

Econ 361: Intermediate Microeconomics
Prof. Sarah West
Homework 3
30 points

1. (5 points) Construct a worksheet in Excel using the information provided below showing quantity combinations for two goods (good *A* and good *B*) providing a consumer identical levels of satisfaction (Utility), and information about prices and income. Then answer the questions below.¹

The columns in your spreadsheet should look like this:

<i>Q(B)</i>	<i>Q(A)</i> @ <i>U</i> ₁	<i>Q(A)</i> @ <i>U</i> ₂	<i>P(A)</i>	<i>P(B)</i>	<i>Y</i>	<i>Y(A,B)</i>
0			\$20	\$5	\$200	$=(Q(A)*P(A))+(Q(B)*P(B))$
4	46	60				or
8	22	30				
12	9	16				$Q(A)=(200/P(A))-((Q(B)*P(B))/P(A))$
16	4	7.5				
20	3.2	5				
24	2.8	4.3				
28	2.4	3.8				
32	2.1	3.5				
36	2	3.3				
40	1.9	3.2				

Q(B) represents the quantity of good *B*.

Q(A) represents the quantity of good *A*.

*U*₁ indicates a level of consumer satisfaction (or utility).

*U*₂ represents a level of satisfaction greater than *U*₁.

Q(A)@ *U*₁ represents a quantity of good *A* in combination with the corresponding quantity of good *B* (*Q(B)*) resulting in *U*₁ level of satisfaction.

Q(A)@ *U*₂ indicates the quantity of good *A* required for *U*₂ level of satisfaction for each of the quantities of good *B*.

P(A) and *P(B)* are the market prices for goods *A* and *B*

Y is the consumer's budget

Y(A, B) is the budget constraint relationship of the consumer

Calculate the quantity of good *A* (*Q(A)*) at each specified level of good *B* using the budget constraint *Y(A,B)*.

- Construct a line chart for *U*₁ and *U*₂ using the given data for *Q(A)*@ *U*₁ and *Q(A)*@ *U*₂. Use the quantity data for good *B* as the x-axis.
- Are these well-behaved indifference curves? Explain.
- Now add the budget constraint line to your chart. Print out your line chart from Excel and staple it to your homework.

¹ Material for this problem was taken from Duke, et al. (2004) *Microsoft Excel for Microeconomics* (Upper Saddle River Pearson, Prentice Hall).

- d. At what quantities of good A and good B will the consumer attain his or her maximum utility given the budget constraint (line) $Y(A,B)$? Explain.
2. (5 points) For an individual the substitution effect of a change in the price of x on x equals -4, and the change in x with respect to a change in income equals -3. Under what condition will x be a Giffen good for this person? Use the Slutsky equation in your answer.
3. (5 points) Mary's utility function is given by $U_R = I^{1/4}$ and Dave's utility function is given by $U_J = I^{1/3}$, where I is income. For incomes greater than 100, who is more risk averse? Explain.
4. (5 points) Raymond and Sarah are the only consumers in a market for Star Wars wrist watches. Strangely, but lucky for you, despite the fact that they are the only two buyers of these watches, they are both price takers.

Sarah's utility is a function of her consumption of these watches, x , and of a composite of all other goods, y . Her utility function is given by: $U_S = x^{1/4} y^{3/4}$.

Raymond's utility is a function of his consumption of these watches, x , and of a composite of all other goods, y . His utility function is given by: $U_R = (1/5) \log x + (4/5) \log y$.

What is the market demand for watches, X ? Derive the equation and draw the graph.

5. (5 points) You are a financial planner. On behalf of each of your clients you can invest in one of two investments, which have the following payoffs and probabilities associated with each payoff. If your goal is to make your clients happy, for what kinds of clients would you recommend Investment A? Investment B? Be sure to use specific numerical justifications in your answers.

Payoff	Probability (Investment A)	Probability (Investment B)
\$600	0.30	0.10
\$500	0.40	0.80
\$400	0.30	0.10

6. (5 points) Suppose that Kathy is currently earning an income of \$51,000 ($I = 51$) and can earn that income next year with certainty. Her utility function is given by $U = (9I)^{1/2}$.
- a. Kathy is offered a chance to take a new job that offers a .5 probability of earning \$75,000 ($I = 75$) and a .5 probability of earning \$40,000 ($I = 40$). Should she take the new job? Use numerical calculations in your explanation.
- b. Would Kathy be willing to buy insurance to protect against the variable income associated with the new job? If so, how much would she be willing to pay for that insurance? Use numerical calculations in your answer.