

EXAMINATION 1 VERSION A
"Competitive Supply and Demand"
September 18, 2025

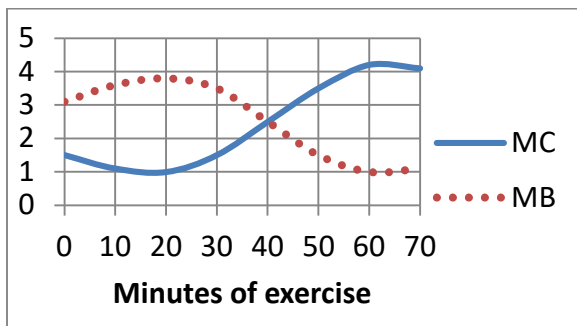
INSTRUCTIONS: This exam is closed-book, closed-notes. Simple calculators are permitted, but graphing calculators, calculators with alphabetical keyboards, cell phones, and wireless devices are NOT permitted. Numerical answers, if rounded, must be correct to at least 3 significant digits. Point values 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, 15 pts total]

- (1) In economics, *rational behavior* means
- using math to make decisions.
 - ignoring "soft" concerns like friendships and charity.
 - doing the best one can with what one has.
 - making sacrifices today for a better future.
 - maximizing one's income.

- (2) Alice buys a ticket to a football game for \$30. When she arrives at the stadium, she discovers that scalpers are willing to pay \$100 for her ticket. Her *opportunity cost* of attending the game is now
- \$0.
 - \$30.
 - \$70.
 - \$100.

- (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
- zero minutes.
 - 20 minutes.
 - 40 minutes.
 - 50 minutes.
 - 60 minutes.

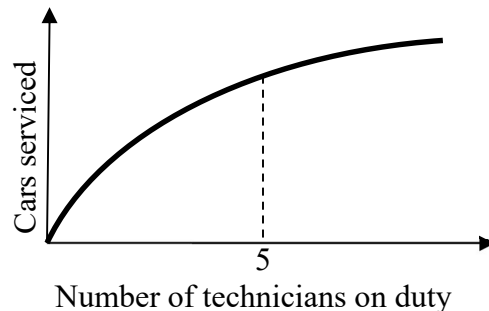


- (4) In economics, an *equilibrium* is a situation where
- total costs equal total benefits.
 - no one wants to change their choices.
 - inflation equals zero percent.
 - economic growth is zero.

- (5) "The inflation rate rises whenever the unemployment rate falls below 4%" is an example of
- a positive statement.
 - a normative statement.
 - both of the above.
 - none of the above.

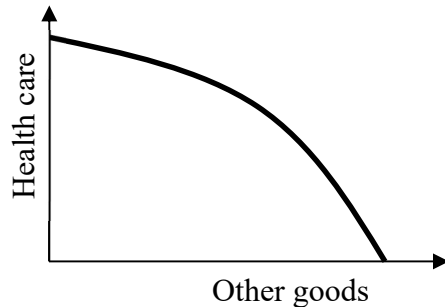
- (6) Economic or physical capital includes
- bank accounts.
 - shares of stock in corporations.
 - bonds.
 - all of the above.
 - none of the above.

- (7) 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 5 technicians.
 - Yes, but only before 5 technicians.



(8) Suppose a country's production possibility curve is as shown below. By definition, what is held constant along the curve?

- a. Output of health care.
- b. Output of other goods.
- c. The country's total inputs.
- d. The prices of health care and other goods.
- e. None of the above.



(9) Barter is an unpopular method of trading because it

- a. is subject to higher taxes.
- b. requires that each party be able to offer a good that the other wants.
- c. is often illegal.
- d. causes both parties to lose.
- e. all of the above.

(10) The Law of One Price means

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

(11) 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

- a. complementary goods.
- b. substitute goods.
- c. normal goods.
- d. inferior goods.

(12) As consumers' incomes rise, they typically go to more music concerts, because concerts are

- a. a substitute good.
- b. a complementary good.
- c. an inferior good.
- d. a normal good.

(13) If a new, more efficient method for growing rice is developed, then

- a. demand for rice will shift left.
- b. demand for rice will shift right.
- c. supply of rice will shift left.
- d. supply of rice will shift right.

(14) Excess demand in the market for cars would occur if the actual price of cars were

- a. greater than the equilibrium price.
- b. less than the equilibrium price.
- c. too close to the equilibrium price.
- d. cannot be determined from the information given.

(15) Data show that the price of electricity is rising and the quantity of electricity produced is also rising. This could be caused by a

- a. rightward shift in the demand for electricity.
- b. rightward shift in the supply of electricity.
- c. leftward shift in the demand for electricity.
- d. leftward shift in the supply of electricity.

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] A store sells shirts at a price of \$10 each but three shirts for \$25. Compute the marginal cost of the third shirt.

\$

(2) [Percent change, midpoint formula: 2 pts] Suppose the price of a bus ride in City A is \$3, while the price in State B is \$5. Compute the percent difference in price using the midpoint formula.

%

(3) [Percent change with multiplication: 4 pts] A vegetable stand's revenue from tomatoes equals price times quantity sold. Suppose the price of tomatoes increases by 5% and the quantity sold decreases by 2%

a. Does the vegetable stand's revenue from tomatoes *increase* or *decrease*?

b. By approximately how much?

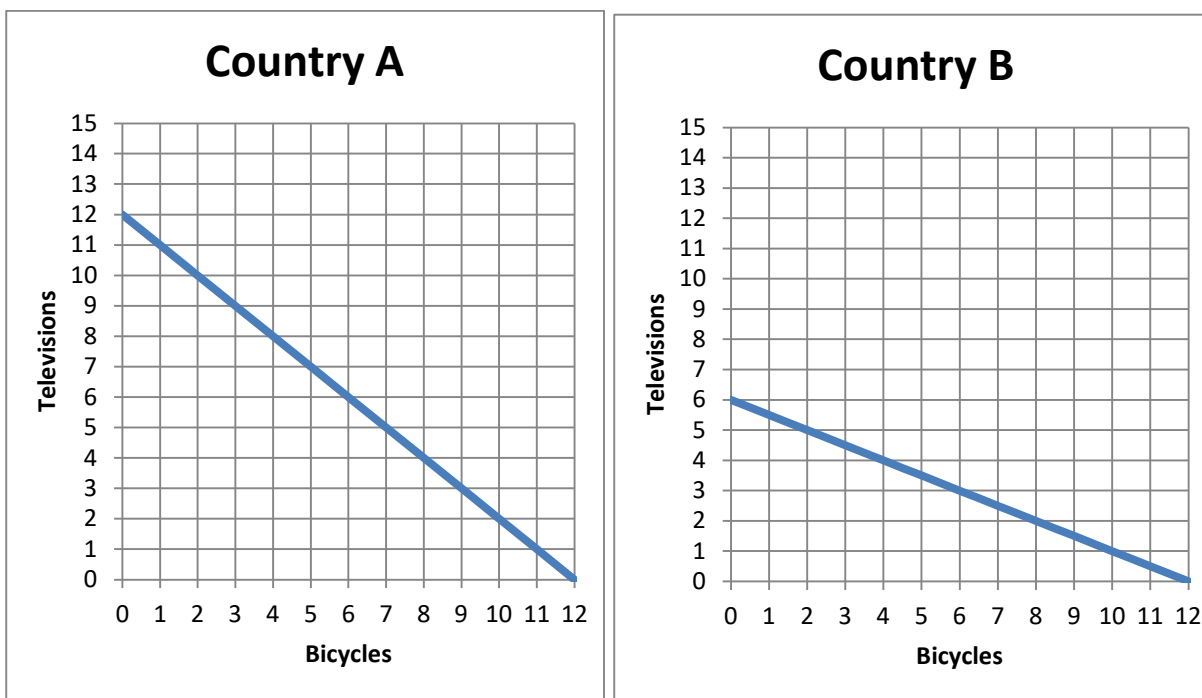
%

(4) [Production functions: 7 pts] A work crew reroofs houses. 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>Houses reroofed per month</i>	<i>Average Product</i>	<i>Marginal Product</i>
0 workers	0 houses		
			houses per worker
3 workers	6 houses	houses per worker	
			houses per worker
6 workers	18 houses	houses per worker	
			houses per worker
9 workers	36 houses	houses 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 A and Country B can each produce televisions and bicycles. They each face a tradeoff between these two products because of limited workforces. Their production possibility curves are shown below.



- What is Country A's opportunity cost of producing a television?
- What is Country B's opportunity cost of producing a television?
- What is Country A's opportunity cost of producing a bicycle?
- What is Country B's opportunity cost of producing a bicycle?
- Which country has a comparative advantage in producing televisions?
- Which country has a comparative advantage in producing bicycles?

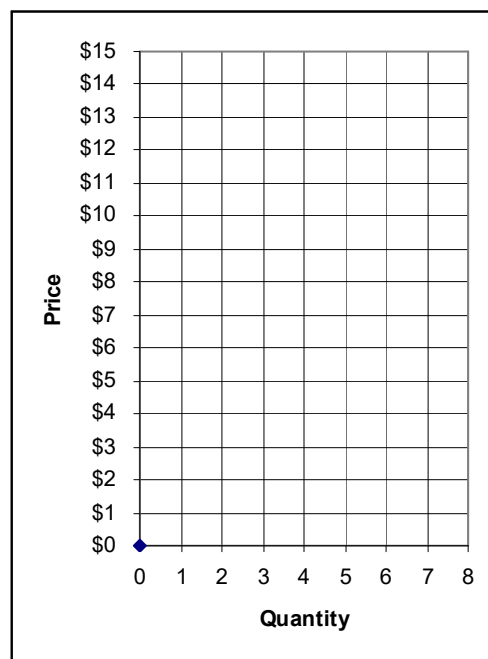
	bicycles
	bicycles
	televisions
	televisions

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 _____ televisions 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 own 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.

<i>Buyer</i>	<i>Value</i>	<i>Seller</i>	<i>Cost</i>
<i>Bob</i>	\$14	<i>Sue</i>	\$ 1
<i>Barb</i>	\$14	<i>Steve</i>	\$ 2
<i>Ben</i>	\$13	<i>Sam</i>	\$ 3
<i>Bailey</i>	\$12	<i>Sven</i>	\$ 4
<i>Brian</i>	\$11	<i>Sarina</i>	\$ 9
<i>Betty</i>	\$ 9	<i>Sean</i>	\$11
<i>Bert</i>	\$ 7	<i>Sally</i>	\$13



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 **\$5**, 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 **wooden furniture**: The price of wood rises.

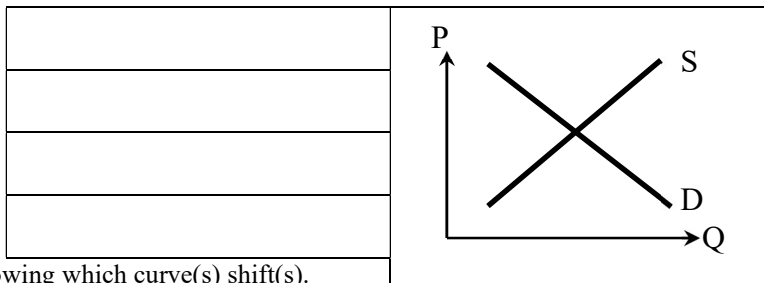
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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 **electric cars**: The price of gasoline rises.

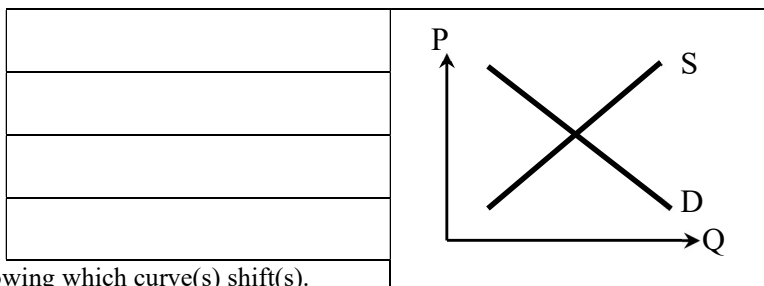
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Does the equilibrium price *increase*, *decrease*, or *cannot be determined* ?

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.

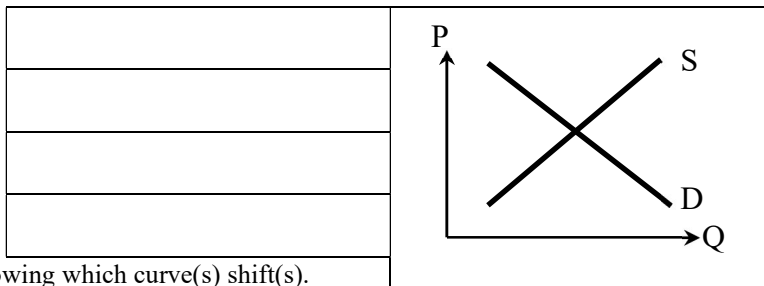
Does demand shift *left*, shift *right*, or remain *unchanged* ?

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).



The graph illustrates the market equilibrium for a product. The Supply curve (blue line with diamond markers) shows that as the quantity increases, the price also increases. The Demand curve (red line with square markers) shows that as the quantity increases, the price decreases. The equilibrium point, where supply equals demand, is at a quantity of 6 thousand units and a price of \$5.

Quantity (thousands)	Supply Price (\$)	Demand Price (\$)
0	2.0	11.0
1	2.5	10.0
2	3.0	9.0
3	3.5	8.0
4	4.0	7.0
5	4.5	6.0
6	5.0	5.0
7	5.5	4.0
8	6.0	3.0
9	6.5	2.0
10	7.0	1.0
11	7.5	0.0

thousand

\$
thousand
\$
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\$ 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) In very cold weather, the prices of fuels like natural gas and propane, which are used to heat houses, tend to rise. Why? Justify your answer using a supply-and-demand graph, labeling all axes and 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]