remain *unchanged* ?

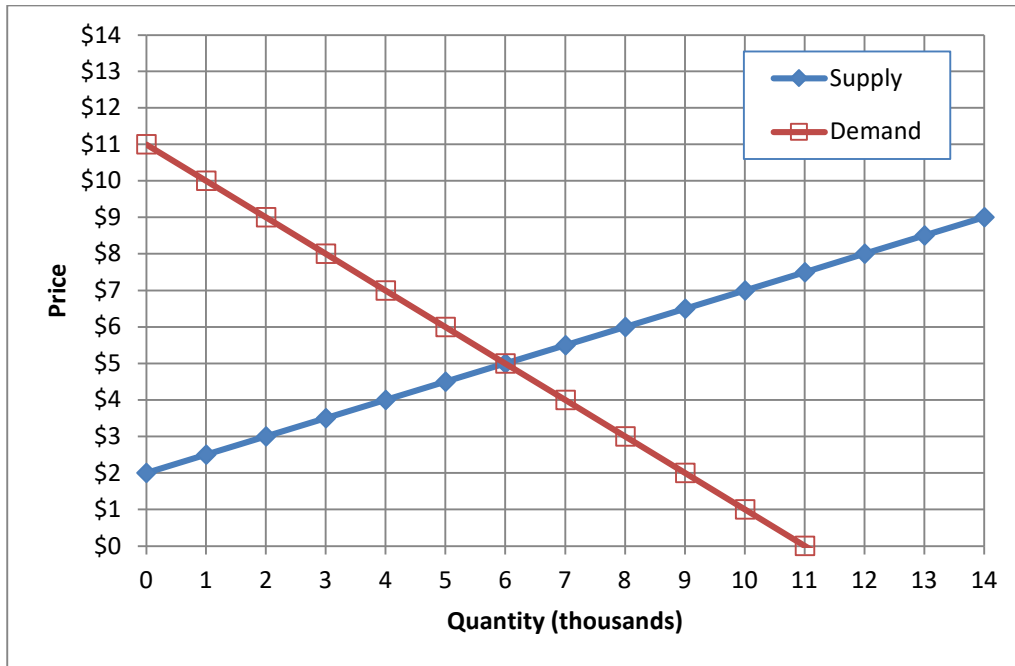
Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?

Does the equilibrium quantity *increase*, *decrease*, or *cannot be determined* ?

Sketch a graph of this scenario at right, showing which curve(s) shift(s).



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



Suppose the price in this market were \$6 for some reason.

- Would there be *excess demand*, *excess supply*, or *neither*?
- How much?
- Would the price tend to *rise*, *fall*, or remain *constant*?

thousand

Now suppose the market is in equilibrium.

- What is the equilibrium price?
- What is the equilibrium quantity?
- How much are consumers willing to pay for the 3 thousandth pumpkin?
- How much consumer surplus do they enjoy for the 3 thousandth pumpkin?
- What is the marginal cost to producers of the 4 thousandth pumpkin?
- How much producer surplus do they enjoy for the 4 thousandth pumpkin?
- Compute total consumer surplus.
- Compute total producer surplus.

\$
thousand
\$
\$
\$
\$
\$ thousand
\$ thousand

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

- (1) Why are tomatoes in Iowa expensive in winter and spring but cheap in summer and fall? Justify your answer using a supply-and-demand graph, labeling all axes and curves.
- (2) An angry reader wrote to the Des Moines *Register*: “The grocery stores are charging higher prices for eggs claiming a shortage because of the bird flu. So why is it 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 “splain” (explain) why, in a free market for eggs, bird flu does *not* result in empty shelves (that is, excess demand). Label both axes and all curves.

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]