

**SOLUTIONS**

**ECO 100Y  
INTRODUCTION TO ECONOMICS  
Midterm Test # 1**

LAST NAME \_\_\_\_\_

FIRST NAME \_\_\_\_\_

STUDENT NUMBER \_\_\_\_\_

**INSTRUCTIONS:**

1. The total time for this test is 1 hour and 50 minutes.
2. Aids allowed: a simple calculator.
3. Write with pen instead of pencil.

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DO NOT WRITE IN THIS SPACE

Part I 1. \_\_\_\_\_/10

6. \_\_\_\_\_/10

2. \_\_\_\_\_/10

7. \_\_\_\_\_/12

3. \_\_\_\_\_/10

8. \_\_\_\_\_/13

4. \_\_\_\_\_/10

Part II \_\_\_\_\_/40

5. \_\_\_\_\_/10

TOTAL \_\_\_\_\_/125

## PART I (85 marks)

**Instructions:** Answer **all** questions in the space provided.

1. (10 marks) You were willing to pay \$15 for a ticket to next week's baseball game but you got it for only \$10. After you bought this ticket, which cannot be resold, you realize that on that day there is a concert that you would prefer to attend. You are willing to pay up to \$30 for a ticket to this concert but you can get a ticket for just \$18.

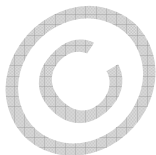
1.1. What is your opportunity cost of attending the concert? Briefly explain. (4 marks) Will you attend the concert? Briefly explain. (3 marks)

My opportunity cost of attending the concert is \$33, i.e., it is equal to the price of the ticket (the actual \$18 I must pay for the ticket) plus the value I assign to the alternative activity (i.e., the \$15 I was willing to pay for a baseball ticket).

To decide whether to attend the concert or not I must compare the opportunity cost of attending each of these events and decide for the one with lower opportunity cost. The opportunity cost of attending the baseball game is equal to the value I assign to attending the concert (i.e., the \$30 I was willing to pay for a concert ticket). The \$10 I spent on the baseball ticket is a sunk cost, i.e., it cannot be recovered whether I attend the game or not. Therefore, the price of this baseball ticket is not part of my opportunity cost of attending the baseball game. Since the opportunity cost of attending the baseball game (\$30) is lower than the opportunity cost of attending the concert (\$33), I will attend the baseball game and not the concert.

1.2. Suppose now that the ticket to the baseball game can be resold at the same purchasing price of \$10. Which event will you decide to attend now? Briefly explain. (3 marks)

My opportunity cost of attending the baseball game now changes. It is now \$40, i.e., equal to the price of the baseball ticket (the actual \$10 I must pay for the ticket) plus the value I assign to alternative activity (i.e., the \$30 I was willing to pay for a concert ticket). Since the opportunity cost of attending the baseball game (\$40) is now greater than the opportunity cost of attending the concert (\$33), I will now decide to attend the concert and not the baseball game.

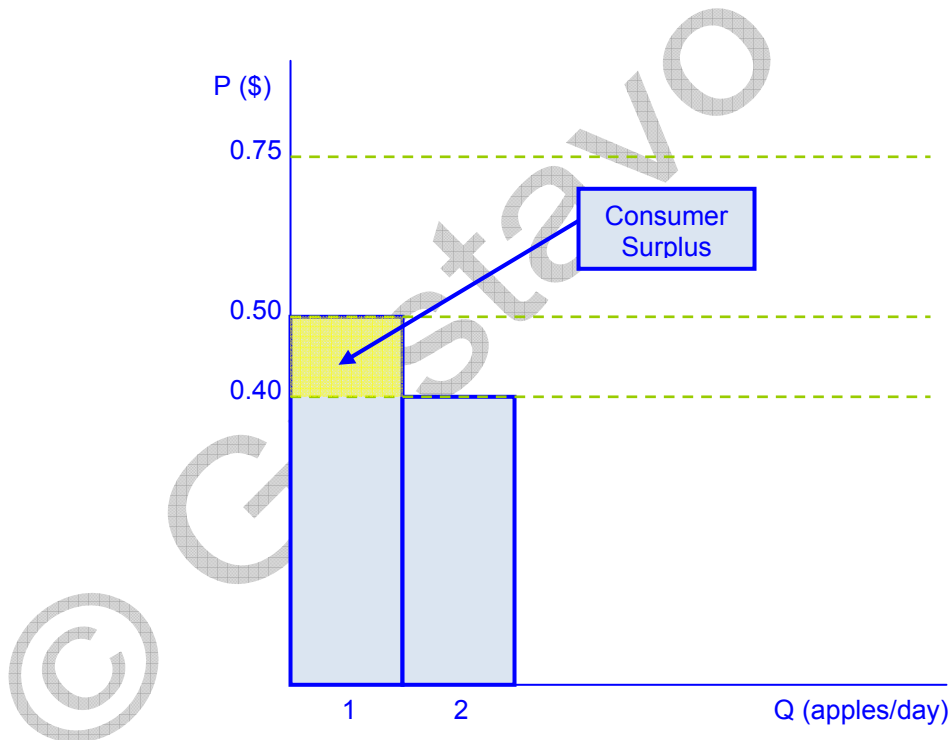


2. (10 marks) When the price of apples is \$0.75 a piece, Yvonne doesn't buy any. However, as the price of apples gradually falls, she buys one apple a day when its price drops to \$0.50 a piece. As the price continues to fall, she buys two apples a day when its price falls to \$0.40 a piece. What is Yvonne's consumer surplus when the price of apples is \$0.40 a piece? Briefly explain. [Note: Use an appropriate diagram to explain your answer. Assume that Yvonne cannot partially eat an apple, i.e., she can only eat two whole apples, one whole apple, or none at all.]

When the price is \$0.75 Yvonne doesn't buy any apples. This means that the maximum price she is willing to pay for the first apple is less than \$0.75.

However, when the price of apples gradually drops to \$0.50 a piece she buys one apple a day. This means that the maximum price she is willing to pay for this first apple is exactly \$0.50, and thus the consumer surplus she gets by consuming this first apple is zero. Indeed, the maximum price she is willing to pay is equal to the actual price she is paying for the apple and thus the consumer surplus is zero.

Now, when the price gradually drops further to \$0.40 she buys two apples a day. Again she will pay now the maximum price she is willing to pay for this second apple, but she will pay a price lower than the maximum price she was willing to pay for the first apple. The second apple does not generate any consumer surplus for Yvonne, but the first one generates a consumer surplus equal to the difference between the maximum price she was willing to pay for it (\$0.50) and the actual price she is paying (\$0.40) – thus Yvonne's total consumer surplus is \$0.10.



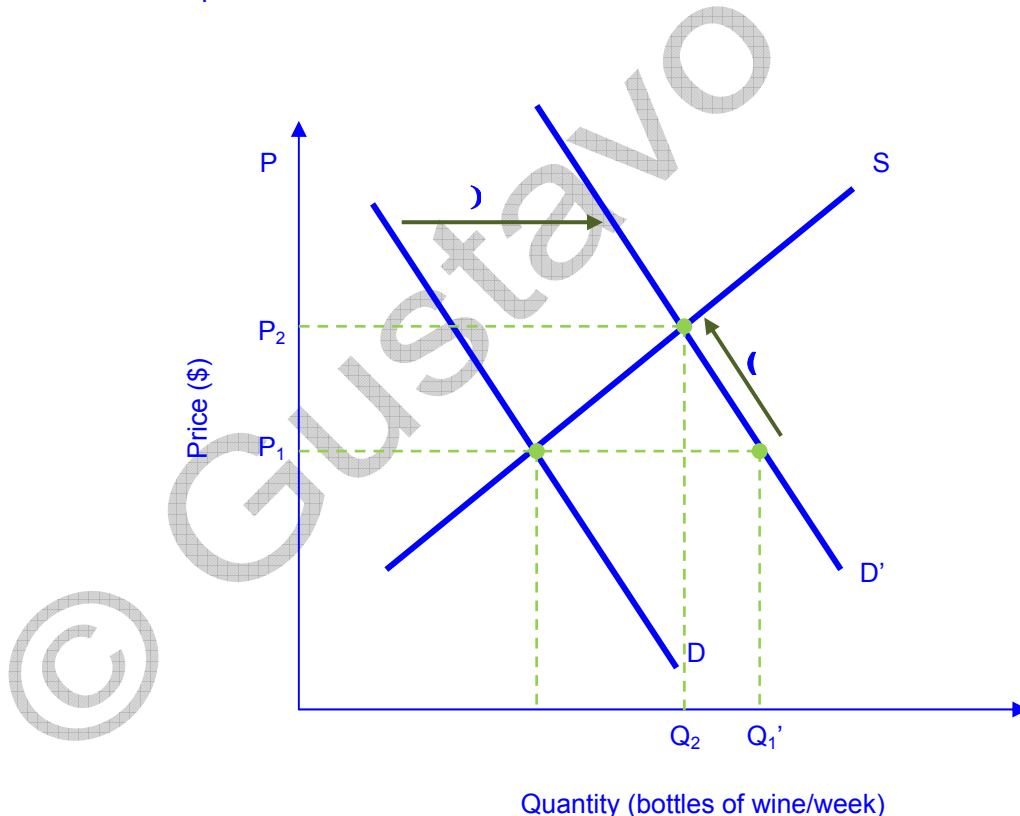
3. (10 marks) With the help of an appropriate diagram, explain whether you agree or disagree with the following statement. Marks will be given entirely for the explanation.

“A study shows that drinking one glass of red wine a day reduces the risk of having a heart attack. As a result of this study, many consumers increase their demand for red wine causing the price of red wine to rise. Consumers then react to the increase in the price of red wine by reducing their demand for red wine, thus causing the price of red wine to fall. Therefore, we must conclude that the ultimate effect of the study on the price of red wine is uncertain.”

As a result of the study, consumers wish now to consume more red wine, i.e., they increase their demand for red wine. An increase in demand is depicted graphically by a shift to the right of the demand curve, i.e., by an increase in the quantity demanded at each price level. This is shown in the diagram below by the shift of the demand curve from  $D$  to  $D'$ . The diagram shows, for instance, that at the initial equilibrium price  $P_1$  the quantity demanded increases from  $Q_1$  to  $Q_1'$  thus creating an excess demand at this price level (equal to the difference between  $Q_1'$  and  $Q_1$ ).

Since there is now an excess demand at the price level  $P_1$ , the price of wine starts to rise. This represents a movement up along the new demand curve  $D'$  and this movement continues until a new equilibrium is reached at  $P_2$ . Note that this increase in price does not decrease the demand for wine as the statement suggests; rather, it decreases the quantity demanded of wine – a movement along the curve rather than a shift of the curve.

Therefore, the statement is wrong. The ultimate effect of the study on the price of wine is not uncertain: the price of wine will increase from  $P_1$  to  $P_2$  as a result of the increase in demand.

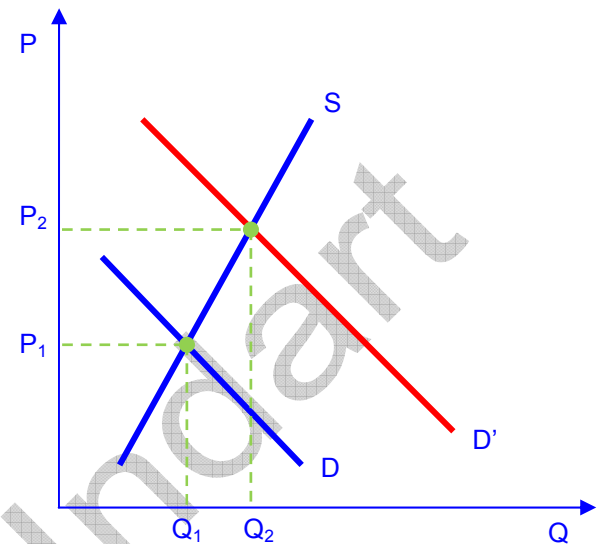


4. (10 marks) With the help of an appropriate diagram, explain the demand relationship in each of the following situations. Each question is of equal value.

4.1. “The data must be wrong,” says Rohan. “Torontonians are buying more expensive cars although their average income has not changed and the price of expensive cars has increased.”

If Torontonians are buying more expensive cars although their prices have increased, then we must conclude that the demand for expensive cars has increased (i.e., the demand curve for expensive cars has shifted to the right). This increase in demand could be the result of a change in any one of the variables that determine the position of the demand curve (increase in income, change in the distribution of income, change in the prices of other goods, change in expectations, or a change in tastes).

Since average income has not changed, the most likely cause of the increase in demand might be a worsening in the distribution of income, i.e., an increase in the income accrued to individuals with relatively high income.

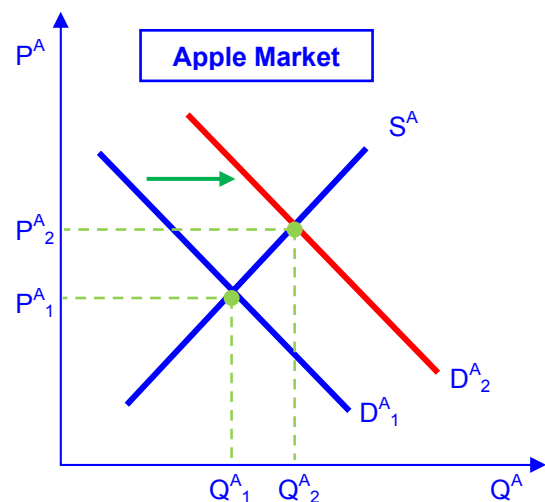
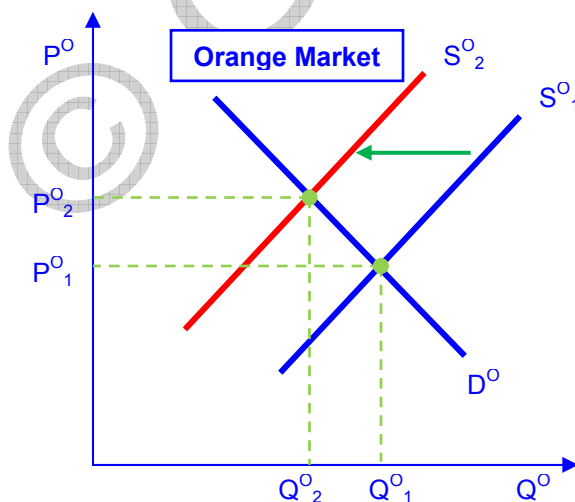


4.2. “Markets are not working competitively,” says Joanna. “When hurricane Ike destroyed orange trees in Florida the price of apples increased!”

These statements indicate that oranges and apples are substitutes.

On the one hand, the destruction of orange trees decreases the supply of oranges, i.e., the supply curve for oranges shifts to the left as shown in the left hand-side diagram below. Therefore, the equilibrium price in the orange market increases from  $P_1^O$  to  $P_2^O$  and the quantity demanded decreases from  $Q_1^O$  to  $Q_2^O$ .

On the other hand, since oranges and apples are substitutes, consumers will substitute apples for oranges as the price of oranges increases. This means that at each price level for apples the quantity demanded will increase—in other words, the demand for apples will increase. An increase in demand is shown graphically by a shift of the demand curve to the right, as shown in the right hand-side diagram below. Therefore, the equilibrium price in the apple market increases from  $P_1^A$  to  $P_2^A$  and the quantity demanded increases from  $Q_1^A$  to  $Q_2^A$ .

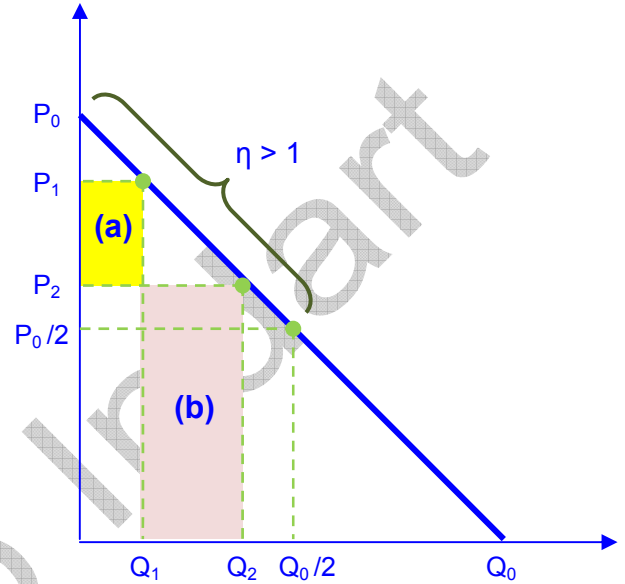


5. (10 marks) What can you conclude about the price elasticity of demand in each of the following statements? Briefly explain. Each question is of equal value.

5.1. "I used to spend 40% of my income on cafeteria meals, but since the price of cafeteria meals went down I found myself spending 50% of my income on cafeteria meals."

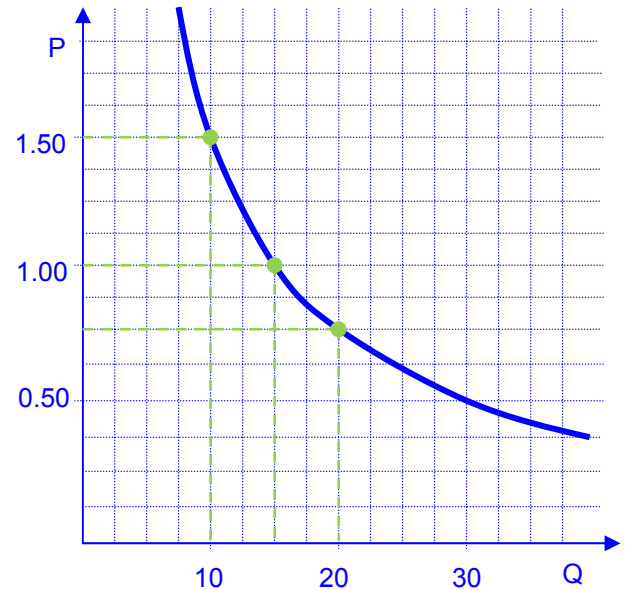
If my total expenditure on cafeteria meals increases when the price of meals decreases, then I'm operating in the elastic segment of my demand curve. Indeed, if elasticity is greater than one then the percentage increase in the quantity demanded is greater than the percentage decrease in price and thus my total expenditure increases. This can be observed in the diagram on the right.

We are operating in the segment where  $\eta > 1$ , i.e., in the segment of the demand curve between the vertical intercept and the midpoint. As the price falls from  $P_1$  to  $P_2$ , total expenditure (i.e., price times quantity) increases by the difference between areas (a) and (b).



5.2. "The price of coffee has oscillated between \$0.75 and \$1.50 a cup during the last two years. However, I always spend exactly \$15 per week on coffee."

If my total expenditure on coffee remains constant as the price of coffee changes, then my demand curve for coffee has unit elasticity. Indeed, if  $\eta = 1$  then, as the price of coffee falls, the percentage increase in the quantity demanded is equal to the percentage decrease in price and thus my total expenditure on coffee doesn't change. This can be observed in the diagram on the right. At any point on the demand curve, price times quantity is always equal to \$15. For instance, when the price of coffee is \$0.75 a cup, I purchase 20 cups a day – total expenditure on coffee =  $\$0.75 \times 20$  cups = \$15; and when the price of coffee is \$1.00 a cup, I purchase 15 cups a day – total expenditure on coffee =  $\$1.00 \times 15$  cups = \$15.



6. (10 marks) Consider the following production possibilities of a hypothetical country:

Option	A	B	C	D	E	F	G
Capital Goods (Units)	60	56	50	40	30	20	0
Consumer Goods (Units)	0	10	19	25	30	35	40

6.1. What is the opportunity cost of increasing capital goods output from 40 to 50 units? Briefly explain. (2 marks)

In order to increase the output of capital goods from 40 to 50 units, enough resources must be transferred from the consumer goods industry which will reduce the production of consumer goods 25 to 19 units. Therefore, the opportunity cost of increasing capital goods from 40 to 50 units is 6 units of consumer goods.

6.2. Suppose the economy is currently producing a combination of 30 capital goods and 25 consumer goods. What is the opportunity cost of increasing capital goods output from 30 to 40 units? Briefly explain. (2 marks)

If the economy is currently producing 30 capital goods and 25 consumer goods, the opportunity cost of increasing the production of capital goods from 30 to 40 units is zero since no reduction in the production of consumer goods is required.

- 6.3. Enter in the table below the production possibilities that result from a natural catastrophe that decreases consumer goods production by 50% without affecting capital goods output. (3 marks)

Option	A'	B'	C'	D'	E'	F'	G'
Capital Goods (Units)	60	56	50	40	30	20	0
Consumer Goods (Units)	0	5	9.5	12.5	15	17.5	20

- 6.4. While the production of capital goods increases the capital stock of the country, depreciation of the capital stock has the opposite effect. Suppose that at the present time the depreciation of the capital stock is equivalent to 40 units of capital. How will the **original** production possibility curve change in the next period if option C is chosen in the current period? And if option D is chosen? And if option E is chosen? Briefly explain. (3 marks)

If option C is chosen, then the production of capital goods will be 50 units and thus the net change in the capital stock of the country will be an increase of 10 units (equal to the difference between the production of 50 units and the depreciation equivalent to 40 units). Thus the PPC will shift outward in the next period.

If option D is chosen, then the production of capital goods will be 40 units and thus there will be no net change in the capital stock of the country (equal to the difference between the production of 40 units and the depreciation equivalent to 40 units). Thus the PPC will remain unchanged in the next period.

If option E is chosen, then the production of capital goods will be 30 units and thus the net change in the capital stock of the country will be a decrease of 10 units (equal to the difference between the production of 30 units and the depreciation equivalent to 40 units). Thus the PPC will shift inward in the next period.



7. (12 marks) The demand and supply schedules for CDs are shown in the table below, where price is expressed in dollars per CD and quantities are expressed in thousand CDs per week.

Price	6	7	8	9	10	11	12	13	14	15	16
Quantity demanded	14	13	12	11	10	9	8	7	6	5	4
Quantity supplied	6	7	8	9	10	11	12	13	14	15	16

- 7.1. What is the equilibrium price and quantity? Briefly explain. (2 marks)

The equilibrium price is \$10 and the equilibrium quantity is 10 units since at this price level (\$10) the quantity demanded is equal to the quantity supplied (10 units).

- 7.2. What is the price elasticity of demand at the point of equilibrium? (3 marks)

As price increases by \$1, the quantity demanded always decreases by 1 unit – i.e., the slope of the demand curve is constant and equal to -1. The price elasticity of demand at the equilibrium point is therefore:

$$\eta = \frac{P_0/Q_0}{\Delta P/\Delta Q} = \frac{10/10}{-1} = -1 \text{ or } 1 \text{ in absolute value}$$

7.3. The government now imposes a \$2 unit-tax to be paid by producers. Enter in the table below the quantity supplied at each price level after the unit-tax is imposed. (3 marks)  
 What is the new market price and quantity? Briefly explain. (2 mark)

Price	6	7	8	9	10	11	12	13	14	15	16
Quantity demanded	14	13	12	11	10	9	8	7	6	5	4
Quantity supplied before the tax	6	7	8	9	10	11	12	13	14	15	16
Quantity supplied after the tax	4	5	6	7	8	9	10	11	12	13	14

The minimum price required to produce each additional unit of output will now be \$2 higher than before – e.g, the minimum price required to produce the 8<sup>th</sup> unit was \$8 and now it will be \$10. In other words, the supply curve will shift vertically up by exactly the size of the tax – \$2.

The new market price is thus \$11 since at this price level quantity demanded is equal to the quantity supplied (9 units).

7.4. What is the incidence of the tax on consumers and on producers? (2 marks)

After the imposition of the unit-tax, consumers are paying a price of \$11 while producers are receiving a price of \$9 net of the tax – the difference between these two prices being the tax collected by the government.

The incidence of the tax on consumers is the difference between the price they are paying after the imposition of the tax and the price they were paying before, i.e.,  $\$11 - \$10 = \$1$ .

The incidence of the tax on producers is the difference between the price they were receiving before the imposition of the tax and the price they are receiving now net of the tax, i.e.,  $\$10 - \$9 = \$1$ .

8. (13 marks) Five students in ECO100 are interested in purchasing used copies of the Ragan & Lipsey textbook but at a price significantly below the price of a new copy. Each of these students is willing to pay the following amounts for a used copy of the textbook (and this information is known by all these five students):

Farhana	Xiaodan	Simona	Fernando	Natasha
\$80	\$70	\$70	\$65	\$50

- 8.1. The university bookstore has used copies of the textbook for sale at a price of \$70 a piece. Who of these five students will purchase a copy of the textbook? Briefly explain (marks will be given for the explanation). (1 mark) What will their total consumer surplus be in money terms? Briefly explain. (1 mark)

At a price of \$70 a piece, only Farhana, Xiaodan and Simona will buy a used copy of the book – they will do so because they are willing to pay a maximum price greater than or equal to \$70. Fernando and Natasha will not buy any because the maximum price they are willing to pay is less than \$70.

On the one hand, Xiaodan and Simone will not appropriate any consumer surplus since the maximum price they are willing to pay is equal to the price of the book. Farhana, on the other hand, will appropriate a consumer surplus equal to \$10 – the difference between the maximum price she is willing to pay (\$80) and the price she is actually paying (\$70). Their total consumer surplus is thus \$10.

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- 8.2. Suppose that before these students purchase the book from the bookstore they learn that the Department of Economics is selling used copies of the textbook at a discount price of \$60 a piece. Who of these five students will purchase a copy of the textbook from the Department? Briefly explain (marks will be given for the explanation). **(1 mark)** What will their total consumer surplus be in money terms? Briefly explain. **(1 mark)**

In addition to Farhana, Xiaodan and Simona, now Fernando will also purchase a copy of the book since the maximum price he is willing to pay is greater than the price of the book. Natasha will not buy a copy of the book since the price of the book (\$60) is still greater than the maximum price she is willing to pay (\$50).

The consumer surplus is the difference between the maximum price a consumer is willing to pay for a unit of the good and the actual price s/he is paying. Therefore the consumer surplus of each of these students is as follows: for Farhana, it is  $\$80 - \$60 = \$20$ ; for both Xiaodan and Simona, it is  $\$70 - \$60 = \$10$ ; and for Fernando, it is  $\$65 - \$60 = \$5$ . Therefore, the total consumer surplus is  $\$20 + \$10 + \$10 + \$5 = \$45$ .

- 8.3. Suppose now that the Department of Economics has only three used copies of the textbook for sale and thus only three of these five students will be able to purchase these copies at a discount price of \$60 a piece. Suspecting that there might be an excess demand at a price of \$60 a piece, the Department decides to select the potential buyers through a lottery system and asks students interested in purchasing a copy to sign up for this lottery. Who will sign up for the lottery? Briefly explain (marks will be given for the explanation). **(2 marks)** [Note: Keep in mind that these five students know the maximum price that each of them is willing to pay for a used copy of the textbook.]

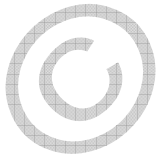
Farhana, Xiaodan, Simona and Fernando will add their names to the list because all of them are interested in buying the book at this price. But, what about Natasha? Natasha is not willing to pay \$60 for the book for herself but she might consider buying the book and then sell it for a profit to one of the other students who were unable to get a copy at \$60, and thus would have to buy it from the bookstore at \$70 a piece. Indeed, the situation of excess demand gives rise to the possibility of a black market to emerge. If Natasha gets a copy of the book in the lottery, she will be able to sell it for up to \$70 to either Farhana, Xiaodan or Simona since at least one of them will be out of the lottery allocation.

- 8.4. If the lottery allocates the three copies of the book to Farhana, Xiaodan and Simona (i.e., Farhana, Xiaodan and Simona buy the book at a price of \$60), what is their total consumer surplus? Briefly explain. (1 mark) Would you expect a black market to arise? Why or why not? Briefly explain. (2 mark)

If Farhana, Xiaodan and Simona get each a copy of the book, their total consumer surplus will be \$40, i.e., \$20 for Farhana, and \$10 each for Xiaodan and Simona. A black market will not arise here because although Fernando is willing to pay a price greater than \$60, the maximum price he is willing to pay (\$65) is less than the value Farhana (\$80), Xiaodan (\$70) and Simona (\$70) attribute to the consumption of this good.

- 8.5. If instead the lottery allocates copies of the book to Xiaodan, Simona and Fernando (i.e., Xiaodan, Simona and Fernando buy the book at a price of \$60), would you expect a black market to arise? Why or why not? Briefly explain. (2 mark) Who will most likely sell his/her book in the black market? Briefly explain. (2 mark)

If Xiaodan, Simona and Fernando get each a copy of the book, then a black market might arise since Farhana is willing to pay up to \$80 for a book. However, the price cannot exceed \$70, since this is the price of the book at the bookstore. Therefore, neither Xiaodan nor Simona will sell their copies of the book since they assign a value of \$70 to the book. Fernando, on the other hand, assigns a value of only \$65 to the book and, since he can get up to \$70 by selling it to Farhana, he will do so.



**PART II** (40 marks)

**Instructions:**

- Multiple choice questions are to be answered using a **black pencil** or a **black or blue ball-point pen** on the separate **SCANTRON sheet** being supplied.
- **Be sure to fill in your name and student number on the SCANTRON sheet!**
- Each question is worth 4 marks. **No deductions will be made for incorrect answers.**
- **Write your answers to the multiple choice questions ALSO in the table below.** You may use this question booklet for rough work, **and then transfer your answers to each multiple choice question onto the separate SCANTRON sheet.** Your answers **must be** on the SCANTRON sheet. In case of a disagreement, **the answer to be marked is the one on the SCANTRON sheet.**

1	2	3	4	5	6	7	8	9	10	11
D	C	A	B	D	A	A	A	D	E	B

1. Sean is attending university as a full time student this year. Sean therefore had to give up his full time job in which he earned \$25,000 per year. He also had to move away from his parents' home where he was paying \$2,000 per year for room and board and is now enrolled in a university residence which costs \$12,000 per year. In addition, Sean must pay tuition of \$5,000 and buy text books for \$500. What is Sean's opportunity cost of becoming a full-time university student?  
A) \$20,500.  
B) \$25,000.  
C) \$30,000.  
D) \$40,500.  
E) \$42,500.
2. Which one of the following statements is correct?  
A) If the price of a product increases and total revenue is unchanged, then the demand curve is relatively inelastic.  
B) If the price of a product increases and total revenue rises, then the demand curve is relatively elastic.  
C) If the price of a product falls and total revenue falls, then the demand curve is relatively inelastic.  
D) If the price of a product falls and total revenue rises, then the demand curve has unitary elasticity.  
E) None of the above is correct.
3. A museum increases its admission price by 10 percent. As a result, total revenues increase by 10 percent. This implies that the price elasticity of demand for admission is  
A) less than one.  
B) greater than one.  
C) equal to one.  
D) unaffected by the programs offered.  
E) none of the above.

4. A fall in the price of a good from \$22 to \$18 results in an increase in quantity demanded from 19,000 to 21,000 units. Without considering the sign, the arc price elasticity of demand in this part of the demand curve is
- A) 0.2.
  - B) 0.5.
  - C) 2.0.
  - D) 5.0.
  - E) none of the above.
5. Suppose that 1 unit of labour can produce either 5 units of wool or 2 pineapples. What is the opportunity cost of producing 1 pineapple?
- A) 5 units of wool.
  - B) 2 units of wool.
  - C) 0.4 units of wool.
  - D) 2.5 units of wool.
  - E) Zero.
6. Suppose there are only three things you can do rather than attend a community social event: read a novel (you value this at \$5), go to work (you could earn an extra \$7), or watch videos with some friends (you value this at \$10). The opportunity cost of attending the community social event is
- A) \$10, because this is the highest valued alternative forfeited.
  - B) \$5, because this is the lowest valued alternative forfeited.
  - C) \$7, because going to work is the only alternative involving a genuine monetary payment.
  - D) \$22, because this is the total dollar amount of the three alternatives.
  - E) Zero.
7. Assume that apples and oranges are substitute goods. Given the initial supply and demand curves for apples, an increase in the price of oranges will tend to
- A) increase the price of apples.
  - B) decrease the demand for apples.
  - C) increase the demand for oranges.
  - D) decrease the demand for oranges.
  - E) decrease the price of apples.
8. Because bagels and cream cheese are often eaten together, they are complements. We observe that both the equilibrium price of cream cheese and the equilibrium quantity of bagels have risen. What could be responsible for this pattern?
- A) A fall in the price of flour.
  - B) A fall in the price of milk.
  - C) An increase in the price of milk.
  - D) An increase in the price of flour.
  - E) A decrease in the price of muffins, a close substitute for bagels.

9. Assume that an industry has a perfectly inelastic supply curve. The government introduces a unit-tax of \$2.50 to be paid by producers. As a result, which one of the following statements would be correct?
- A) The consumer price would increase by \$2.50.
  - B) The consumer price would fall by \$2.50.
  - C) The burden of the tax would fall completely on consumers.
  - D) The price received by the producer would decrease by \$2.50.
  - E) None of the above.
10. Assuming everything else remaining the same, which one of the following would cause the demand curve in an industry to shift to the right?
- A) The price of a substitute product decreased.
  - B) Disposable income increased and the good was an inferior good.
  - C) The price of a complementary product increased.
  - D) Disposable income decreased and the good was a normal good.
  - E) None of the above.

**Bonus question (an additional 4 marks):**

11. Suppose that the labour market for the fast-food service sector is in equilibrium, i.e., at the present wage rate the quantity supplied and the quantity demanded of fast-food workers are equal and thus there is no unemployment in this sector of the economy. Further suppose that the demand curve for fast-food workers is perfectly inelastic while the supply curve for fast-food workers has the usual positive slope. If the government were to introduce an effective minimum wage for fast-food workers, then
- A) the equilibrium level of employment would decrease and unemployment would appear in the fast-food service sector.
  - B) the equilibrium level of employment would not change but unemployment would nonetheless appear in the fast-food service sector.
  - C) the equilibrium level of employment would increase and unemployment would not arise in the fast-food service sector.
  - D) the equilibrium level of employment would increase but unemployment would also arise in the fast-food service sector since the quantity supplied of fast-food workers will increase more than the quantity demanded.
  - E) the equilibrium level of employment would decrease but unemployment would not arise since both the quantity supplied and the quantity demanded for fast-food workers will decrease by the same amount.

