Economics 101
Fall 2017
Homework #4
Due Tuesday, November 14, 2017

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.
- Late homework will not be accepted so make plans ahead of time.
- Show your work. Good luck!

Please realize that you are essentially creating "your brand" when you submit this homework. Do you want your homework to convey that you are competent, careful, and professional? Or, do you want to convey the image that you are careless, sloppy, and less than professional? For the rest of your life you will be creating your brand: please think about what you are saying about yourself when you submit any work for someone else.

Part I: Real vs. Nominal

1) Suppose the nominal prices over time for the following goods in some fictional city are given by the following table:

Year	Price per Cup of Diet Drinks	Price per Pizza	Price per TV
2014	$1.75	$10.00	$165
2015	$1.50	$10.50	$170
2016	$1.65	$11.00	$155
2017	$2.00	$11.50	$150

Suppose a typical consumer basket throughout the year consists of 200 cups of diet drinks, 25 Pizzas, and 1 TV.

a. Using the above information to calculate the cost of the market basket for each of the years and present your calculations in the table below:

Year	Cost of Market Basket
2014	
2015	
2016	
2017	

b. Let 2014 be the base year, calculate the CPI for each year using a 100-point scale. Then, for 2015 to 2017, calculate the annual inflation rate. Calculate your answers to two places past the decimal.

Year	CPI	Inflation Rate
2014		-
2015		
2016		
2017		

c. 2014 is still the base year. Calculate the real price of pizza in each year. Again, calculate your answers to two places past the decimal.

Year	Real price of pizza
2014	
2015	
2016	
2017	

Part II: Elasticity

2) This set of questions focuses on elasticity.

a. Suppose Howard's demand for hamburgers decreases from 8 hamburgers to 5 hamburgers when the price increases from $4 per hamburger to $6 per hamburger. What is his price elasticity of demand for hamburgers? Use the standard formula for the percentage change to calculate this value.

b. Although the price of a hamburger remains at $6 per hamburger, Howard's demand for hamburgers increases from 5 hamburgers to 8 hamburgers when his hourly wage rises from $20 to $36. What is his income elasticity of demand for hamburgers? Use the standard formula for the percentage change to calculate this income elasticity. Are hamburgers normal or inferior goods for Howard?

 c. John, a seller of hamburgers, sells hamburgers to Howard for $6 per hamburger. John has observed that Howard's demand for hamburgers decreases from 8 hamburgers to 5 hamburgers when the price of sandwiches decreases from $5 per sandwich to $4 per sandwich. What is his cross-price elasticity of hamburgers for sandwiches? Use the arc elasticity formula concept when calculating this cross-price elasticity. Based upon your value for the cross-price elasticity of demand of hamburgers for sandwiches, are these two goods substitutes or complements? Explain your answer.

d. Suppose at $6 per hamburger, John can supply an infinite quantity of hamburgers but he will supply none at a price below $6. What do you know about his supply when price rises above $6? What is John's price elasticity of supply?

e. When the price of hamburgers is $8 per hamburger, John can sell 45 hamburgers in a day. We know when the price of hamburgers decreases to $6 per hamburger, John's total revenue remains unchanged. Given this information and assuming that John's demand curve for hamburgers is linear, what do we know about the price elasticity of demand for his hamburgers? Use the standard formula for the percentage change to calculate this elasticity value. Given this information write an equation for this demand curve in slope-intercept form. Once you find the demand curve provide an explanation for why John's total revenue is not changing as the price of hamburgers falls from $8 per hamburger to $6 per hamburger.

Part III: Consumer Theory

3) The goal of this problem is to help you understand the idea of the income effect and the substitution effect.

Suppose a Wisconsin resident Alice only consumes two goods: bread (B) and rice (R). Her budget constraint and utility are given by the following formula:

$$Y = P_B B + P_R R \qquad U = BR$$

Where Y is the amount of income that Alice has, P_B is the price of bread, P_R is the price of rice, B and R are the quantity that Alice consumes for bread and rice respectively. U is her utility from consuming these two goods.

a. Initially, Alice has Y = $40, and the prices of bread and rice are $4 and $1 respectively. Graph Alice's budget constraint (BL1), with bread on the horizontal axis and rice on the vertical axis.

b. At the initial price levels, Alice's optimal consumption bundle is (B = 5, R = 20). Mark this point on your graph. What is Alice's utility level from consuming this consumption bundle?

c. Now, due to a special bread sale, the price of bread drops to $1. What is Alice's new budget constraint (BL2)? Add this to your graph from part (a).

d. With this bread sale, Alice's consumption bundle is (B = 20, R = 20). Add this point to your graph as well. What is Alice's utility level from consuming this consumption bundle?

f. Twice this month Alice was late to work and this has resulted in her income decreasing this month. The bread sale is still on, but her new optimal consumption bundle is (B = 10, R = 10). Given this information and holding everything else constant, what is her new monthly income? Add this new budget constraint, BL3, to your graph from part (a). What is Alice's utility level from consuming this consumption bundle?

g. What is the income effect and the substitution effect if the price of bread decreases from $4 to $1 given Alice's initial income is $40?

4) With the same information as above, a Wisconsin resident Alice only consumes two goods: bread (B) and rice (R). Her budget constraint and utility are given by the formula:

$$Y = P_B B + P_R R \qquad U = BR$$

Given her current consumption bundle (B, R), her marginal utility from consuming bread is given by $MU_B = R$ and her marginal utility from consuming rice is given by $MU_R = B$.

a. Suppose Alice's income is Y=$40, and the prices for bread and rice are $P_B = \$4, P_R = \$1$. What is her optimal consumption bundle? (You have to derive it instead of using the result of Question 3(a)). What is the value of Alice's utility at this consumer optimization point? Show how you found this value.

b. Fill out all the missing information in the table

Quantity of Bread	Quantity of Rice	Utility
1		100
5		100
10	10	
20		100
	4	100

c. Graph the optimal consumption bundle in (a), with bread on the horizontal axis and rice on the vertical axis. Also graph the indifference curve, IC1, for U = 100 using the values you found in part (b).

d. Draw the indifference curve, IC2, for U = 400 in this same graph. You might find it helpful to construct a similar table to part (b) with U = 400.

e. Now suppose the price level is $P_B = 1, P_R = 1$ and Alice's income is now equal to $20. Suppose Alice wants to achieve a utility level of U=100. Given this information and holding everything else constant, what should be her optimal consumption bundle?