WELLESLEY COLLEGE
DEPARTMENT OF ECONOMICS

ECONOMICS 101 ~ 95 **JOHNSON**

Answers to Problem Set #1

1. Mankiw, page 37, #4:

a. A: 40 lawns mowed; 0 washed cars
B: 0 lawns mowed, 40 washed cars
C: 20 lawns mowed; 20 washed cars
D: 25 lawns mowed; 25 washed cars

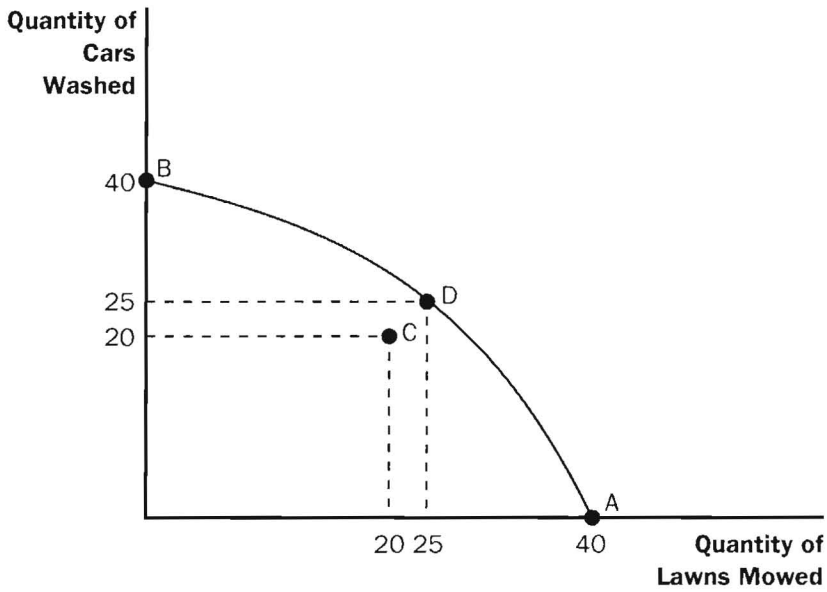


Figure 8

b. The production possibilities frontier is shown in Figure 8. Points A, B, and D are on the frontier, while point C is inside the frontier.

c. Larry is equally productive at both tasks. Moe is more productive at washing cars, while Curly is more productive at mowing lawns.

d. Allocation C is inefficient. More washed cars and mowed lawns can be produced by simply reallocating the time of the three individuals.

2. Mankiw, pg. 37, #6:

a. The statement that society faces a short-run tradeoff between inflation and unemployment is a positive statement. It deals with how the economy *is*, not how it should be. Since economists have examined data and found that there is a short-run negative relationship between inflation and unemployment, the statement is a fact, thus it is a positive statement.

b. The statement that a reduction in the rate of growth of money will reduce the rate of inflation is a positive statement. Economists have found that money growth and inflation are very closely related. The statement thus tells how the world is, and so it is a positive statement.

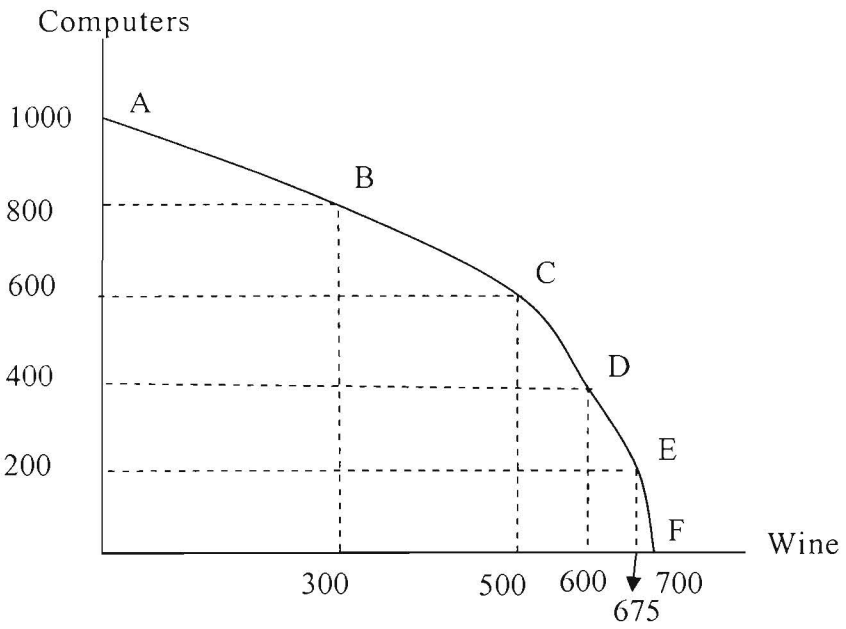
c. The statement that the Federal Reserve should reduce the rate of growth of money is a normative statement. It states an opinion about something that should be done, not how the world is.

d. The statement that society ought to require welfare recipients to look for jobs is a normative statement. It does not state a fact about how the world is. Instead, it is a statement of how the world should be and is thus a normative statement.

e. The statement that lower tax rates encourage more work and more saving is a positive statement. Economists have studied the relationship between tax rates and work, as well as the relationship between tax rates and saving. They have found a negative relationship in both cases. So the statement reflects how the world is, and is thus a positive statement.

3.

a.

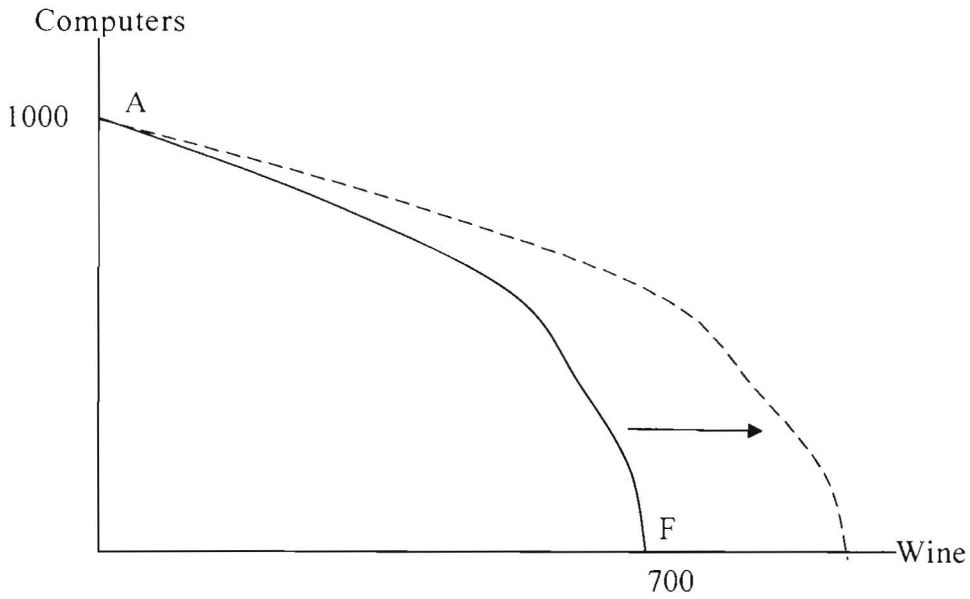


Yes, it faces increasing opportunity costs of wine production. Opportunity cost of wine is the amount of computers you have to give up to get one more cask of wine.

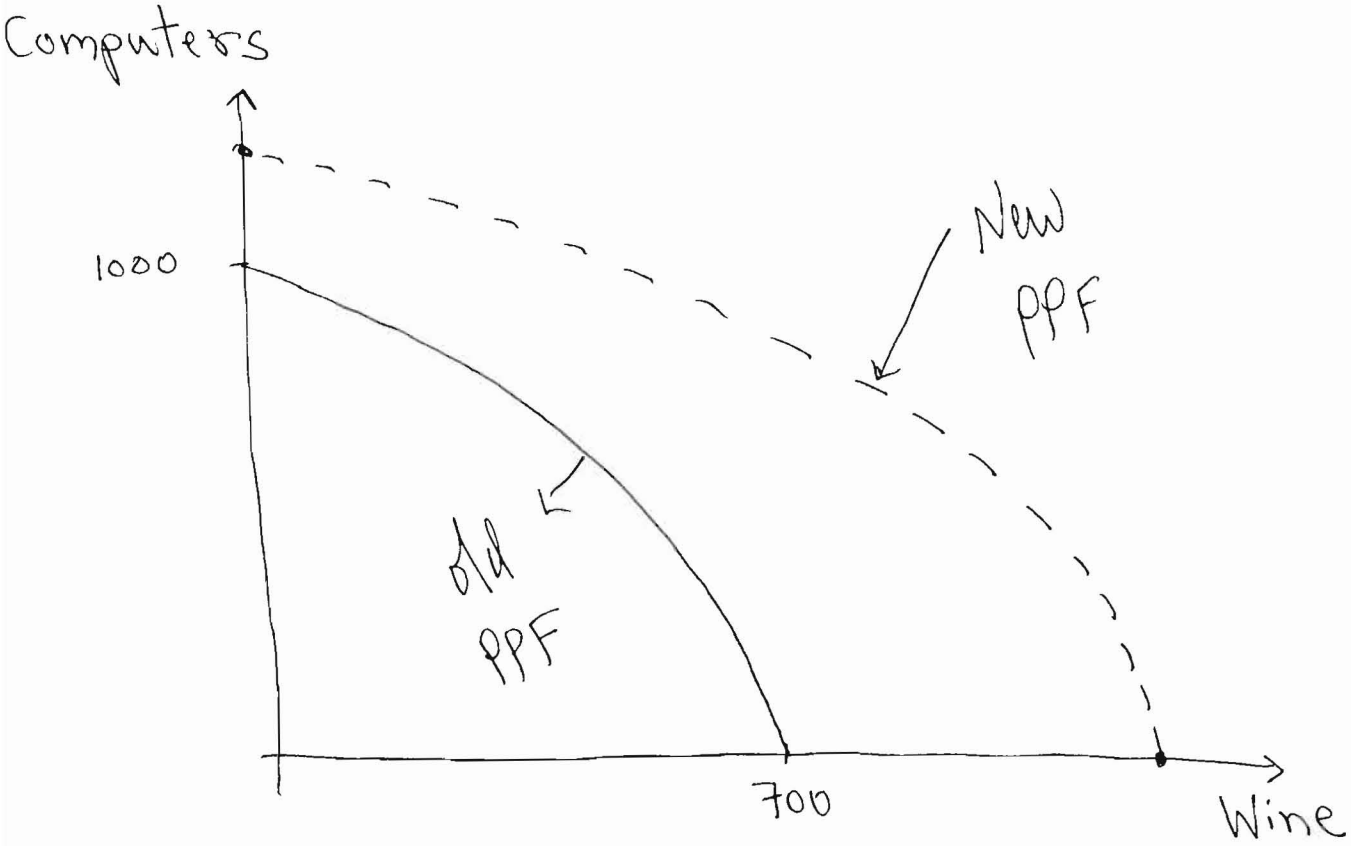
Where	Opp cost of wine
A to B	200 comp / 300 wine = 2/3 comp for 1 wine
B to C	200 comp / 200 wine = 1 comp for 1 wine
C to D	200 comp / 100 wine = 2 comp for 1 wine
D to E	200 comp / 75 wine = 8/3 comp for 1 wine
E to F	200 comp / 25 wine = 8 comp for 1 wine

In the A to B region, you have to give up 200 computers to get 300 casks of wine, or you have to give up 2/3 of a computer to get 1 more cask of wine, so the opportunity cost of one cask of wine in that region is 2/3 of a computer. Notice that as you increase production of wine (as you move from A to F), the opportunity cost of wine increases.

b. Let's think about what would happen if you only wanted to produce computers. Then the bigger feet invention won't have any effect on the total number of computers you can produce, which means that point A stays the same. Next, think about only producing wine. The big feet would allow you to produce more casks than before, so point F is moved to the right. At the other in between points, since you are producing some wine, the big feet would allow you to produce more than before, so those points move to the right also.

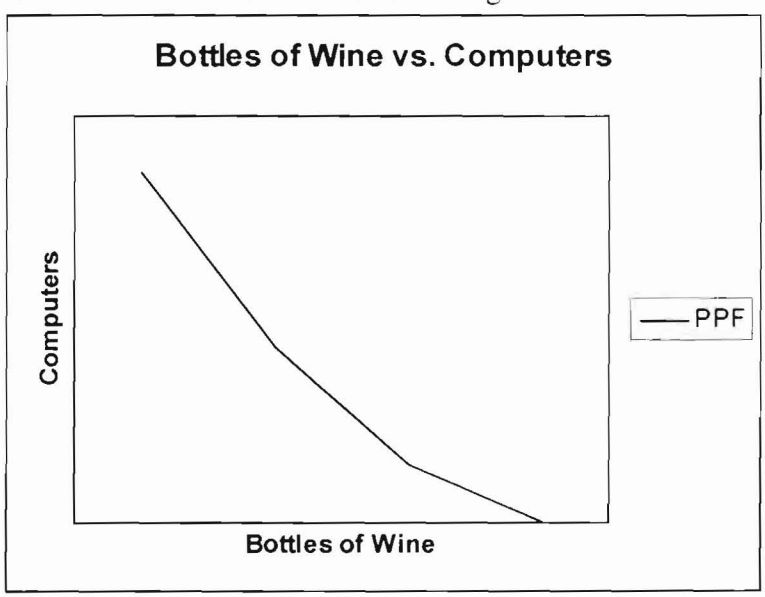


c. If Microgrigio annexes a nearby tropical island, and people from neighboring countries move to the island, it is clear they will be able to use the extra land and labor to produce more of each type of good. However, the information that the land is particularly well suited to growing grapes suggests that the PPF will shift out proportionately more along the wine axis than along the computer axis. At any given level of computers produced, Microgrigio faces a LOWER marginal opportunity cost of wine because, say, they can bulldoze the Microsoft plant on the island and replace it with vineyards in that very fertile soil. Perhaps, then, as you may already surmise, it might be efficient to put ONLY vineyards on the island and then build the necessary Microsoft plants ONLY on the mainland! Indeed! See new PPF below:



d) Two answers are proposed to this questions

1) Poor allocation of workers.
Suppose that our economy consists of 3 agents. They happen to be named Bill Gates (computer wiz), Pat, and Ernest Gallo (wine buff). (This is where our assumption of heterogeneous labor comes in). Now, rather than with our typical PPF, we have Bill Gates leaving computer production **first**. Pat leaves **second**, and Gallo leaves **third**. This also means that when we switch from producing wine to computers, Gallo leaves first, Pat second, and Gates third. This gives us a PPF that looks like the following:



This technology is inefficient because clearly, we'd be better off if Gates was the last person to leave the computer industry and if Gallo was the last to leave the wine industry. If this were the case, we'd have a "normal" PPF.

2) Efficient Allocation of Workers (Extra Credit Answer!):

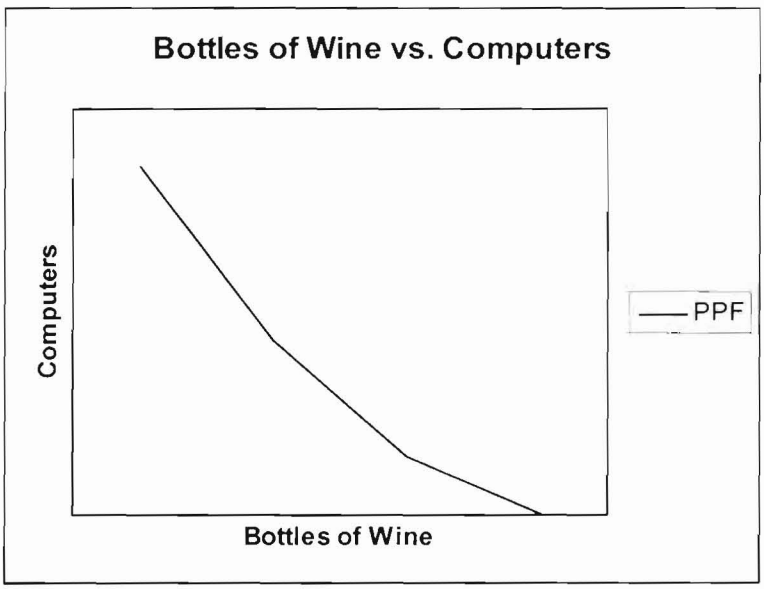
Suppose our economy consists of the following three people:
Bill Gates, Paul Allen, and Steve Wozniak

You all should know who Gates and Allen are because they are among the richest people on the planet and they have buildings named after them on campus. Wozniak built the first Apple computer prototype... by himself. I will produce an economy with decreasing opportunity costs to computers. To formulate an example with decreasing opportunity costs to wine, switch the numbers and find the names of famous wine makers.

Now, suppose that these three people have complementary production ability in terms of computers. Suppose that all three are pretty bad at making wine. In particular, regardless of which particular individual works, the economy produces on bottle of wine for each person placed in that sector. I.E. if any one of the three makes wine, the economy has 1 bottle of wine. If two work to make wine, the economy has 2 bottles of wine. Also, suppose that if any one of the three makes computers, then the economy produces one computer. Now, if two work together to make computers, the economy has 3 computers. If all three of these technology titans work together to make computers, they will be able to produce 6 computers for this economy. This means that optimal output is defined by the following table:

Workers in Wine	Workers in Computers	Computers manufactured	Bottles of wine
3	0	0	3
2	1	1	2
1	2	3	1
0	3	6	0

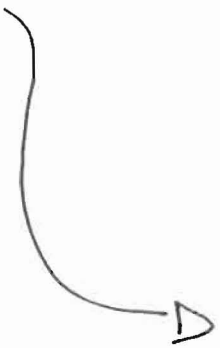
The opportunity cost of going from 0 to 1 computers is 1 bottle of wine per computer. The opportunity cost of going from 1 to 3 computers is 1/2 of a bottle of wine per computer. The opportunity cost of going from 3 to 6 computers is 1/3 of a bottle of wine per computer. The PPF is:



Note: This example is completely efficient! It just relies on economies of scale.

4.

To get the highest average grade, you want to maximize the total number of points in all three classes. There are only 6 hours, so you have to allocate your time in the way that will maximize your total number of points. Let's look at the marginal benefit of each hour of studying for the 3 subjects, for the first few hours. The marginal benefit is the number of extra points you gain from studying that subject for one more hour:



6

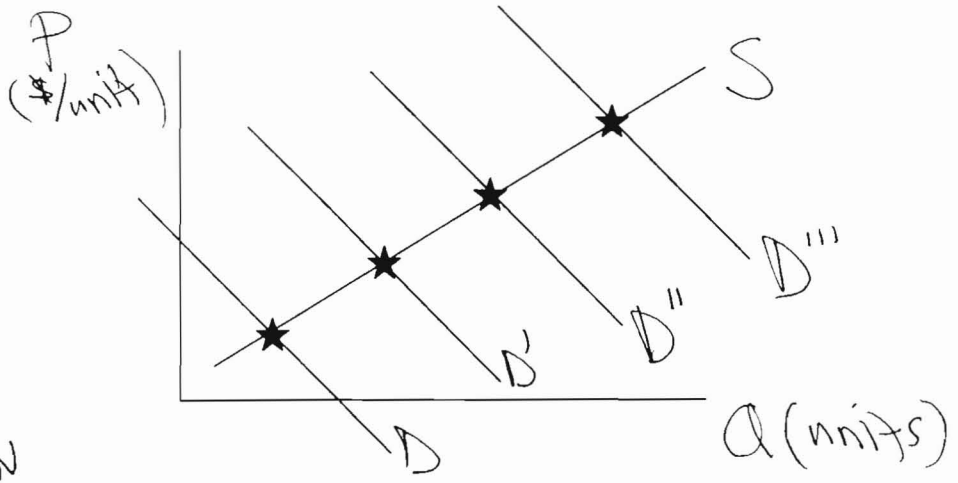
Hours	Economics Marginal Benefit	Math MB	Stats MB
1	25	12	10
2	20	10	5
3	10	9	2
4	8	7	1

So what are you going to do with the first hour? You get the highest point increase from spending that first hour on Econ, because 25 is higher than 12 or 10. What about the second hour? Again it's econ, because 20 is still higher than 12 or 10. For the third hour, you want to spend it on Math, because the point increase is 12 compared to 10 for both econ and stats. For the 4th, you can spend it on any of the 3, because the MB is 10 for all of them. For the 5th and 6th, spend it on whichever you didn't spend it on in the 4th or 5th hours (for example, spent the 4th on math, 5th on stats, and 6th on econ). Also, since the MB of studying economics goes down, it exhibits diminishing returns.

5.

a. **FALSE**!!! This question unfortunately deals with the semantics of "demand" vs. "quantity demanded." The true statement is that a decrease in supply results in a decrease in QUANTITY demanded. There is a movement **along** the demand curve.

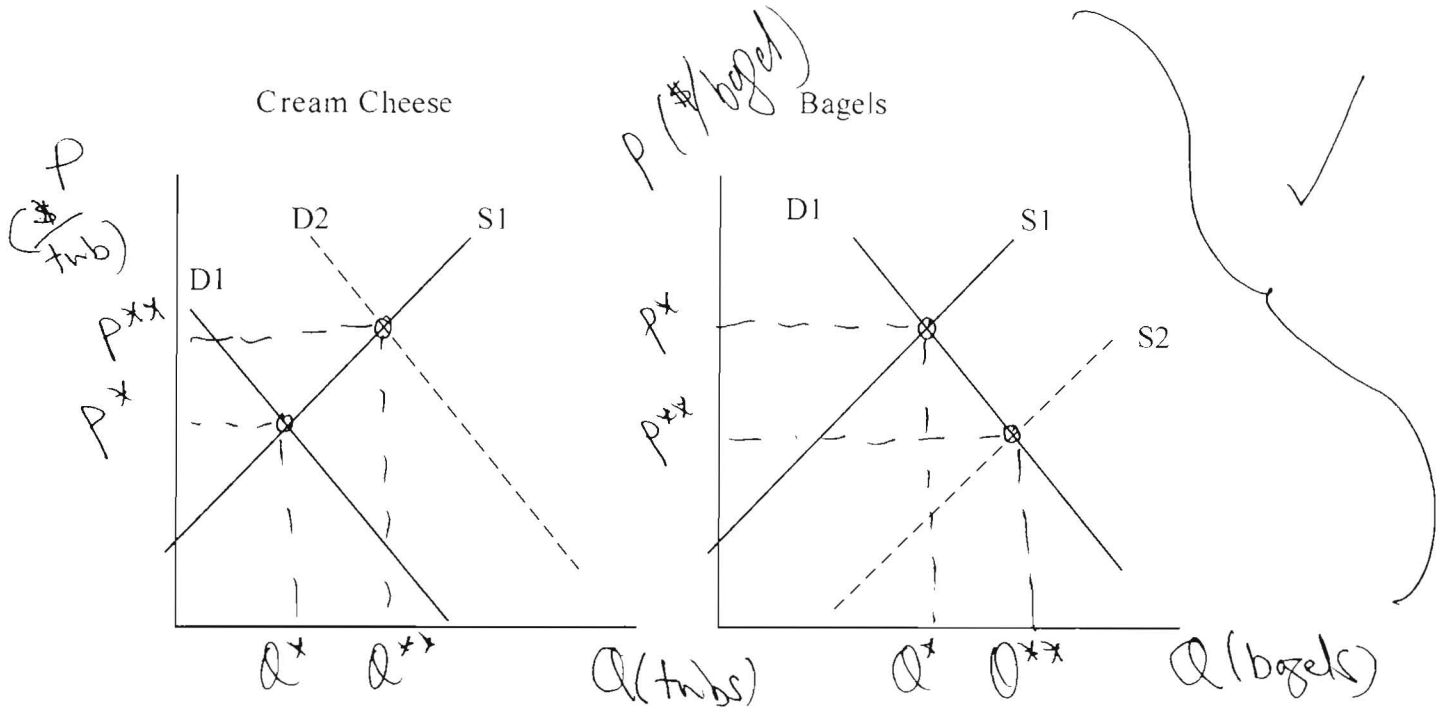
b. **False**. Suppose the stars are the observed equilibrium price and quantity. Then the positive correlation can be explained by a moving demand curve (also other explanations):



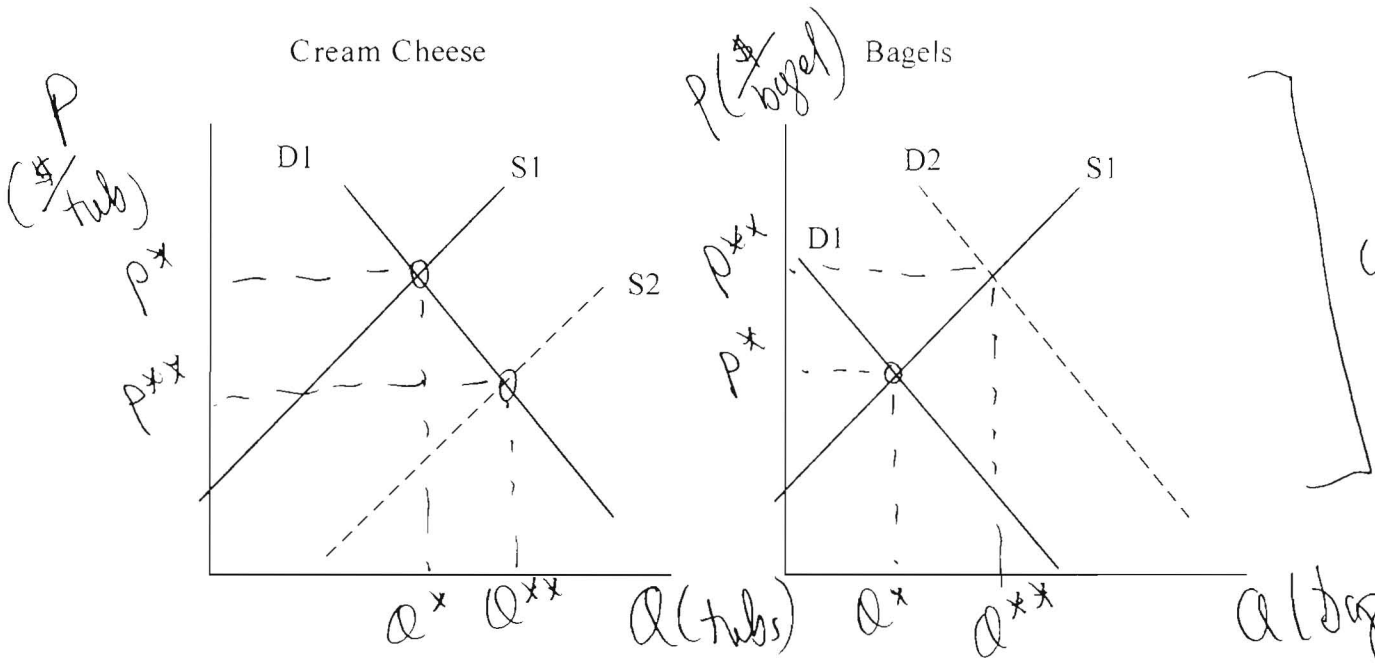
Let's look at which change has the effect that we want.

6. MANKIW pg. 86, #11

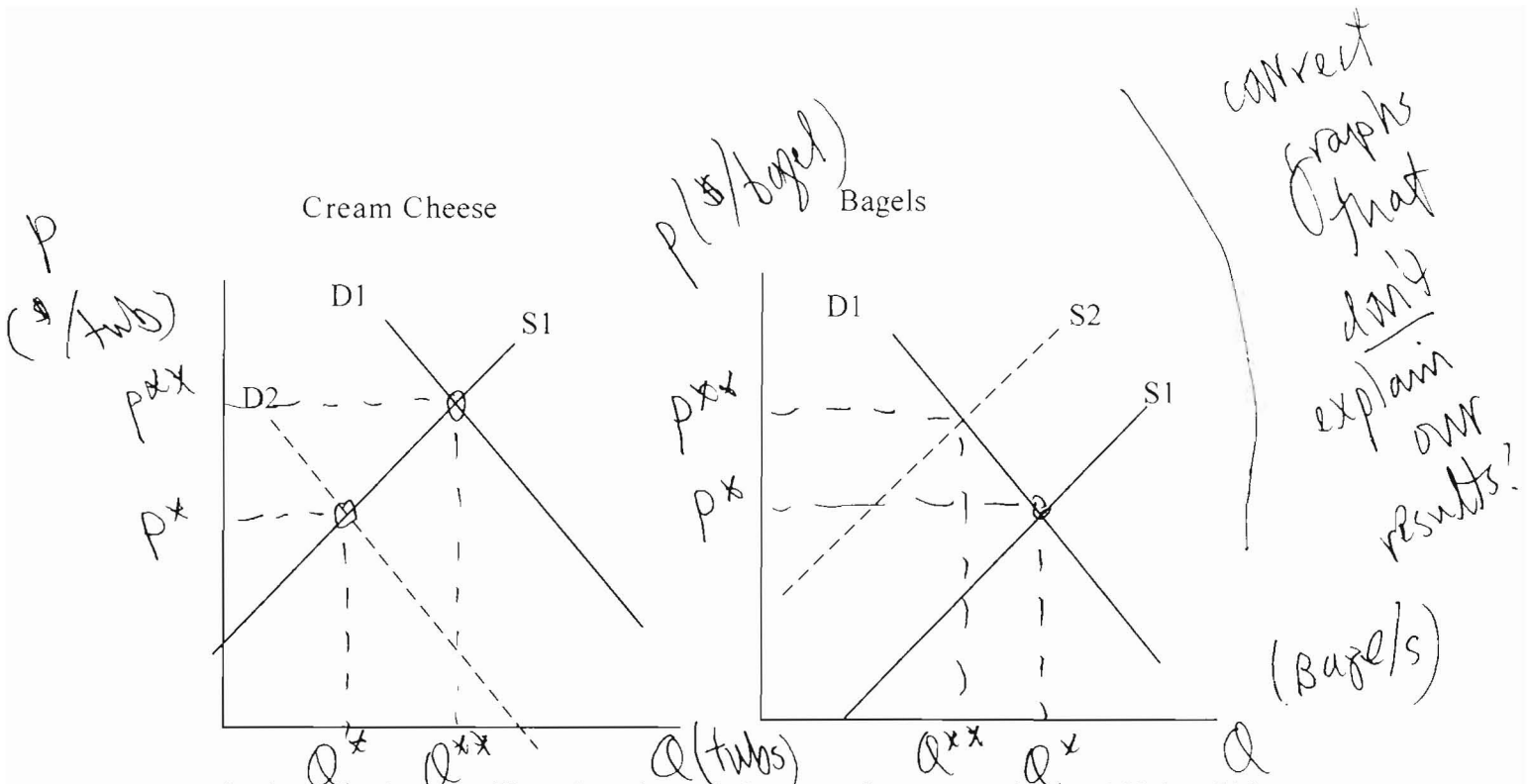
a. A fall in price of flour makes bagels cheaper to make, so it shifts the supply curve for bagels out. This results in an increase in the quantity demanded of bagels. Since bagels and cream cheese are complements, this makes the demand for cream cheese rise, increasing the price of cream cheese. **So this could be responsible for the increase in the equilibrium quantity of bagels and price of cream cheese.**



A fall in the price of milk makes the supply curve for cream cheese shift out. This makes the price of cream cheese go down, and the quantity demanded go up. Since they are complements, this makes the demand for Bagels increase, and the quantity demanded increase. Since the price of cream cheese fell, this could not explain it.

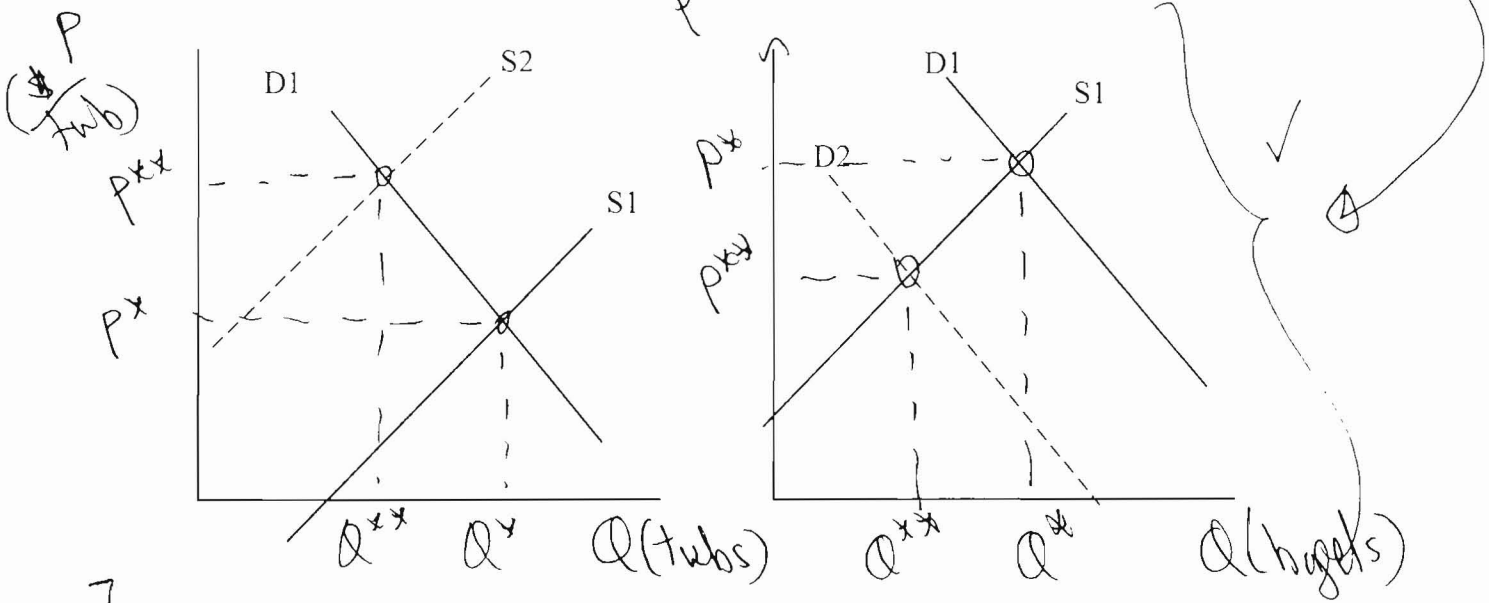


b. A rise in the price of flour makes bagels more expensive to make, so it shifts the supply curve for bagels in. This results in an decrease in the quantity demanded of bagels. Since bagels and cream cheese are complements, this makes the demand for cream cheese fall, decreasing the price of cream cheese. So this could not be responsible for the decrease in the equilibrium quantity of bagels and increase in price of cream cheese.



correct graphs that don't explain our results!

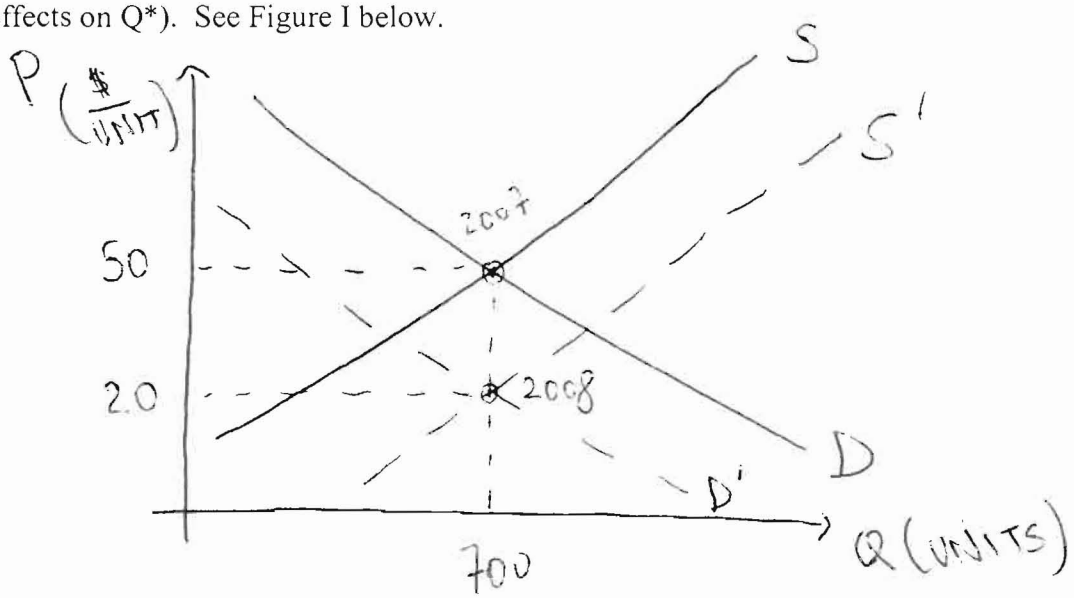
A rise in the price of milk makes the supply curve for cream cheese shift in. This makes the price of cream cheese go up, and the quantity demanded go down. Since they are complements, this makes the demand for Bagels decrease, and the quantity demanded decrease. **So this does explain the increase in the price of cream cheese and decrease in the quantity of bagels.**



7.

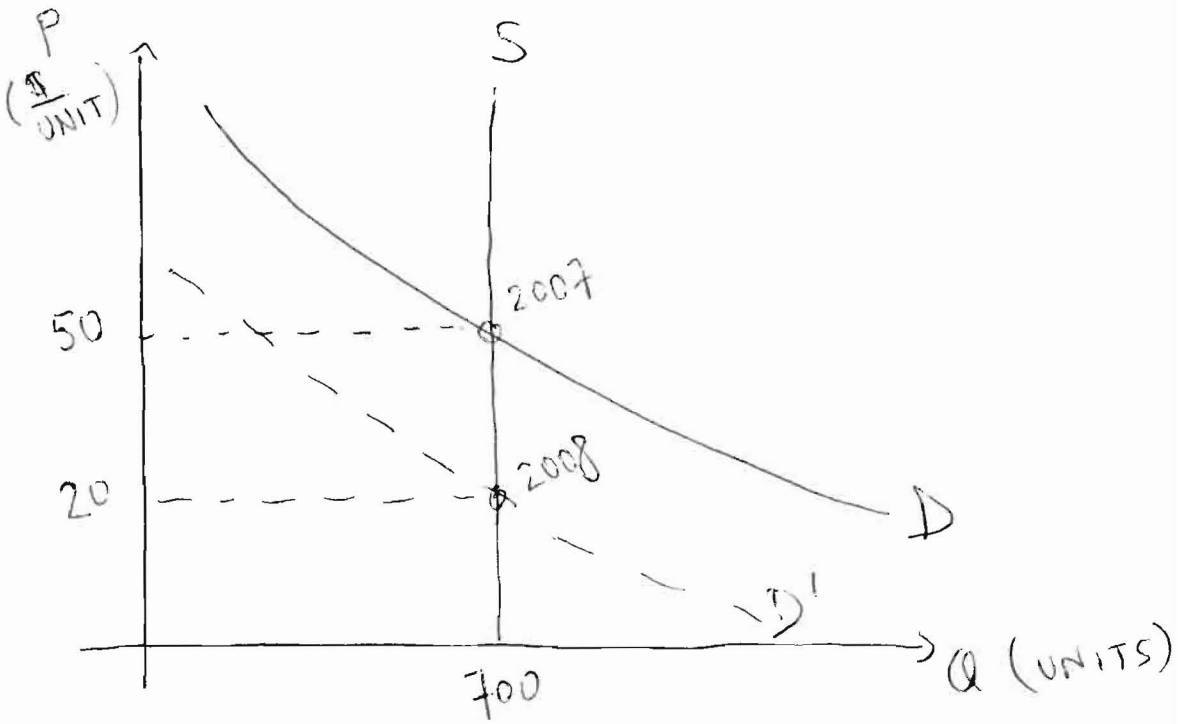
7. In this question, you want P* to FALL and Q* to stay the same. Thus, if you're dealing with S and D curves NEITHER of which are perfectly inelastic, you will need changes in S and D that predict the same qualitative changes to P* BUT opposing qualitative changes to Q*. By that logic, then, we would want an DECREASE in demand (by itself putting downward pressure on both P* and Q*) and an INCREASE in supply (by itself putting downward pressure on P* but upward pressure on Q*). This combination could indeed result in a DECREASE in P* (via both forces) and NO CHANGE in Q* (if those forces balance in their effects on Q*). See Figure I below.

Fig. I

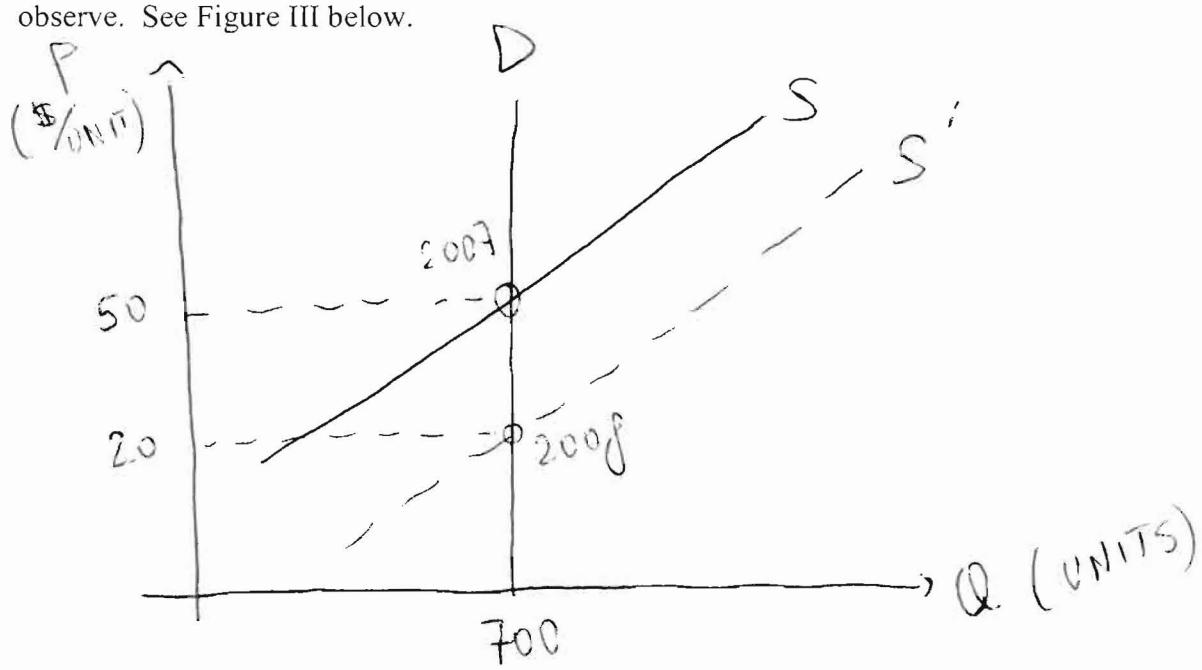


Now, allowing either S or D to be perfectly inelastic FIXES Q* because perfect inelasticity implies a vertical curve. Thus, if, for example, you decide to make S perfect inelastic, you will need a change in D to result in a FALL in P* -- well, we have such a change in D from above. So, the combination of perfectly inelastic S with a DECREASE in D will deliver. See Figure II below.

Fig. II

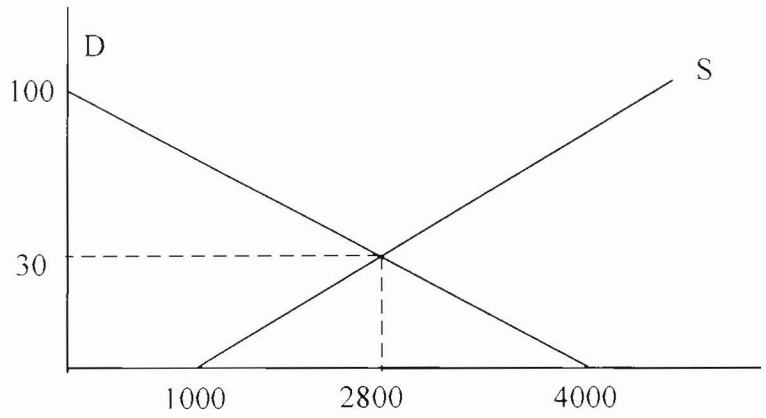


Similar logic applies when we allow D to be perfectly inelastic. Then, we need the change in S to deliver the FALL in P*. Thus, a perfectly inelastic D curve with an INCREASE in S is the last combination that will back out the data we observe. See Figure III below.

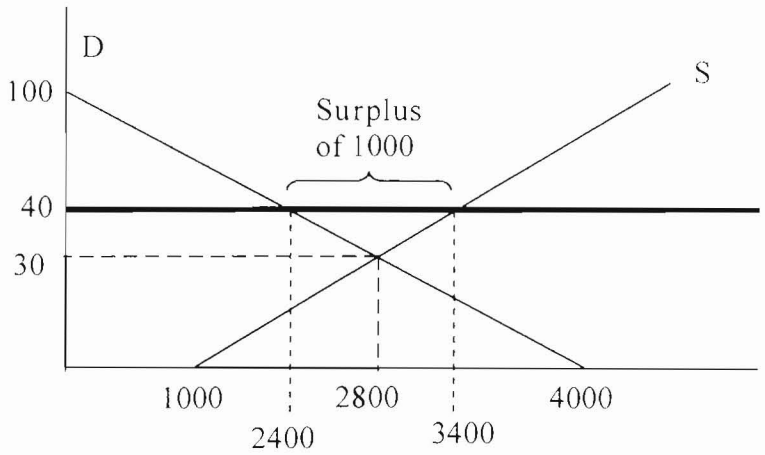


8.

a. At the equilibrium, Quantity Demanded equals Quantity Supplied. So
4000 – 40P = 1000 + 60P
3000 = 100P
P = 30
now find Q:
Q = 4000 – 40*60 = 2800



b.



With the price floor of $40/sweatshirt, the new QD is:
QD = 4000 – 40*40 = 2400
and the new QS is:
QS = 1000 + 60*40 = 3400
so the surplus is 1000 sweatshirts.
Since the council agreed to buy the surplus sweatshirts at $40 each, the cost of the policy to the council is $40/sweatshirt*1000sweatshirts = **$40,000**!

c. Consumer Expenditures = Price * QD

old: $30*2800 = $84,000
new: $40*2400= $96,000

Since an increase in price causes consumer expenditures to rise, it means that demand is **inelastic**. Why? When P goes up, QD goes down. So if P*QD goes up when P goes up, it means that the percentage increase in P must be greater than the percentage decrease in QD.

if $|\%\Delta P| > |\%\Delta Q^D|$, then

$$\left|\frac{\%\Delta Q^D}{\%\Delta P}\right| \equiv \varepsilon^D < 1 \;!!$$

Inelastic!

[Just in case you WANT the practice, the actual #'s for elasticity here are → 12 [3/7 w pt. form; 7/13 w midpt. form]