

**ECON 605**  
**Intermediate Microeconomics**  
**Homework 2**  
**Instructor: Travis Freidman**

**Chapter 3 Question**

1. (20 pt) Sally consumes two goods,  $X$  and  $Y$ . Her utility function is given by the expression  $U = 3XY^2$ . The current market price for  $X$  is \$10, while the market price for  $Y$  is \$5. Sally's current income is \$500.  $MU_Y = 6XY$  and  $MU_X = 3Y^2$ 
  - (a) Sketch a set of two indifference curves when Sally has a utility of 60 (Label it  $U_{60}$ ) and a utility of 72 (Label it  $U_{72}$ ).
  - (b) Write the expression for Sally's budget constraint. Graph the budget constraint (on a new graph) and determine its slope.
  - (c) Determine the  $X, Y$  combination which maximizes Sally's utility, given her budget constraint. Show her optimum point on a graph. (Partial units for the quantities are possible.)
  - (d) Calculate what Sally's new utility maximizing bundle would be if an increase in the price of  $X$  to \$15. What would happen to her utility as a result of the price increase?

**Chapter 4 Questions**

2. (20 pt) Each week, Sydnee, Taylor, and Rileigh select the quantity of two goods,  $x_1$  and  $x_2$ , that they will consume in order to maximize their respective utilities. They each spend their entire weekly income on these two goods.
  - (a) Suppose you are given the following information about the choices that Sydnee makes over a three-week period:

	$X_1$	$X_2$	$P_1$	$P_2$	$I$
Week 1	10	20	2	1	40
Week 2	7	19	3	1	40
Week 3	8	31	3	1	55

Did Sydnee's utility increase or decrease between week 1 and week 2? Between week 1 and week 3? Identify the income and substitution effects that result from a change in the price of good  $x_1$ . Explain using a graph to support your answer.

- (b) Now consider the following information about the choices that Taylor makes:

	$X_1$	$X_2$	$P_1$	$P_2$	$I$
Week 1	10	20	2	1	40
Week 2	6	14	2	2	40
Week 3	20	10	2	2	60

Did Teylor's utility increase or decrease between week 1 and week 3? Does Teylor consider both goods to be normal goods? Explain using a graph to support your answer.

3. (20 pt) Suppose that Chloè faces an increase in the price of mango's, moving her from an optimal bundle of mango to rice depicted in Figure 1 as point  $A$  on  $U_1$  to bundle  $B$  on  $U_2$ .
  - (a) Using the attached Figure 1 (thus, remove it from the question sheet and **attach** to your final homework submission), depict and label the income and substitution effect.
  - (b) Which effect is strongest? How can you tell?
4. (25 pt) Figures 2-4 depict the preferences of three consumers (Justin, Travis, & Griffin) over two goods apples and beer. All of the consumers have income of \$30 and the prices are  $P_{apples} = \$2$   $P_{beer} = \$3$ .
  - (a) Now the price of beer falls to \$2. Draw a new budget line for each consumer on the appropriate figures (make sure to detach like you did for question 2) and label the original point and the new point. What is the new optimal bundle & what is the change from the first bundle to the new bundle? Record your answer in chart similar to the one at the end of this question.
  - (b) On the figures depict the income and substitution effect for beer, and give their mathematical magnitudes (i.e. +7 or -3 or no change etc.) on the chart you created.
  - (c) For each consumer say what type of good they consider beer to be and why.

	New Bundle	$\Delta$ in each good	Substitution effect	Income Effect
Justin				
Travis				
Griffin				

5. (25 pt) Suppose that you are the Chief Economist at the Washington State Department of Transit. You have been tasked by the legislature to replace the floating WA-520 bridge. Through previous research you know that demand for cars to cross the bridge hourly is given by the inverse demand curve of:  $P = 20 - (\frac{1}{4})Q$ . Your boss recognizes that this isn't taking into account rush hour traffic, but that is fine for the work you're doing today. As part of the replacement process the state is considering putting a toll on the bridge.
  - (a) Draw out the demand curve for this hourly traffic flow.
  - (b) How many people would cross the bridge if there were no toll at all?
  - (c) What is the the consumer surplus loss if the toll was raised to \$5

- (d) It is now several years in the future and Tim Eyeman, a notoriously duplicitous state senator, is considering an even higher toll than the \$5 toll that was enacted from your previous question! At the higher price of \$7 how many people could cross the bridge? Would the 520 bridge revenue increase or decrease? What does your answer tell you about elasticity of demand?
- (e) Find the lost consumer surplus associated with the increase in the price of the toll from \$5 to \$7.

### Chapter 5 Questions

6. (15 pt) If Kam is deciding whether to buy a state lottery ticket. Each ticket costs \$1, and the probability of winning payoffs is given as follows:

Probability	Payout
0.50	\$0.00
0.25	\$1.00
0.20	\$2.00
0.05	\$7.50

- (a) What is the expected value of Kams payoff if he buys a lottery ticket?
- (b) If Kam is an extremely risk-averse individual, would he buy the ticket?
- (c) Kam has been given 1000 lottery tickets. Discuss how you would determine the smallest amount for which he would be willing to sell all 1000 tickets.
7. (25 pt) Suppose that Sonce's utility function is given by  $U(I) = \sqrt{10I}$ , where  $I$  represents annual income in thousands of dollars.
- (a) Is Sonce risk loving, risk neutral, or risk averse? Explain.
- (b) Suppose that Sonce is currently earning an income of \$40,000 ( $I = 40$ ) at his current bar job and can earn that income next year with certainty. He is offered a chance to take a new head bar manager job that offers a 0.6 probability of earning \$44,000 and a 0.4 probability of earning \$33,000. Should he take the new job?
- (c) In (b), would Sonce be willing to buy insurance to protect against the variable income associated with the new job? If so, how much would he be willing to pay for that insurance? (Hint: What is the risk premium?)