Exercise Session 4

1. *Consider public policy aimed at smoking.*

a) Studies indicate that the price elasticity of demand for cigarettes is about 0.4. If a pack of cigarettes currently costs $2 and the government wants to reduce smoking by 20 percent, by how much should it increase the price?

Answer. With a price elasticity of demand of 0.4, reducing the quantity demanded of cigarettes by 20% requires a 50% increase in price, because 20/50 = 0.4. With the price of cigarettes currently $2, this would require an increase in the price to $3.33 a pack using the midpoint method: denote the final price with X then using midpoint method:

$$\frac{endvalue - start\ value}{midpoint} = 0.5 \Rightarrow \frac{X-2}{(X+2)/2} = \frac{1}{2} \Rightarrow X = 3.33$$

b) If the government permanently increases the price of cigarettes, will the policy have larger effect on smoking 1 year from now or 5 years from now?

Answer. The policy will have a larger effect five years from now than it does one year from now because in the long run both supply and demand curves are more elastic.

c) Studies also find that teenagers have a higher price elasticity than do adults. Why might this be true?

Answer. Because teenagers do not have as much income as adults, they are likely to have a higher price elasticity of demand. Also, adults are more likely to be addicted to cigarettes, making it more difficult to reduce their quantity demanded in response to a higher price.

2.

Price	Quantity Demanded
$0	50
$2	40
$4	30
$6	20
$8	10

Using the midpoint method, what is the price elasticity of demand between $2 and $4?

Answer. $\frac{\frac{40-30}{35}}{\frac{4-2}{3}} = 0.43$.

between $6 and $8?

Answer. 2.33

Between which two quantities listed is demand most inelastic?

Answer. 40-50

elastic?

Answer. 10-20

unit elastic?

Answer. 20-30.

3. The federal government is concerned about obesity in the United States. Congress is considering two plans. One will ban the production and sale of "junk food." The other will increase nutrition education programs and include substantial advertising campaigns to encourage healthy eating habits. The junk-food ban program

a) and the education program will reduce the quantity of junk food sold and raise the price.

b) and the education program will reduce the quantity of junk food sold and lower the price.

c) will reduce the quantity of junk food sold and raise the price. The education program will reduce the quantity of junk food sold and lower the price.

d) will reduce the quantity of junk food sold and lower the price. The education program will reduce the quantity of junk food sold and raise the price.

Answer. c

4. *For which of the following goods is the income elasticity of demand likely lowest?*

a. water

b. sapphire pendant necklaces

c. filet mignon steaks

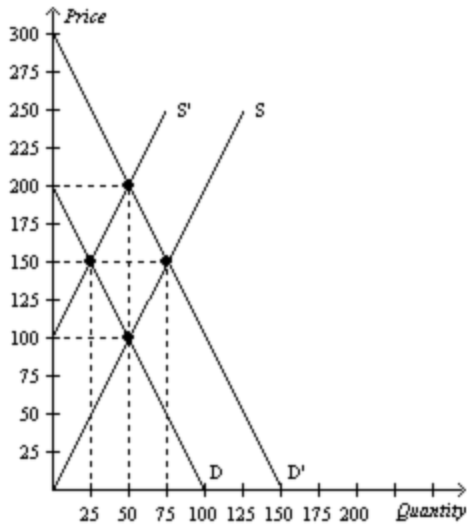
d. fresh fruit

Answer. a because water is essential and almost free. You will be consuming the same amount of water regardless of the income

5. *Olena and Thibaud go to the store to purchase some lottery tickets. Without looking at the price, Olena says "I'll take 10 lottery tickets," and Thibaud says "I'll take $10 worth of lottery tickets." What is each person's price elasticity of demand for lottery tickets?*

Answer. Olena's price elasticity of demand is 0. Thibaud has an infinitely elastic demand.

6.



If the demand curve is D and the supply curve shifts from S' to S, what is the *change* in producer surplus?

Answer: Producer surplus increases by $1,875.

7. *Suppose Rebecca needs a dog sitter so that she can travel to her sister's wedding. Rebecca values dog sitting for the weekend at $200. Susan is willing to dog sit for Rebecca so long as she receives at least $175. Rebecca and Susan agree on a price of $185. Suppose the government imposes a tax of $30 on dog sitting. What is the deadweight loss of the tax?*

   ***ANSWER:** the lost benefit to Rebecca and Susan (25$) because after the tax, Susan will not dog sit for Rebecca*

8. *With linear demand and supply curves in a market, suppose a tax of $0.20 per unit on a good creates a deadweight loss of $40. If the tax is increased to $0.50 per unit, the deadweight loss from the new tax will be*

   a. $200.

   b. $250.

   c. $475.

   d. $625.

   Use "similar triangle" method first calculate the height of the original triangle $0.2 * \frac{H_s}{2} = 40 \Rightarrow H_s = 400$ ***then*** $\frac{0.2}{0.5} = \frac{400}{H_b} \Longrightarrow H_b = 1000$ ***Finally, DWL^{new}=1000*0.5/2***

9. *Assume the supply curve for diapers is a typical, upward-sloping straight line, and the demand curve for diapers is a typical, downward-sloping straight line. Suppose the equilibrium quantity in the market for diapers is 1,000 per month when there is no tax. Then a tax of $0.50 per diaper is imposed. The effective price paid by buyers increases from $1.50 to $1.90 and the effective price received by sellers falls from $1.50 to $1.40. The government's tax revenue amounts to $475 per month. Which of the following statements is correct?*

   a. After the tax is imposed, the equilibrium quantity of diapers is 900 per month.

   b. The demand for diapers is more elastic than the supply of diapers.

c. The deadweight loss of the tax is $12.50.

d. The tax causes a decrease in consumer surplus of $380.

10. A certain competitive firm sells its output for $20 per unit. The 50th unit of output that the firm produces has a marginal cost of $22. Production of the 50th unit of output does NOT necessarily

a. increase the firm's total revenue by $20.

b. increase the firm's total cost by $22.

c. decrease the firm's profit by $2.

d. increase the firm's average variable cost by $0.44

11. Laura is a gourmet chef who runs a small catering business in a competitive industry. Laura specializes in making wedding cakes. Laura sells 20 wedding cakes per month. Her monthly total revenue is $5,000. The marginal cost of making a wedding cake is $300. In order to maximize profits, Laura should

a. make more than 20 wedding cakes per month.

b. make fewer than 20 wedding cakes per month.

c. continue to make 20 wedding cakes per month.

d. We do not have enough information to answer the question.

12. Suppose that a firm in a competitive market faces the following revenues and costs:

Quantity	Total Revenue	Total Cost	Profit	AVC
0	$0	$3	-3	NA
1	$7	$5	2	2
2	$14	$9	5	3
3	$21	$15	6	4
4	$28	$23	5	5
5	$35	$33	2	6
6	$42	$45	-3	7
7	$49	$59	-10	8

a) Calculate the marginal cost of producing the 4th unit

***Answer**: 8$*

b) At which level of production will the firm maximize profit?

***Answer**: 3 units, look at the profit column in the table. This also can be calculated by first computing MC and MR and setting MC=MR*

c) If the firm produces the profit-maximizing level of production, how much profit will the firm earn?

***Answer**: 6$*

d) Which level of production in the table has the lowest average variable cost?

***Answer**: 1 unit. Pay attention that fixed cost of production is 3$*

e) At which level of output in the table is average variable cost equal to $6?

***Answer**: 5 units*

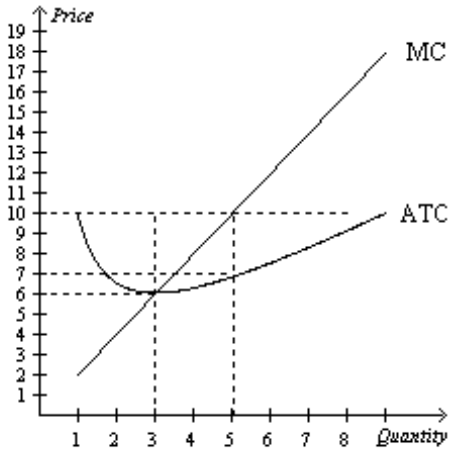
13.Consider a competitive market with 50 identical firms. Suppose the market demand is given by the equation $Q^D = 200 - 10P$ and the market supply is given by the equation $Q^S = 10P$. In addition, suppose the following table shows the marginal cost of production for various levels of output for firms in this market.

Output	Marginal Cost
0	--
1	$5
2	$10
3	$15
4	$20
5	$25

How many units should a firm in this market produce to maximize profit?

***Answer: 2 units.** First equalize $Q^D = Q^S$ to compute P=10 & Q=100. Then pay attention that there are 50 identical firms on the market, therefore, each will produce 100/50=2 units. Alternatively, MR=P=10$. Looking at the table, MC at first unit=5$, meaning that you can increase profits by increasing the produced units. At 2 units MC=MR=10, meaning that this is the profit maximizing output. At 3 units MC=15$, while MR=10, meaning that you make losses for the additional third unit*

14. Suppose a firm operating in a competitive market has the following cost curves:

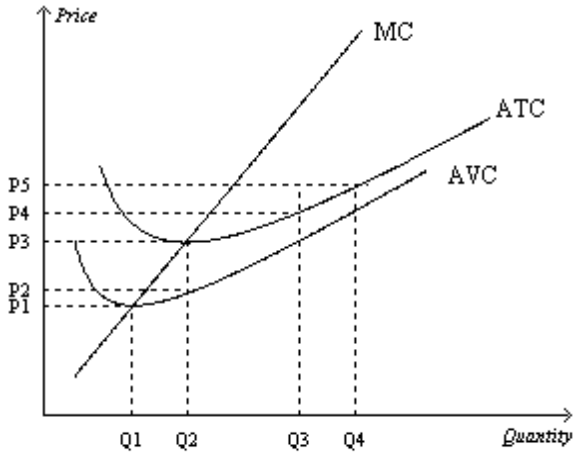


a) What is the firm's short-run economic profit if the market price is $10? 6$?

b) What is the firm's total cost and total revenue if the market price is $10?

Answer: a) 15$, 0$ b) 35$ and 50$

15. Suppose a firm operating in a competitive market has the following cost curves:



i. When market price is P3, a profit-maximizing firm's total revenue
   a. can be represented by the area P3 × Q3.
   b. can be represented by the area P3 × Q2.
   c. can be represented by the area (P3-P2) × Q3.
   d. is zero.

ii. For which prices should firms be encouraged to enter this market? **Above P3**

iii. When market price is P3, by which area can a profit-maximizing firm's total costs be represented? **P3 × Q2.**

iv. Firms will earn losses in the short run but will remain in business if the market price is in which range?
   greater than P1 but less than P3. "Will remain in business" means that they will not shut down.

v. For what market price will firms shut down in the short run? **If price is below P1**