**Economics 111**

**Fall 2019**

**Homework #2**

**Due Thursday, October 3, 2019**

**General Instructions:**

* Homework is due at the beginning of the lecture.
* Do not submit the homework questions. Just submit your answers: these answers should be neat, legible, and easy to follow. Be generous with your use of paper. Do not write in small, hard to read font. If asked to provide a graph, provide a generous graph.
* All homeworks should be stapled and on the front page your name should be legibly written.
* It is all right to do homework with a "study buddy": however, when asked to explain your answer your words should be significantly different from your "study buddy's" words. Homeworks that are too similar to one another will not receive any credit.
* To get full credit for the homework you need to answer every question that is asked. A failure to answer all the questions will result in a lower homework score.
* It is a good idea to make a copy of your homework so that you can compare your answers to the posted answers. Your copy (a digital photo) also provides a time-stamped proof that you did the homework.

**Basic Supply and Demand:**

1. (Do not use a calculator on this problem: you are working to grow stronger computational skills and to do that I need you to stop turning to your calculator so quickly! Also, work this with the fractions (no decimals) but think about how you can "get rid of" the fractions. This is another aspect that I am working on with respect to growing your numerical literacy.) Suppose there are two firms in a market, Good Enterprises and Products Unlimited. You are told the following information about this market. Good Enterprises supplies 200 units of the product sold in this market when the price is $10 per unit. When the price in this market increases to $20, the quantity of the product supplied by Good Enterprises increases by 100 units. Good Enterprises supply curve is linear. Products Unlimited supplies 150 units of the product sold in this market when the price is $15 per unit. When the price increases to $30, the quantity of the product supplied by Products Unlimited increases to 300 units. Products Unlimited's supply curve is also linear.

a. From the above information write the equation for the supply curve for Good Enterprises.

b. From the above information write the equation for the supply curve for Products Unlimited.

c. Assuming that these two firms are the only producers of this product, draw a graph that illustrates the market supply curve for this product. Then, provide an algebraic expression for the market supply curve. If you need more than one equation please be sure to note what the relevant range of prices is for each equation.

Now, suppose that Products Unlimited discovers a new technology (that they patent and therefore do not share with any of their competitors) that allows them to double their output at every price level. [Hint: you might find it helpful to draw a graph of Products Unlimited's initial supply curve and then from this graph draw their new supply curve.]

d. Given this new information write the equation for Products Unlimited's new supply curve.

e. Given this new information, provide an algebraic expression for the market supply curve. If you need more than one equation please be sure to note what the relevant range of prices is for each equation.

2. You are given the following information:

|  |  |  |
| --- | --- | --- |
| Price | Quantity Demanded | Quantity Supplied |
| $1 | 20 | 10 |
| $2 | 16 | 13 |
| $3 | 12 | 16 |
| $4 | 8 | 19 |

Given the above information and holding everything else constant, how many of the following statements are true? Provide a proof for each statement!

* The equation for the demand curve in x-intercept form is: Q = 6 – (1/4)P.
* The equilibrium price must be greater than $2.
* The equilibrium quantity must be less than 16 units.

Use the information below to answer the **next two (2)** questions.

Suppose there is a market with three individuals. We know their individual demand curves and they are given by the following equations where P is the price of the good and Q is the quantity of the good:

Bob's demand curve for the good: Q = 10 – P

Ann's demand curve for the good: Q = 10 – 2P

Tom's demand curve for the good: Q = 4 – (1/2)P

3. Given this information and holding everything else constant determine which of the following statements are true and which are false. Provide a proof for each statement.

1. If the price is between $5 and $8 then only Bob and Tom will have a demand for the good.
2. If the price is between $5 and $10 then only Bob and Ann will have a demand for the good.
3. If the price is between $5 and $8 then only Tom and Ann will have a demand for the good.

1. If the price is less than $8 then all three of these individuals will have a demand for the good.

4. Given this information and holding everything else constant, how many of the following statements are true? Provide a proof for each statement.

* The market demand curve will have three kink points.
* One of the kink points for this market demand curve is (Q, P) = (6.5, 5).
* If the price of the good in the market was $4 per unit then the total quantity demanded at this price would be 14 units.
* If the price is lower than $4.50 than all three of these individuals will buy the good.

**Price Ceilings and Price Floors:**

5. Consider the market for luxury sport utility vehicles. Suppose that the demand and supply curves for these vehicles is given by the following two equations where P is the price per vehicle measured in thousands of dollars and Q is the quantity of vehicles measured in millions of vehicles:

Market Demand: P = 80 – 2Q

Market Supply: P = 20 + Q

a. Given this information, what is the equilibrium price and the equilibrium quantity in the market for luxury sport utility vehicles? Show how you found your answer and make sure you include the correct scale for both measures (thousands of dollars and millions of vehicles).

b. Given this information, what is the value of consumer surplus (CS) in this market? What is the value of producer surplus (PS) in this market? Show how you found your answer and make sure you include the correct scale for both measures.

c. Suppose that the government decides that the current price of luxury sport utility vehicles is too high. The government passes a price ceiling for this market where the price of a luxury sport utility vehicle is set at $30,000 per vehicle.

i. Given this price ceiling, how many luxury sport utility vehicles will be demanded?

ii. Given this price ceiling, how many luxury sport utility vehicles will be supplied?

iii. Given this price ceiling, which side of the market is the “short side”?

iv. What is the value of consumer surplus with this price ceiling (CS’)?

v. What is the value of producer surplus with this price ceiling (PS’)?

vi. Who do you think lobbied the government for the imposition of this price ceiling? Explain the reasoning behind your answer.

vii. Is there a deadweight loss with this price ceiling (DWL)? If there is a DWL, calculate its value.

6. Let’s return to the set-up you were given for problem 5. But, instead of a price ceiling let’s analyze the impact of a quantity control on the market for luxury sport utility vehicles. Suppose that the government decides that driving these cars represents a huge negative externality to the residents of this country and that the government should actively intervene to limit the number of luxury sport utility vehicles that are sold. The negative externality is an idea we will study later in the semester, but basically in this example this negative externality refers to the costs society incurs when people drive gas guzzling cars: pollution costs, environmental damage, contribution to climate change, etc. Suppose that the market demand and supply curves you were given in problem 4 still describe this market, but now the government has imposed a quantity control or quota of 10,000,000 vehicles in this market. That is, the government has decreed that only 10,000,000 luxury sport utility vehicles can be sold during the current time period.

a. How does the quantity control affect the price that producers of these vehicles will charge demanders of these vehicles?

b. How does the quantity control affect the value of consumer surplus (CS”) in this market?

c. How does the quantity control affect the value of producer surplus (PS”) in this market?

d. Is there a DWL from the imposition of this quantity control? If so, provide a numeric measure of the DWL.

e. If the government sells licenses to car producers for the right to provide these vehicles, what is the maximum per luxury sport utility vehicle a supplier will pay for this right?

f. Draw a diagram that illustrates the effect of this quantity control on this market. In your diagram label CS”, PS”, the area that represents the total amount car producers would be willing to pay for the right to provide these vehicles, and any area of DWL.

**Government Intervention in Agricultural Markets: Price Support Programs and Price Guarantee Programs**

7. Consider the market for soybeans. The market demand and supply curves are as follows where P is price per bushel of soybeans and Q is the quantity of soybeans measured in bushels:

Market Demand: Q = 10,000 – 1000P

Market Supply: Q = 250P

a. Given the above information, what is the equilibrium price and quantity of soybeans? Show your work.

b. Given the above information, what is the value of consumer surplus (CS), producer surplus (PS), and total surplus (TS)? Show your work for each of these calculations.

c. Suppose soybean farmers successfully lobby the government to institute a price floor in this market. To be effective, what must be true about this price floor? Use complete sentences to answer this question and provide specific numeric guidance with regard to this effective price floor.

d. Suppose the price floor is implemented and it results in the government cost (excluding any storage costs) of $11,250. Given this information, calculate the price the government set as the price floor. Show your work and your reasoning in a neat, easy to follow answer!

e. Given the price floor described in (c) and calculated in (d), what is the value of consumer surplus with the price floor (CS’) and the value of producer surplus with this price floor (PS’)? Show your work and your reasoning.

8. Use the information below about the market for corn to answer this question.

The market for corn is described by the graph below where P is the price of corn, Q is the quantity of corn, S is the supply of corn, and D is the demand for corn. Use this graph to answer this set of questions. Assume this graph is drawn to scale.



Suppose that the government promises farmers to pay them a total price of P1 per ton of soybeans but the government instructs the farmers in this market to sell as much of the soybeans as they can. Then, the government will pay a subsidy to the farmers equal to the difference between the price the government guaranteed and the price the soybeans actually sold for in the market. Given this program and holding everything else constant, answer the following questions:

a. The cost to the government of this program is given by area \_\_\_\_\_\_\_\_\_\_\_.

b. The total revenue received by farmers with this program is given by area \_\_\_\_\_\_\_\_.

c. The expenditure by consumers on this product given this program is given by area \_\_\_\_\_\_.

**Excise Taxes:**

9. In Surburbia the demand and supply curves for gasoline are given by the following equations where P is the price per gallon and Q is the quantity of gasoline in gallons:

Market Demand: Q = 10,000 – 1000P

Market Supply: Q = 2000P + 4000

a. What is the slope of the demand curve? What is the slope of the supply curve?

b. What is the equilibrium price and equilibrium quantity of gasoline in Surburbia? Show your work in finding these answers.

c. What is the value of consumer surplus (CS) in this market? What is the value of producer surplus (PS) in this market? Show your work in finding these answers. In your answer be sure to include the units of measurement throughout your work.

d. Suppose that the government of Surburbia decides that less gasoline should be consumed in Surburbia due to concerns about climate change. The government decides to enact an excise tax so that the total consumption of gasoline falls by 3000 gallons from its equilibrium quantity. The government has asked you to advise them as to the size of the excise tax that will be necessary in order to achieve this goal. Assume that the only thing that changes in this market is the excise tax and also assume that this excise tax is levied on producers of gasoline.

e. Given the excise tax you calculated in (d): [Hint: you may find it helpful to do step (vii) before you tackle the rest of the steps!]

i. What is the total tax revenue that will be collected from this excise tax?

ii. What is the consumer tax incidence (CTI) equal to given this excise tax?

iii. What is the producer tax incidence (PTI) equal to given this excise tax?

iv. What is the deadweight loss (DWL) from this excise tax?

v. What is the change in consumer surplus due to this excise tax?

vi. What is the change in producer surplus due to this excise tax?

vii. Draw a diagram of the market for gasoline illustrating this excise tax. Make sure your graph is completely and carefully labelled!

f. Instead of the excise tax described in (d), suppose the government of Surburbia decides to approach the problem of too much gasoline being produced and consumed in Surburbia by targeting a particular price for gasoline. Suppose the government mandates that the price per gallon of gasoline must be $8 per gallon. How big must the excise tax be in order for the government of Surburbia to achieve their goal of the price of gasoline being $8 per gallon?

g. Given the excise tax you calculated in (f): [Hint: you may find it helpful to do step (vii) before you tackle the rest of the steps!]

i. What is the total tax revenue that will be collected from this excise tax?

ii. What is the consumer tax incidence (CTI) equal to given this excise tax?

iii. What is the producer tax incidence (PTI) equal to given this excise tax?

iv. What is the deadweight loss (DWL) from this excise tax?

v. What is the new consumer surplus given this excise tax?

vi. What is the new producer surplus given this excise tax?

vii. Draw a diagram of the market for gasoline illustrating this excise tax. Make sure your graph is completely and carefully labelled!

**International Trade: Tariffs and Import Quotas:**

10. Suppose that a small, closed economy manufactures pencils. There are five domestic manufacturers of these pencils and they have identical supply curves. Suppose the supply curve for a single manufacturer of these pencils is given by the equation P = Q + 20. Additionally you know that the domestic demand for pencils in this small, closed economy is given by the equation P = 50 – (1/10)Q.

a. What is the domestic supply curve for pencils in this economy?

b. Given the domestic supply curve and the domestic demand curve, what is the equilibrium price and quantity of pencils in this economy if the economy is closed?

c. Calculate the value of consumer surplus, producer surplus, and total surplus if the domestic economy is a closed economy with regard to the pencil market.

d. Suppose that this economy decides to open this market to trade. Analyze what happens in this market if the world price of pencils is $45 per pencil. In your answer identify the level of imports or exports, the new level of consumer surplus, the new level of producer surplus, the new level of total surplus, and identify the distributional consequences of opening this market to trade.

e. Suppose that this economy decides to open this market to trade. Analyze what happens in this market if the world price of pencils is $30 per pencil. In your answer identify the level of imports or exports, the new level of consumer surplus, the new level of producer surplus, the new level of total surplus, and identify the distributional consequences of opening this market to trade.

f. Suppose that this market for pencils is opened to world trade and the world price is $30 per pencil. Furthermore, suppose that the government of this economy decides to implement a tariff so that the price of pencils in the small open economy is equal to $35 per pencil. Analyze the effect of this tariff on imports or exports, consumer surplus, producer surplus, total surplus, government tariff revenue and deadweight loss relative to the results you got when the market was open to trade and there was no tariff.

11. Cubville is a small economy and its market for sweaters is currently a closed market that can be described by the following domestic demand and domestic supply curves where P is the price per sweater in dollars and Q is the quantity of sweaters:

Domestic Demand Curve for Sweaters: P = 200 – Q

Domestic Supply Curve for Sweaters: P = 50 + (1/2)Q

Currently the world price of sweaters is $60 per sweater.

a. The government of Cubville has decided to open its sweater market to trade, but at the same time it has decided it must either implement a tariff or a quota such that imports into its market are equal to 60 sweaters. The government of Cubville has asked you to determine what level of tariff will be necessary to obtain this goal. The government will also need a thorough explication of how you determined this tariff and the government has also requested that you provide a graph illustrating the sweater market and this tariff.

b. The government of Cubville has requested that you also provide them with an alternative to the tariff. The government needs to know if they choose to use a quota rather than a tariff, how big does the quota need to be? Remember that the government wants these two potential policies to result in the same outcome. The government of Cubville needs a thorough explication of how you determined this quota and they also need a graph illustrating the sweater market with this quota.

c. If the government of Cubville implements the quota you recommend in (b), what is the maximum that a foreign importer of sweaters will be willing to pay for the right to import a sweater? Explain how you found your answer.