Economics 102
Spring 2012
Homework #1
Due 2/8/12

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.** Good luck!

1. For the following pairs of equations below, find the point of intersection for each pair.
   a. $7y - 14x = 49$ and $-3x = y - 12$
   b. $13 + y = 3x$ and $3 - x = y$
   c. $5y + 15x = 25$ and $2x - y = 10$

   a. Set both equations in terms of y and solve for x, then you can plug that value of x into either equation and get the corresponding y.
   $7y - 14x = 49$ (Divide both sides by 7) $-3x = y - 12$ (Add 12 to both sides)
   $y - 2x = 7$ (Add 2x to both sides) $y = 12 - 3x$
   $y = 7 + 2x$
   $7 + 2x = 12 - 3x$ (subtract 7 from both sides and add 3x to both sides)
   $5x = 5$ (Divide both sides by 5)
   $x = 1 \Rightarrow y = 7 + 2(1) = 12 - 3(1) = 9$
   b. $13 + y = 3x$ (Subtract 13 from both sides) $3 - x = y$
   $y = 3x - 13$
   $3x - 13 = 3 - x$ (Add 13 to both sides and add x to both sides)
   $4x = 16$ (Divide both sides by 4)
   $x = 4 \Rightarrow y = 3(4) - 13 = 3 - 4 = -1$
   c. $5y + 15x = 25$ (Divide both sides by 5) $2x - y = 10$ (Add y to both sides)
   $y + 3x = 5$ (Subtract 3x from both sides) $2x = 10 + y$ (Subtract 10 from both sides)
   $y = 5 - 3x$ $y = 2x - 10$
   $5 - 3x = 2x - 10$ (Add 3x to both sides and add 10 to both sides)
   $5x = 15$
   $x = 3 \Rightarrow y = 5 - 3(3) = 2(3) - 10 = -4$

2. Find the equation of a line described by the following:
   a. A line that goes through the points (7, 5) and (11, 3)
   b. A line that has a y-intercept of 8 and goes through the point (1, 2)
   c. A line with a slope of 3 and goes through the point (6, 5)

   a. Find the slope first. $m = \Delta y/\Delta x = (3 - 5)/(11 - 7) = -2/4 = -1/2$
   $y = mx + b$. Find b. Plug one of the points into the line with the slope.
   $3 = (-1/2)(11) + b \Rightarrow 3 = -11/2 + b \Rightarrow b = 17/2$
   The line: $y = (-1/2)x + 17/2$

b. The y-intercept has the point (0, 8). With two points we can find the line.
$m = \Delta y/\Delta x = (2 - 8)/(1 - 0) = -6$. Since we already have the y-intercept as 8, b = 8.
The line: $y = -6x + 8$

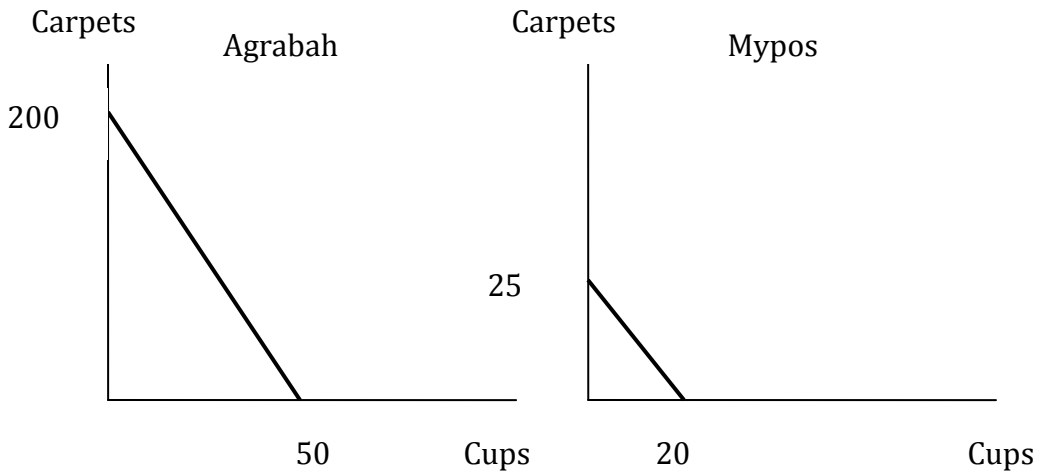
c. We have the slope and a point. We only need the y-intercept. Plug the point into the equation of the line and solve for b.
$5 = 3(6) + b \Rightarrow 5 = 18 + b \Rightarrow b = -13$
The line: $y = 3x - 13$

3. Assume Agrabah and Mypos are two countries. Both countries produce carpets and cups. Suppose that these two countries only use labor to produce these two goods (this is just a simplifying assumption to make our work easier). Agrabah is a larger country and has 400 hours of labor available while smaller Mypos only has 100 hours of labor. The following table tells you how many hours of labor are needed in each country to produce one carpet or one cup.

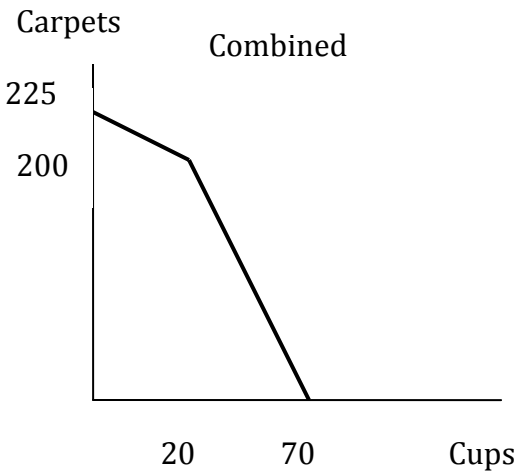
	Hours of Labor Needed to Produce One Carpet	Hours of Labor Needed to Produce One Cup
Agrabah	2 hours of labor	8 hours of labor
Mypos	4 hours of labor	5 hours of labor

a. Using the above table, draw the production-possibility frontiers (PPF) for both Agrabah and Mypos(on two separate charts). Put number of carpets produced on the Y axis, and cups produced on the X axis.
b. What is Agrabah's opportunity cost of producing one carpet?
c. What is Agrabah's opportunity cost of producing one cup?
d. What is Mypos's opportunity cost of producing one carpet?
e. What is Mypos's opportunity cost of producing one cup?
f. Which country has the absolute advantage in producing carpets?
g. Which country has the absolute advantage in producing cups?
h. Which country has the comparative advantage in producing carpets?
i. Which country has the comparative advantage in producing cups?
j. What range of trading prices would be acceptable to both countries in terms of carpets for 1 cup?
k. What range of trading prices would be acceptable to both countries in terms of cups for 4 carpets?
l. Suppose now that the two countries agree to team up and combine their production. Draw the combined PPF for the two countries.

a. To find the PPF of both countries, we want to find the maximum number carpets and cups each country would produce if it only produced one product. If Agrabah only produced carpets they could produce 400/2=200 carpets and if they only produced cups they could produce 400/8=50 cups. Mypos could produce 100/4=25 carpets and 100/5=20 cups. Plot these points on the vertical and horizontal axes and connect them to obtain the PPF for each country.



b. In the time it takes Agrabah to produce one carpet, it can produce 2/8=1/4 of a cup. So the opportunity cost of a carpet is 1/4 cup. Or take maximum cups divided by maximum carpets to find 50/200=1/4.
c. To find opportunity cost of cups, divide max number of carpets by max number of cups. This yields 200/50=4
d. Mypos opportunity cost for carpets is 20/25=4/5.
e. Mypos opportunity cost for cups is 25/20=5/4.
f. Agrabah has the absolute advantage in producing carpets because 200>25.
g. Agrabah has the absolute advantage in producing cups because 50>20.
h. To have comparative advantage means to have lower opportunity cost. Thus Agrabah has a comparative advantage in carpets since 1/4 is less than 4/5.
i. Mypos has a comparative advantage in producing cups because 5/4 is less than 4.
j. An acceptable trade price should lie between both countries opportunity cost for cups. So a trading price for one cup must be between 5/4 and 4 carpets.
k. As in the previous problem, a trade price for one carpet must be between 1/4 and 4/5 cups. A price for 4 carpets must be 4 times this, so between 1 and 16/5 cups.
l. To find the combined PPF, we want to find the Y intercept, the X intercept, and the location of the kink. If both countries only produce carpets, they can produce 225 carpets. If they produce only cups, they can produce 70 cups. To find the kind, first assume that they are producing 225 carpets and no cups. If they want to start producing cups, they will make Mypos produce cups since they have a comparative advantage. Since they can produce a maximum of 20 cups, there will be a kink at the point 200 carpets and 20 cups. Connect these three points to get the combined PPF.



a.

4. Suppose there are two countries, Kreplakistan and Petoria, which produce wallets and radios. The only input required to produce these goods is labor. Both countries have linear PPF's. You are given the following information about the amount of labor that is needed in each country to produce wallets and radios.

	Hours of Labor Needed to Produce One Wallet	Hours of Labor Needed to Produce One Radio
Kreplakistan	2 hours of labor	2 hour of labor
Petoria	1 hours of labor	4 hours of labor

You are also given the following information about the current level of production of wallets and radios. Both countries are currently producing at an efficient level.

	Current Level of Wallet Production	Current Level of Radio Production
Kreplakistan	180	100
Petoria	50	50

a. If Kreplakistan only produces wallets, what is the maximum amount of wallets it can produce?
b. If Kreplakistan only produces radios, what is the maximum amount of radios it can produce?
c. If Petoria only produces wallets, what is the maximum amount of wallets it can produce?
d. If Petoria only produces radios, what is the maximum amount of radios it can produce given the above information?
e. Which country has the comparative advantage in the production of wallets?
f. Which country has the comparative advantage in the production of radios?

a. We can see that currently Kreplakistan uses 180*2=360 hours making wallets and 100*2=200 hours making radios. Since they are producing efficiently, it must be that

they have 560 hours of labor. Therefore, the maximum number of wallets they can produce is 560/2=280.

b. Since they have 560 hours of labor, they can produce 560/2=280 radios.
c. We can see that Petoria currently uses 50*1=50 hours making wallets and 50*4=200 hours making radios. Therefore they have 250 hours of labor available. The maximum number of wallets they can produce is 250/1=250.
d. Since they have 250 hours available, they can produce 250/4=62.5 radios.
e. To find which country has the comparative advantage, we first must find the opportunity cost of each good. Kreplakistan's opportunity cost of producing both wallets and radios is 280/280=1. Petoria's opportunity cost of producing wallets is 62.5/250=1/4. Their opportunity cost of producing radios is 250/62.5=4. Since Petoria's opportunity cost is lower for wallets, they have a comparative advantage in producing wallets.
f. Since Kreplakistan has a lower opportunity cost of radios, they have a comparative advantage in producing radios.

5. Suppose there are two people on an island, Chuck and Wilson. Both can gather fish and coconuts and have 100 hours of labor available. The following table shows how long it takes each person to gather fish and coconuts.

	Hours of Labor Needed to Gather One Fish	Hours of Labor Needed to Produce One Coconut
Chuck	1 hours of labor	1 hour of labor
Wilson	4 hours of labor	2 hours of labor

a. Which person has the comparative advantage in the gathering of fish?
b. Which person has the comparative advantage in the gathering of coconuts?
c. Chuck realizes that he is faster at gathering both fish and coconuts and decides he would be better off moving to the other side of the island by himself. Given that the two individuals do not trade, is 21 fish and 81 coconuts attainable for Chuck? Is 29 fish and 19 coconuts attainable for Wilson?
d. A week later Wilson comes to Chuck's side of the island with an idea: Wilson would produce 50 coconuts and tells Chuck to produce 50 fish and 50 coconuts. Then Wilson will give Chuck 31 coconuts in exchange for 29 fish. Is this a reasonable price for trade? If the trade is accepted, how many fish and coconuts will Chuck and Wilson each have?

a. Chuck's opportunity cost of producing both goods is 1/1=1 ((1 fish/hr)/(1 coconut/hr) = ((1 coconut/hr)/(1 fish/hr)). Wilson's opportunity cost of fish is 2 coconuts ((1/2 coconut/hr) /(1/4 fish/hr)) and his opportunity cost of coconuts is 1/2 of a fish.
b. Chuck has the comparative advantage in fish since his opportunity cost is lower. Wilson has the comparative advantage in coconuts.
c. 21 fish is not attainable for Chuck because he would need 21*1+81*1=102 hours to accomplish this. 29 fish and 19 coconuts is not attainable for Wilson because he would need 29*4+19*2=154 hours.
d. This is a reasonable price for a trade. Wilson will pay 31/29 coconuts for each fish. This is lower than Wilson's opportunity cost for fish (2) and higher than Chuck's opportunity cost for fish (1). Wilson will end up with 29 fish and 19 coconuts and

Chuck will have 21 fish and 81 coconuts. This was unattainable without trade but can be attained here since both parties specialize then trade.