

**EC302 - INTERMEDIATE MICROECONOMICS**  
**Loyola University**  
**Fall 2017**

**Problem Set 2**  
**Discussion Date: October 9, 2017**

Answer all questions succinctly and thoroughly.

1. Draw the indifference curves for the following individual's preferences for spring rolls and noodles.

a) Ms. H loves spring rolls, but hates noodles. She always prefers more spring rolls no matter how much noodles she has.

b) Mr. D is indifferent between bundles of either three spring rolls or two noodles. His preferences do not change as she consumes more of either good.

c) Ms. G eats one spring rolls and washes it down with one noodles. She will not consume an additional order of spring rolls with one more noodles.

2. Show that the two utility functions given below generate the identical demand functions for goods  $x$  and  $y$ :

a.  $U(x,y) = \log(x) + \log(y)$

b.  $U(x,y) = (xy)^{0.5}$

3. Consider the following Utility function.  $U = X^\alpha Y^\beta$

a. Compute the  $MU_X$  and  $MU_Y$

b. Prove that if  $0 < \alpha < 1$  and  $0 < \beta < 1$

the marginal utility of both  $X$  and  $Y$  are subject to diminishing marginal utility.

4. Suppose the demand for good  $Q_x = 500P_x^{-1}I^{0.5}$   $X$  is: . Compute both price and income elasticity of demand. Show work.

5. Analysis indicates that if cocaine (or heroin) prices increase 5%, the quantity demanded will decrease by 1%. Answer the following questions with regard to the market for cocaine and anti-cocaine policies.

- a. What elasticity of demand is implied by this analysis?
- b. If the supply for cocaine is relatively elastic, assess the impact on cocaine prices and the quantity exchanged for the following two anti-cocaine policies. Use graphs to illustrate your answers as appropriate.
  - i. Drug interdiction (ban on drugs, for example) efforts to reduce the supply of drugs.
  - ii. Drug education and testing programs to reduce the demand for cocaine.
- c. Which policy would be most effective in reducing cocaine use? Why?

6. The demand curve for beer is  $Q_B = 50000 - 500 P_B$  where  $Q_B$  is the quantity demanded of beer (in bottles) and  $P_B$  is the price of beer (in \$ per bottle).

- a. If the supply of beer is perfectly inelastic at a quantity of 40000 bottles per year, what is the equilibrium price of a bottle of beer?
- b. What would be the effect on the price of a bottle of beer if the government imposes a tax of 5 cents per bottle? (Show graphically and explain)

7. The price consumption curve showing the effect of an increase in the price of X is upward sloping. Given this information is the value of the elasticity of good X elastic or inelastic. Prove both mathematically and graphically.