Economics 101
Homework #3
Spring 2009
Due 03/03/2009 at beginning of lecture

Directions: The homework will be collected in a box **before** the lecture. Please place your name, TA name and section number on top of the homework (legibly). Make sure you write your name as it appears on your ID so that you can receive the correct grade. Please remember the section number for the section **you are registered,** because you will need that number when you submit exams and homework. Late homework will not be accepted so make plans ahead of time. **Please show your work.** Good luck!

Q1. Tariffs and Quotas

The domestic demand and domestic supply curves for CD players in a small closed economy are as follows:

Supply: $P = 2Q_S + 2$
Demand: $P = -Q_D + 32$

I. Closed Economy (no trade)

a. Calculate the value of consumer surplus (CS) and producer surplus (PS) for the CD player market in this small closed economy.

II. Open Economy with Free Trade.
Use the following information to answer question a) ~ d). Suppose that this small closed economy is open to **free trade** and that the **world price is $10 ** per CD player.

a. With free trade, what is the quantity supplied by domestic producers?
b. With free trade, what is the quantity demanded by domestic consumers?
c. With free trade, how many CD players will the country import or export?
d. Calculate the value of consumer surplus (CS ^{trade}) and producer surplus (PS ^{trade}).

III. Open Economy with Tariff
Use the following information to answer question a) ~ g). Suppose that the government imposes a **tariff of $4** on each imported CD player, and the **world price is $10** per CD player.

a. What is the quantity supplied by domestic producers after the introduction of the tariff?
b. What is the quantity demanded by domestic consumers after the introduction of the tariff?
c. How many CD players will the country import or export after the introduction of the tariff?

d. Draw a graph and shade the areas of the consumer surplus (CS ^{tariff}), the producer surplus (PS ^{tariff}), the total tariff revenue (TR ^{tariff}), and the deadweight loss (DWL) after the introduction of tariffs.
e. Calculate the value of consumer surplus (CS ^{tariff}) and the value of producer surplus (PS ^{tariff}) for the CD player market after introducing the tariff.
f. Calculate the value of total tariff revenue (TR ^{tariff}).
g. Calculate the value of the deadweight loss (DWL).

IV. Open Economy with Quota

Use the following information to answer question a) ~ j). Suppose that the government introduces a **quota allowing imports of 6 units** instead of introducing tariffs. Suppose that **the world price is $10** per CD player.

a. Given the quota of 6 imported units, find the equation for the new supply curve.
b. What is the quantity demanded by domestic consumers after the introduction of the quota?
c. What is the quantity supplied by domestic producers after the introduction of the quota?
d. How many CD players will the country import or export after the introduction of the quota?
e. Draw a graph and mark the new supply curve S ^{Quota} with a **bold line** or a **colored line** on the graph after the implementation of the quota. Shade the areas of the consumer surplus (CS ^{quota}), the producer surplus (PS ^{quota}), the license holder revenue (LHR), and the dead weight loss (DWL) after the introduction of the quota. Calculate the value of consumer surplus (CS ^{quota}) and the value of producer surplus (PS ^{quota}) for the CD player market after introducing the quota.
f. Calculate the value of total license holder revenue (LHR).
g. Calculate the value of the deadweight loss (DWL).
h. Rank the consumer surplus (CS) for the three options from the highest to the lowest:
Option 1: the CD player market without trade.
Option 2: the CD player market with free trade.
Option 3: the CD player market with the quota.
i. Rank the producer surplus (PS) for the three options from the highest to the lowest:
Option 1: the CD player market without trade.
Option 2: the CD player market with free trade.
Option 3: the CD player market with the quota.

j. If the government wants to use the quota policy to attain the equilibrium quantity equal to the domestic quantity demanded under the $4 tariff policy in III, what would be the quantity the government sets for the quota to achieve this goal?

Q2. Elasticity

I. Price Elasticity of Demand:

Buzz demands 20 slices of cheese when the price (P) is equal to 10, while he demands 28 slices of cheese when P=8.

a) Elasticity (for part (a) use the simple formula for percentage changes and not the arc elasticity formula)

a-1) What is Buzz's price elasticity of demand for cheese (ε_p) at P=$10?
a-2) Is Buzz's demand for cheese elastic, inelastic, or unit elastic at P=$10?
a-3) What is Buzz's price elasticity of demand for cheese (ε_p) at P=$8?
a-4) Is Buzz's demand for cheese elastic, inelastic, or unit elastic at P=$8?

b) Calculation of Elasticity using Mid-point method

b-1) Now use the mid-point price elasticity method (the same formula as the arc elasticity formula) to calculate Buzz's price elasticity of demand for cheese (ε_p) as the price moves from $P_0 = \$10$ to $P_1 = \$8$.
b-2) According to your calculation in b-1), is Buzz's demand for cheese elastic, inelastic, or unit elastic over this range?

Suppose you are told that Buzz's demand for slices of cheese is $Q_d = 60 - 4P$.

c) Point Elasticity

c-1) At price $P = \$10$, what is Buzz's price elasticity of demand (ε_p)? Hint: Use the point elasticity of demand formula to calculate this elasticity.
c-2) Is Buzz's demand for cheese elastic or inelastic at price $P = \$10$?

d) Elasticity and Total Revenue

d-1) Calculate Buzz's total expenditure on cheese (this would be equivalent to the total revenue (TR) the seller of cheese receives when they sell cheese to Buzz) at $P = 10$ and at $P = 8$.
d-2) Does total revenue (TR) increase, decrease, or stay the same when the price decreases from $P = 10$ to $P = 8$?
d-3) Use your calculation of the price elasticity of demand at these two different prices to explain the effect of the price change on total revenue?
d-4) Given Buzz's demand curve for cheese, at what price is Buzz's price elasticity of demand equal to 1?
d-5) Complete the table below based on Buzz's demand for cheese which is $Q_d = 60 - 4P$.

P	Q_d	$\varepsilon_p \left(= \dfrac{1}{\lvert slope \rvert} \left(\dfrac{P}{Q} \right) \right)$	TR (= P x Qd)
0	60	0	0
4			
6	36	2/3	216
7.5			

8	28	8/7	224
10			
15	0	undefined	0

d-6) Suppose Buzz's price elasticity of demand (ε_p) > 1. When the price increases, does total revenue increase, decrease, or remain unchanged?

d-7) Suppose Buzz's price elasticity of demand (ε_p) < 1. When the price increases, does the total revenue increase, decrease, or remain unchanged?

II. Cross-price elasticity of Demand: Buzz substitutes cheese for potatoes sometimes, but Buzz always drinks whiskey when he has a slice of cheese.

a) The price of potatoes decreases by 10%. As a result, Buzz's demand for cheese decreases from 11 slices of cheese to 9 slices of cheese.

a-1) What is the cross-price elasticity of demand for Buzz for these two goods? Hint: for this calculation just use the % change for price you have been given and then calculate the % change in the quantity demanded using the arc elasticity concept.

a-2) From Buzz's perspective, are potatoes a substitute or a complement good for cheese? Why? Use the concept of cross-price elasticity of demand to explain your answer.

b) The price of whiskey increases by 20%. As a result, Buzz's demand for cheese decreases by 15%.

b-1) What is the cross-price elasticity of demand for Buzz for these two goods?

b-2) From Buzz's perspective, is whiskey a substitute or a complement good for cheese? Why? Use the concept of cross-price elasticity of demand to explain your answer.

III. Income elasticity of Demand: **Buzz got a raise at work, and his income increases by 25%. As a result, his demand for <u>whiskey</u> increases by 15%. In the meanwhile, Buzz's demand for potatoes decreases by 10%.**

a-1) What is Buzz's income elasticity of demand for whiskey?

a-2) What does this income elasticity tell us about Buzz's valuation of whiskey (is whiskey a normal or inferior good for Buzz)?

b-1) What is Buzz's income elasticity of demand for potatoes?

b-2) What does this income elasticity tell us about Buzz's valuation of potatoes (are potatoes normal or inferior goods for Buzz)?

Q3. Nominal vs. Real Prices: Use the following table to answer the next five questions.

The CPIs below are constructed using Year 1983 as the base year (BY = 1983).
Data Source: ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt

Year	CPI (BY= 1983)	CPI (BY = 1974)	Nominal wage
1974	50		$6
1983	100		$13
2006	200		$28
2009	210		$28

I.
   a. Using the above table of information, recalculate the CPI using 1974 as the base year (BY). Fill in your answers in the third column of the table above.
   b. What will be the CPI measure in year 1983 if we alter the base year to 2006?

II.
   a. What was the increase in the general price level from 1974 to 1983?
   b. What was the increase in the general price level from 2006 to 2009?
   c. If the wage increased at the same rate as the increase in the general price level, given the nominal wage was $6 in 1974, what should the nominal average salary be in 1983?
   d. If the average salary increased at the same rate as the increase in the general price level, given the nominal average wage was $28 in 2006, what should the nominal average wage be in 2009?

III. According to the data from the U.S. Department of Labor, the nominal price of the minimum wage was $2 per hour in 1974 and $7.25 in 2009. What was the real price of the minimum wage per hour in 1974 using 2009 as the base year?

IV. Suppose your nominal salary was $40,000 in 2006. You are about to meet with your boss and demand a raise. Given the forecast of the CPI in 2009 in the table above, what's the minimum nominal salary you should ask for 2009 in order to maintain the same real salary/purchasing power you had in 2006?