Economics 101
Fall 2013
Homework #1
Due Tuesday, September 17, 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. Late homework will not be accepted so make plans ahead of time. **Please 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 do any work for someone else!

Part I: Math Review
Remember to show all of your work. Also remember that calculators are not permitted on exams, so you should try these by hand.

1. The price of a dozen eggs was $1.50 in 2012.
   a. In 2013, the price decreases to $1.47. What is the percentage change from 2012 to 2013?
   b. Egg economists forecast that egg prices will rise 20% from 2012 to 2014. What is the anticipated price of eggs in 2014?
   c. The price of an 18-pack of eggs is projected to be $2.40 in 2014. Suppose you're writing some long-term egg contracts subject to the eventual 2014 market prices and you want to get the most eggs per dollar. Find and compare the eggs per dollar price for the dozen and 18-packs in 2014 given the projected prices.

2. On June 14, 2000, the Indiana Pacers lost to the Los Angeles Lakers in game four of the NBA finals, giving the Lakers a 3-1 edge on the series. Shaquille O'Neal made 10 free throws on 17 attempts. Reggie Miller made 11 free throws on 12 attempts. How many more free throws would Shaq have to make in a row to match Reggie's percentage?

3. Consider the line given by equation $y = 50 + 4x$.
   a. Does this line intersect the line with equation $12x = 150 - 3y$? Where?
   b. Does this line intersect the line with equation $x = 50 + 4y$? Where?
   c. What is the x-intercept of the original line? The y-intercept? What is the slope?

4. Consider the three lines described by equations $y = 0$, $y = 10$, and $y = x$.
   a. Graph these lines.
   b. Another line passes through points $(x, y) = (20, 0)$ and $(1, 38)$. Give its equation and add it to your graph.

c. These four lines enclose a trapezoid. Give its area.
d. Take the line from part (b) and shift it horizontally 2 units rightward. That is, at every *y*-value, add two to the *x*-values. Give the new equation.
e. Now, with your newly solved equation, shift it down (vertically) 4 units and give the new equation.

Part II: The Economics – Opportunity Cost, Absolute Advantage, Comparative Advantage, Production Possibility Frontier

5. Sage and Jeremy work in Teton Snow Shop. Work in the shop consists of waxing skis or snowboards. Each of them has 10 hours of working time each day. Sage takes 2.5 hours to wax a snowboard, while Jeremy needs 1 hour. It takes Sage 1.25 hours to wax a ski, while Jeremy needs 2 hours. Answer the following questions.
   a. Assuming that shop manager assigns Sage to waxing snowboards, how many boards can he wax during his work shift? What if he is assigned to waxing skis instead?
   b. Assuming that the shop manager assigns Jeremy to waxing snowboards, how many boards can he wax during his work shift? What if he is assigned to waxing skis instead?
   c. Fill out the following table.

Employee	Opportunity Cost of Waxing a Snowboard (in Terms of a Ski)	Opportunity Cost of Waxing a Ski (in Terms of a Snowboard)
Sage		
Jeremy		

   d. Who has the absolute advantage in waxing snowboards? Who has the absolute advantage in waxing skis?
   e. Who has the comparative advantage in waxing snowboards? Who has the comparative advantage in waxing skis?
   f. Sage has decided to work overtime. His work shift is now 15 hours per day. Does this change your answers to part (d) and (e)?
   g. The shop manager has given new waxing equipment to Jeremy as a birthday present. It takes Jeremy half as much time to complete each task. Does this change your answers to part (d) and (e)?

6. Production Possibility Frontiers (PPFs) can be used to investigate international trade – trade among countries. You are a trade negotiator of a world leading trade organization. Suppose there are only two countries in the world, North and South. Using crude oil, measured in barrels, as the only input used in the production of gasoline (G) and plastics (P) both countries produce both gasoline measured in gallons and plastics measured in tons. You have the following information about these two countries:

- Currently, each country does not trade with each other, namely, North produces what is needed for her consumption, and so does South. (This is called "autarky.")
- Each country is endowed with 1,000 barrels of crude oil per year.
- The following table provides information about two possible production points (Point A and Point B) for each country. Note that Point A for North is different than Point A for South; Point B for North is different from Point B for South. Assume that both North and South have linear production possibility frontiers with respect to producing gasoline and plastic.

Country	Gasoline (G)		Plastics (P)	
	Production Point A	Production Point B	Production Point A	Production Point B
North	750 Gallons	500 Gallons	100 Tons	200 Tons
South	300 Gallons	400 Gallons	100 Tons	50 Tons

Answer the following questions. **(Hint: Sometimes life does not work forward but backwards!)**

a. What is the opportunity cost of each good for each country? Assume that each country faces a linear tradeoff (i.e. that the tradeoff is constant–the opportunity cost of producing the first ton of plastic is the same as the opportunity cost of producing the 200th ton and so forth). Fill out the table and correctly specify the units.

Country	Opportunity Cost of a Gallon of Gasoline	Opportunity Cost of a Ton of Plastics
North		
South		

b. Which country has the comparative advantage in refining gasoline? Which country has the comparative advantage in producing plastics?

c. Let G and P be the number of gallons of gasoline refined and tons of plastics produced, respectively. The equation of this straight line PPF can be written as $G = a + bP$, so that G is on the vertical axis and P is on the horizontal axis. Give the equations for the PPF of each country. Clearly identify which equation is North's PPF and which equation is South's PPF.

d. What is the maximum amount of each good that each country can produce? Fill out the following table. (Hint: The answers should be obvious following from part (c).)

Country	Maximum Amount of Gasoline Refined	Maximum Amount of Plastic Produced
North		
South		

e. Which country has the absolute advantage in refining gasoline? Which country has the absolute advantage in producing plastics?
f. Draw the PPF of each country with *G* and *P* on the vertical and horizontal axes, respectively. Clearly denote the opportunity cost on each PPF.
g. In each country, how many barrels of crude oil are required to refine a gallon of gasoline? How many barrels of crude oil are required to produce a ton of plastics? Fill out the following table.

Country	Crude Oil Needed to Refine a Gallon of Gasoline	Crude Oil Needed to Produce a Ton of Plastics
North		
South		

h. You, as a trade negotiator, are trying to promote international trade policy by opening the borders between North and South. In order to make trade possible, the price of the goods must be right. Suggest the range of possible prices for a gallon of gasoline. Also, what is the range of possible prices for a ton of plastics? Which country should specialize in producing each good?
i. Draw the (joint) world PPF with *G* and *P* on the vertical and horizontal axes, respectively. Clearly mark the kink point and the two end points on the PPF.
j. Suppose there is an oil well discovery in the Northern Sea, which is only accessible by North. She is now endowed with 1,500 barrels of crude oil. Does this change the trade policy you have prescribed in part (g)? If yes, prescribe the new policy. If no, why?
k. Suppose there is a technological advancement in the South so that, with the same crude oil input, she can refine twice as much gasoline while producing the same amount of plastics. Does this change the trade policy you have prescribed in part (h)? If yes, prescribe the new policy. If no, why? In your answer assume that the oil well discovery in (j) did not occur.