Economics 102
Spring 2013
Homework #1
Due: 2/11/2013

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 eligibly and neatly**; otherwise you will not receive full credit. Good luck!

1. Math Review

a) Find the intersection of these two lines: $-2y = 5x - 33$ and $3x - y = 11$.
b) What is the equation for the line that passes through points (3,7) and (8,4)?
c) Suppose a straight line's slope is 3 and this line passes through the point (11, 2). Does this line also pass through the point (7, 6)? Explain your answer fully and completely.
d) If we shift $3x = 7y - 16$ up by 4 units, what is the equation of the new line?
e) A promotional deal is offered such that a bottle of water costs $1.20 instead of the usual price of $1.50. What is the percentage decrease in price given this information? A week later the promotion is over and the price of a bottle of water returns to the original $1.50. What is the percent increase in the price given this information?

2. Opportunity Cost

Tina can travel from Madison to Chicago in one hour by taking an airplane. The same trip takes 4 hours by bus. Airfare is $80 and the bus fare is $30. If she is not travelling, Tina can work to earn $25/hour.

Answer the following questions:

a) What is the opportunity cost if Tina travels by bus?
b) What is the opportunity cost if Tina travels by plane?
c) Which of these two travel options is cheaper for Tina if Tina considers the opportunity costs involved in this travel?
d) Suppose Sam is considering the same trip but Sam only earns $7/hour when he is not travelling? Which of these two travel options is cheaper for Sam given this information? Explain the intuition behind the difference in answers you get for Sam and Tina.

3. Comparative Advantages and PPF

In the war against the replicators, the Asgard and the human race are the major forces. To win the war, these two groups need to have their engineers produce both spaceships and defense shields. The Asgard has a total of 2400 engineers while the human race has a total of 2000 engineers. It takes 40 Asgard engineers to produce one spaceship and 30 Asgard engineers to produce one defense shield. For the human race, it takes 50 engineers to produce one spaceship

and 40 to produce a defense shield. Assume for both the Asgard and the human race that the production possibility frontiers are linear with respect to spaceship and defense shield production.

a) Graph the PPFs for both the Asgard and the human race, with spaceships on the horizontal (x) axis and defense shields on the vertical axis (y).
b) Write down the equations for the PPFs you have just graphed.
c) Fill in the following table of opportunity costs. How do these opportunity costs relate to the slopes of the slope of the specific PPF?

	Opportunity cost of spaceships	Opportunity cost of defense shields
The Asgard		
The Human Race		

d) Based on the table in part c), which group has the comparative advantage in producing spaceships and which group has the comparative advantage in producing defense shield?
e) If the two groups are to collaborate in their effort fighting the replicators, how should they specialize? Find the acceptable range of trading prices for spaceships and defense shields.
f) Graph the combined PPF for these two groups. Write the equation for the combined PPF. (Hint: you should have one equation for each segment of your graph)
g) Based on your answers to the previous parts of this question, are these two groups better off fighting on their own against the replicators or collaborating with each other in their fight against the replicators? Briefly explain the reasoning behind your answer.

4. Web - Based Data Question

NOTE: To answer this question, you need to have internet access to retrieve data from the web. You do NOT need to include the data table when you hand in your homework.

Follow the instructions below:
1) Go to the website of the Bureau of Labor Statistics
2) Under Databases and Tools, go to Pay and Benefits.
3) Scroll down to find Weekly & Hourly Earnings, click on Top Picks icon
4) From the list, select the first 3: they give you the median weekly earnings for full time employees for all, men and women respectively
5) At the bottom of the page, click Retrieve Data
6) The page will give you wages from 2002 to 2012. You can download the Excel spreadsheets if you wish to do so.

Now answer the following question:
a) Calculate the percentage increases from 2002 to 2012 in median weekly earnings (annual) for all, men and women respectively.
b) Compare both the numbers and changes in the three tables. Are there any differences and similarities?
c) How would you interpret the differences and/or similarities you found in b)? And what other data would you suggest using to supplement or support your interpretation?