Economics 101
Spring 2019
Homework #1
Due Thursday, February 7th, 2019

Directions:

- The homework will be collected in a box labeled with your TA's name **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 **staple** your homework: we expect you to take care of this prior to coming to the large lecture. You do not need to turn in the homework questions, but your homework should be neat, orderly, and easy for the TAs to see the answers to each question.
- Late homework will not be accepted so make plans ahead of time.
- Show your work. Good luck!

Part I: Math Review

1. Suppose you are given the following two equations where y is measured on the vertical axis and x is measured on the horizontal axis:
   (1) $y = x + 1$
   (2) $0.5x = 4 - y$

   a. Draw the two lines in a graph. Make sure you identify any intercepts in your graphs.
   b. Find the intersection of the two lines. That is, find (x, y) where these two lines intersect one another.
   c. Suppose the y-intercept of equation (2) changes to 7 while the slope of the line is unchanged. In a new graph draw the new lines. Find the new intersection point where line 1 intersects with line 2': (x', y') = _____.

2. This is a question where you just need to do a few calculations (and, it's okay to use a calculator here but show the underlying equations driving your calculator use). Don't make it more difficult than it is! Here's the general scenario: someone borrows money and at the end of the year the person owes the money they borrowed plus the interest payment that is due on the loan. So, for instance if I borrow $10,000 for a year at 2% interest, then at the end of the year I will owe $10,000 plus (10,000)(.02) or $10,200. And, if I don't pay off any of the loan that first year then at the start of the second year I will owe $10,200 and at the end of the second year I will owe $10,200 + (10,200)(.02) or $10,404. Use this example to guide your work for this problem.

   Bob purchased a new car for $30,000, and paid $10,000 in cash and then borrowed the rest of the money from a bank to make the purchase. He takes out a loan for the remaining $20,000 at 1% compounded annually.

a. How much does Bob owe to the bank at the end of the first, second and third year if he doesn't make any payments to the bank? Carry your calculations out to two places past the decimal.
b. If Bob wants to repay his loan as well as the interest that is due on the loan within a year, what does his monthly payment need to be?
c. If Bob pays $600 per month, could he repay his loan in two years? Three years?

3. Suppose the grading system for Econ 101 consists of the following components: 5 homework assignments that together account for 10% (each of them accounts for 2% of the final grade) of the student's final grade; two midterms each of them counting for 25% of the student's final grade; and a final exam that counts the remaining 40% of the student's final grade. Assume the scores on each assignment, midterm, and exam could range from 0 - 100. The table below presents the corresponding scores for 3 students in the class. Assume the class only has three students.

	Adam	Bob	Chris
HW 1 (2%)	60	80	60
HW 2 (2%)	50	80	30
HW 3 (2%)	70	80	20
HW 4 (2%)	70	80	60
HW 5 (2%)	100	80	60
Midterm 1 (25%)	60	100	
Midterm 2 (25%)	60	100	80
Final (40%)	70		50
Total weighted grade		90	

a. Compute the total grade for Adam.
b. What is the average score on Midterm 2?
c. What is Bob's score on the Final Exam if his total weighted grade at the end of the semester is 90?
d. What is Chris's score on Midterm 1 if the average score on Midterm 1 is 65?

Part II: Production Possibility Frontier, Opportunity Cost, Absolute and Comparative Advantage

4. Erika and Laura both have bakeries. Laura can bake 1 cake or 1 brownie in 1 hour and Laura only works 5 hours every day. Erika can bake 4 brownies in one day or two cakes in one day and like Laura, Erika only works 5 hours per day.

   a. In two separate graphs draw an individual PPF for both Laura and Erika measuring brownies per day on the vertical axis and cakes per day on the horizontal axis. Identify all intercepts in the two graphs and make sure your graphs are completely and clearly labeled.
   b. What is the opportunity cost of 1 cake for Laura and Erika, in terms of the number of brownies? What about the opportunity cost of 1 brownie in terms of the number of cakes for Laura and Erika?
   c. Who has a comparative advantage in the production of brownies and why? Who has a comparative advantage in the production of cakes and why?
   d. Who has the absolute advantage in producing brownies? Who has the absolute advantage in producing cakes?
   e. Draw a graph of the joint PPF of Erika and Laura. In this graph, measure brownies per day on the vertical axis and cakes per day on the horizontal axis. Identify all intercepts and the coordinates of any kink points that you find in your graph.

5. Consider two countries Mars and Pluto. Pluto can produce 600kg of dark chocolate in one hour and 300 kg of milk chocolate in one hour. Mars can produce 800kg of dark chocolate in one hour and 300kg of milk chocolate in one hour.

   a. Draw two separate graphs of the PPFs for Pluto and Mars. In your graphs measure milk chocolate on the x-axis.
   b. Which country has a comparative advantage in the production of dark chocolate and why? Which country has a comparative advantage in the production of milk chocolate and why?
   c. Which of the following combinations of milk chocolate and dark chocolate can Pluto produce in one hour? Of the ones that are feasible, which combinations are efficient?
      i) 700kg of dark chocolate and 20kg of milk chocolate
      ii) 180kg of dark chocolate and 200kg of milk chocolate
      iii)550kg of dark chocolate and 10kg of milk chocolate
      iv)300kg of dark chocolate and 150kg of milk chocolate
      v)150kg of dark chocolate and 250kg of milk chocolate
   d. Find the range of prices that Mars and Pluto are going to be willing to trade for. Provide the range of trading prices in terms of dark chocolate that one kg of milk chocolate will trade for and then provide the range of trading prices in terms of milk chocolate that one kg of dark chocolate will trade for.