**Economics 102**
**Fall 2007**
**Homework #1 – Answer Key**

**1.** Cheri's opportunity cost of seeing the show is $115 dollars. This includes the $80 she could have earned working, plus the $30 for the ticket, plus the $5 in transportation costs. Recall the definition of opportunity cost is "the real cost of an item, including what must be given up to obtain it." (Krugman) If Cheri had decided to work instead of seeing the concert she would have earned $80, and she would still have the $35 (the cost of the show and the transportation cost to the show) to spend later.

**2.** a) Normative. This is an opinion about how the income tax structure should be set up, which cannot be tested by data.
b) Positive. This statement can be tested by data.
c) Normative. This is an opinion about protecting jobs in the United States.

**3.** a) Recall that slope is calculated with formula: $\frac{y_2 - y_2}{x_2 - x_1}$

The two points that are most easily identified for Japan are the intercepts, (0,75) and (100,0) respectively.

Plugging these points into the slope formula yields: $\frac{0-75}{100-0} = -\frac{3}{4}$ or -0.75.

For the United States, the two points that are most easily identified are also the intercepts (0,60) and (0,25).

Plugging these points into the slope formula yields: $\frac{0-60}{25-0} = -\frac{12}{5}$ or -2.4.

b) Casey's claim is incorrect. Casey correctly observed that Japan has an absolute advantage in the production of both cars and TV sets. Notice that if Japan used all of its resources to only produce cars, that they could produce 75 cars, while the most the United States could produce is 60 cars. Also, if Japan used all of its resources to only produce TV sets, they could produce 100 TV sets, while the United States could only produce 25 TV sets. This demonstrates Japan's absolute advantage in production.

However, the slopes in part a) tell us that each country has a comparative advantage in the production of one of the goods. The slope for Japan (-3/4) represents the opportunity cost to produce an additional television set. This slope implies that Japan can produce 3 cars or 4 television sets with the same resources. Likewise the slope for the United States (-12/5) implies that the United States can produce 12 cars or 5 television sets with the same resources. Japan has a comparative advantage in the production of TV sets, and the United States has a comparative advantage in the production of cars.

Since Japan, relative to the United States, is a better producer of TV sets than they are of cars, they would like to focus their resources on the production of TV sets. Since the United States, relative to Japan, is a better producer of cars than they are of TV sets, they would like to focus their resources on the production of cars. So, the two can benefit from trade by each focusing on producing the goods that they produce best, and trading with each other for the other good.

**4.** a) In equilibrium, the quantity supplied and the quantity demanded are exactly equal. So, we can solve both the demand function and the supply function for P, and then set them equal to each other to determine the equilibrium quantity.

Demand: $P = 1000 – 20Q$
Supply: $Q = .2P$, solving for P can be rewritten as $P = 5Q$

We can set these two equations equal to each other, since they both equal P (the prices are equal in equilibrium). This yields:

$1000 – 20Q = 5Q$

Solving for Q, we get:
$1000 = 25Q$
$40 = Q$
The equilibrium quantity is 40 iPods.

b) Since we know that the equilibrium quantity of iPods is 40, we can plug 40 in as the value of Q in either the demand or supply equations to determine equilibrium price. For example:

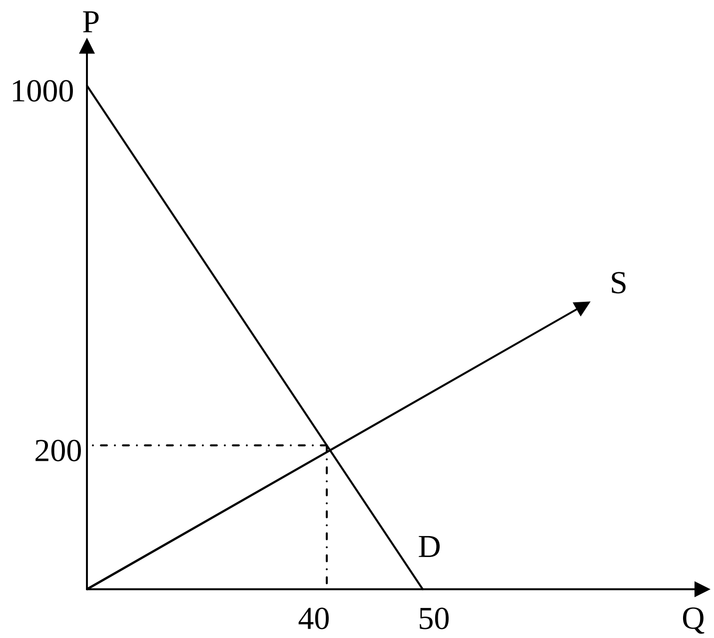
$P = 1000 – 20Q$
$P = 1000 – 20(40)$
$P = 1000 – 800$
$P = 200$
The equilibrium price is $200.

Alternatively, we could "substitute" the supply equation into the demand equation. Since $Q = .2P$ (we see this in the supply equation), we can replace Q in the demand equation with .2P. Rewriting the Demand equation this way yields:

$P = 1000 – 20(.2P)$
$P = 1000 – 4P$
$5P = 1000$
$P = 200$

The equilibrium price is $200.

c)



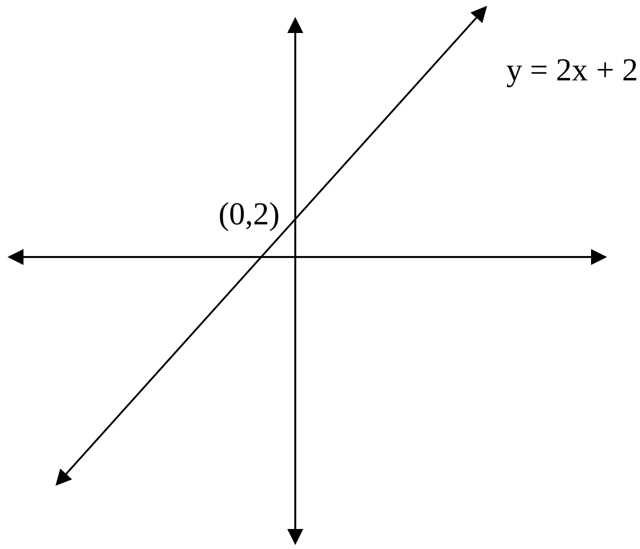

**5.** a) To write the equation of a line in the form y = mx + b, we need to first calculate slope (m) and then plug a point (x,y) into the equation to determine the y-intercept (b).

Recall that slope is calculated with the formula: $\frac{y_2 - y_2}{x_2 - x_1}$

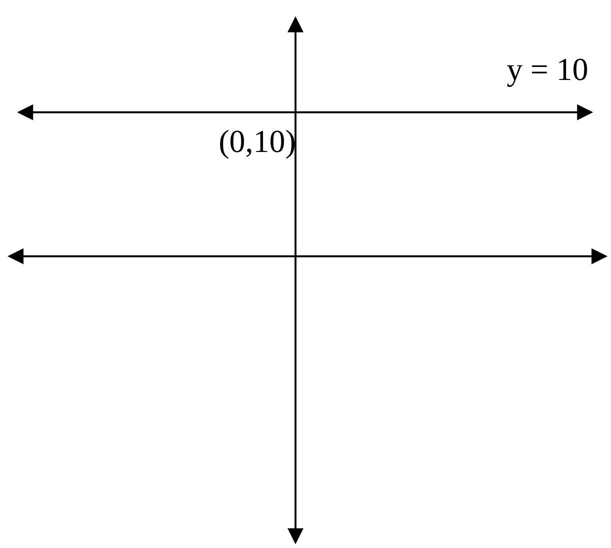
Using our points (3,8) and (5,12), our slope calculation is as follows:
$\frac{12-8}{5-3} = \frac{4}{2} = 2$, so we now know that m = 2 in our slope equation, so we can rewrite the slope equation as y = 2x + b. Now we can pick either point (3,8) or (5,12) and substitute it into this equation for x and y, to determine the y-intercept b.

Using point (3,8) we get:
8 = 2(3) + b
8 = 6 + b
2 = b

So the equation of our line is y = 2x + 2, which is shown in the graph below:



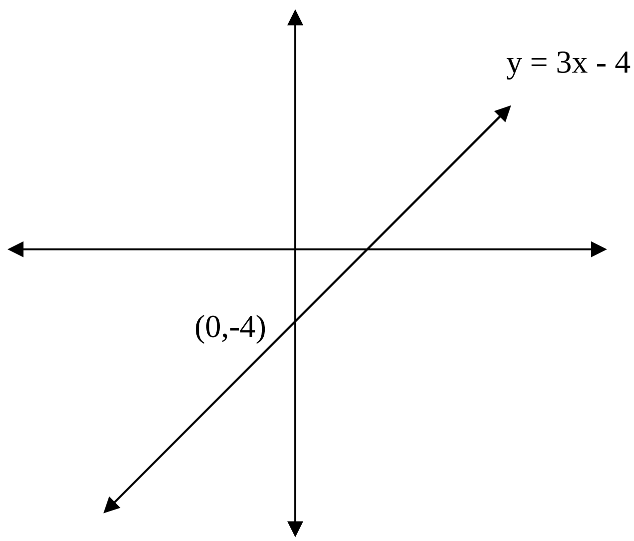

b) Using our points (6,10) and (8,10), our slope calculation is as follows: $\frac{10-10}{8-6} = \frac{0}{2} = 0$, so we now know that m = 0 in our slope equation, so we can rewrite the y-intercept equation (y = mx + b) as y = b. But wait, how can a slope be 0? The slope of a horizontal line is 0. The equation of the line would be y = 10. Regardless of the value for x, the value for y always equals 10. This is easier to see if you try graphing the points (6,10) and (8,10) and realizing that the only line connecting the two is a horizontal line, which is graphed below:



c) Since we are given a value for the slope, we know that the equation of our line is of the form y = 3x + b, and all we need to do is solve for our y-intercept. We can do this by substituting the point (4,8) into the equation as one of the (x,y) values that sits on the line. Using point (4,8):

8 = 3(4) + b
8 = 12 + b
-4 = b

So, the equation of our line is y = 3x – 4, which is shown graphically below:




d) The easiest way to solve this problem is to use the information that is given, with the y = mx + b equation. Since you know that the y-intercept is 5, this means that b = 5, and you can rewrite the equation as y = mx + 5. You know a point (x,y) is (2,9) so you can substitute this into the equation to solve for m as follows:

9 = m(2) + 5
4 = 2m
2 = m, so the equation of your line is y = 2x + 5.

Alternatively, you can determine the slope from the two points that you are given. Since the y-intercept is 5, this represents the point (0,5). Using points (0,5) and (2,9) you can calculate slope with the slope formula: $\frac{y_2 - y_2}{x_2 - x_1}$, for this equation this would be $\frac{9-5}{2-0} = \frac{4}{2} = 2$, which is equal to m. Thus, the equation is y = 2x + 5 which is graphed below.