Economics 102
Spring 2017
Answers Homework #2
Due February 23, 2017

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.
- **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: Production Possibility Frontier

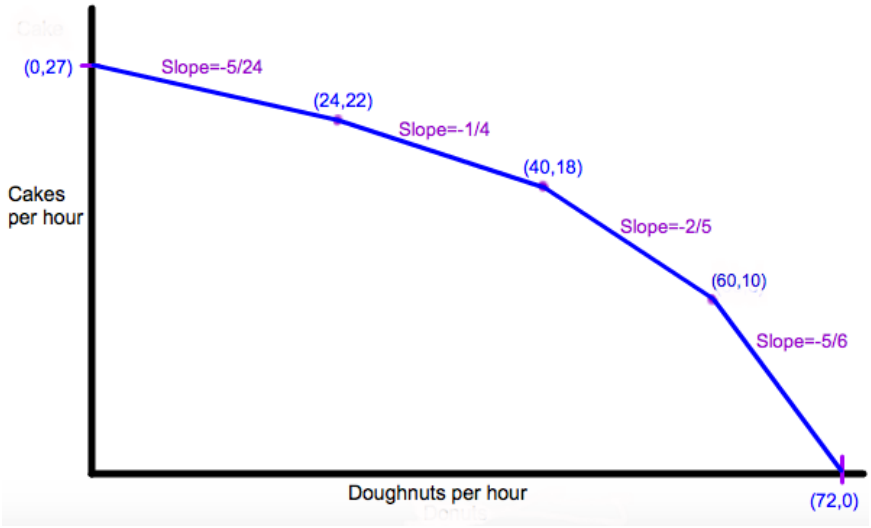
1) Four of your friends Felipe, Morgan, Amanda, and Ulysses decide to open a bakery together. Each hour Felipe can make 5 cakes or 24 doughnuts, Morgan can make 10 cakes or 12 doughnuts, Amanda can make 4 cakes or 16 doughnuts, and Ulysses can make 8 cakes or 20 doughnuts. All four friends have linear production possibility frontiers in these two goods.
   a. Write down each friend's opportunity cost of producing one doughnut in terms of cake. Write down each friend's opportunity cost of producing one cake in terms of doughnuts.

Name	O.C. of producing one doughnut	O.C. of producing one cake
Felipe	5/24=0.21 cake	24/5 = 4.8 doughnuts
Morgan	5/6=0.83 cake	6/5=1.2 doughnuts
Amanda	1/4=0.25 cake	4 doughnuts
Ulysses	2/5=0.4 cake	5/2=2.5 doughnuts

   b. Knowing that you are a bright economics student, your friends ask you for help finding their pastry production possibilities per hour. Draw their joint PPF based upon each individual working one hour, representing the total possible output for this bakery per hour, with doughnuts on the horizontal axis. Be sure to label all of the kink points, and label each of the line segments of this PPF with its respective slope.

      Given their opportunity costs, we know that Felipe will be the first to switch from producing cake to producing doughnuts, then Amanda, then Ulysses, and then Morgan will switch to producing doughnuts.

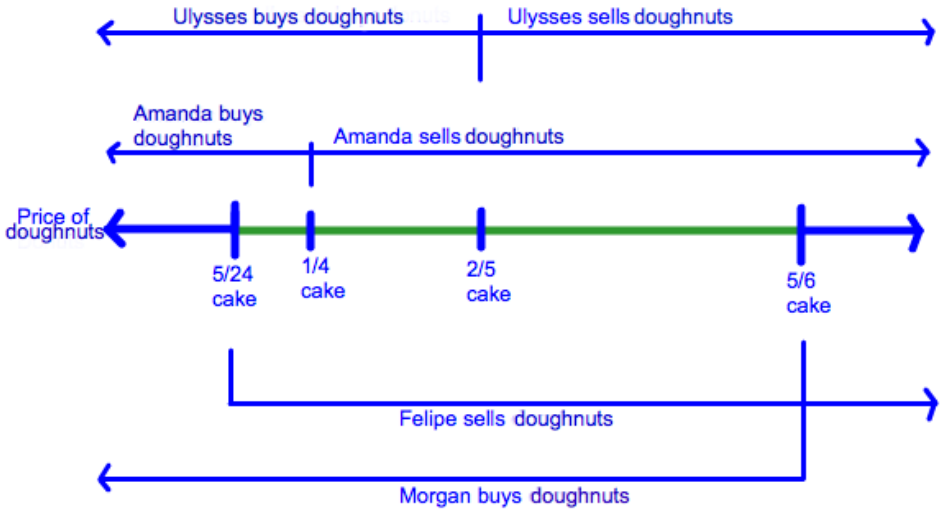
When everyone produces cake, 27 cakes per hour are produced, and we have the point (0, 27) on our PPF. When everyone produces cake except Felipe who produces only doughnuts, 24 doughnuts and 22 cakes are produced, so we have the point (24, 22). When Ulysses and Morgan produce only cake while Felipe and Amanda produce only doughnuts, 40 doughnuts and 18 cakes are produced, so we have the point (40, 18). When Morgan is the last person left making cakes while everyone else is making doughnuts, 60 doughnuts and 10 cakes are produced, leaving us with the point (60, 10) on our PPF. Finally, when everyone produces only doughnuts 72 of these are produced, so we have the point (72, 0).



c. Now suppose, due to conflicting views on the best cake flavor, your friends decide to split up and each start their own bakery. What is the range of trading price for doughnuts in terms of cakes for the four bakeries? Illustrate this and label any points at which certain bakeries switch from buying to selling doughnuts.

Looking at the opportunity costs of each individual, we see that Felipe will be willing to sell doughnuts as long as the price he receives for one doughnut is at least 5/24 cake. Morgan is willing to buy doughnuts as long as the price of one doughnut is no greater than 5/6 cake. Therefore, when the price of one doughnut is between 5/24 cake and 5/6 cake, trade will take place between these two individuals. For Amanda and Ulysses this trading range is a bit more complicated.

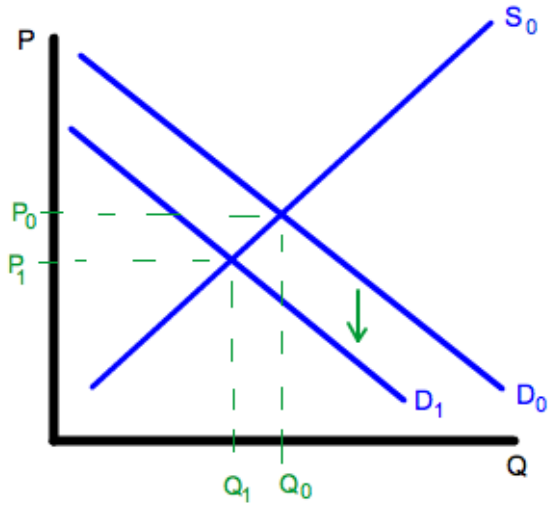
When the price is below 1/4 cake, Amanda can buy doughnuts cheaper than she can make them. When the price is above 1/4 cake she can sell doughnuts and get cake cheaper than she could make it. Similarly, when the price of doughnuts is below Ulysses' opportunity cost of 2/5 cake he buys doughnuts, and when it is above this price he sells doughnuts.



Part II: Supply and Demand

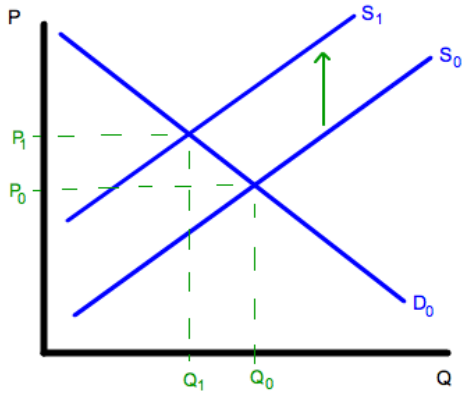
2) Consider the market for movie tickets. Given each of the following changes, specify whether the new equilibrium price and quantity is higher or lower than the initial equilibrium price and quantity. For each of the scenarios, suppose that the market starts in equilibrium. Drawing a graph for each of the scenarios will be helpful.
   a. Hockey tickets are a substitute for movie tickets. Suppose the price of hockey tickets decreases.

      The price of a substitute for movie tickets decreasing causes the demand for movie tickets to decrease. This decrease in demand then results in a lower equilibrium price and a lower equilibrium quantity.



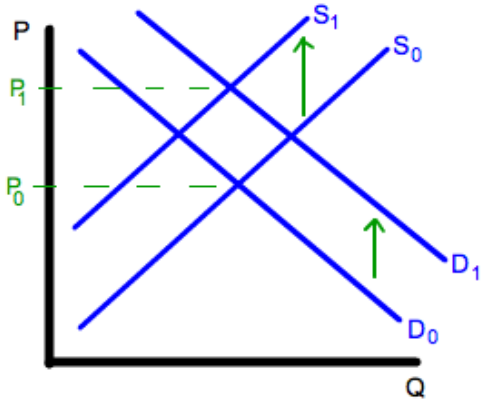
b. Many film companies have stopped providing movie theaters with 35mm film and only provide digital copies of movies. Suppose that it is now more costly for movie theaters to project the digital copies of movies.

Since it is now more costly for movie theaters to project movies, we can expect the supply of movie tickets to decrease. In other words, the minimum acceptable price for these theaters to show movies has now gone up. This decrease in the supply of tickets results in a higher equilibrium price and a lower equilibrium quantity.



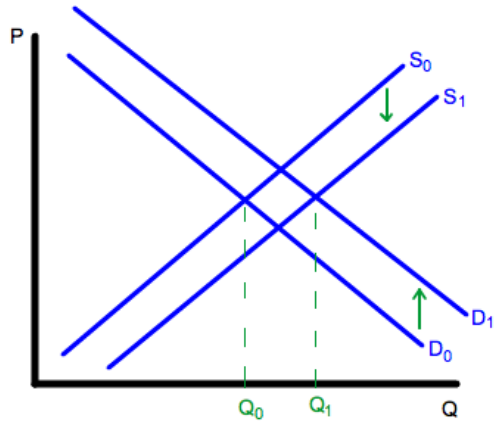
c. Popcorn is a complement to movie tickets. Suppose the price of popcorn decreases. Also, suppose the events of part (b) also take place at the same time.

If the events described in part (b) take place, we are dealing with a reduction in the supply of movie tickets. Now if the price of a complement to movie tickets decreases, this causes an increase in the demand for movie tickets. The increase in demand along with the decrease in supply result in a higher equilibrium price for the tickets, but we cannot determine whether the new equilibrium quantity is higher or lower without knowing the magnitudes of the shifts of the supply and demand curves.



d. Suppose that several new and very popular movies are released in theaters. At the same time the cost that theaters have of printing and distributing tickets has declined.

With several new and popular movies recently released, the demand for movie tickets increases. The reduction in the cost of providing tickets causes the supply of tickets to increase.
The increase in demand along with the increase in supply of movie tickets results in an increase in the equilibrium quantity, but we cannot determine whether the new equilibrium price is higher or lower without knowing the magnitudes of the shifts of the supply and demand curves.

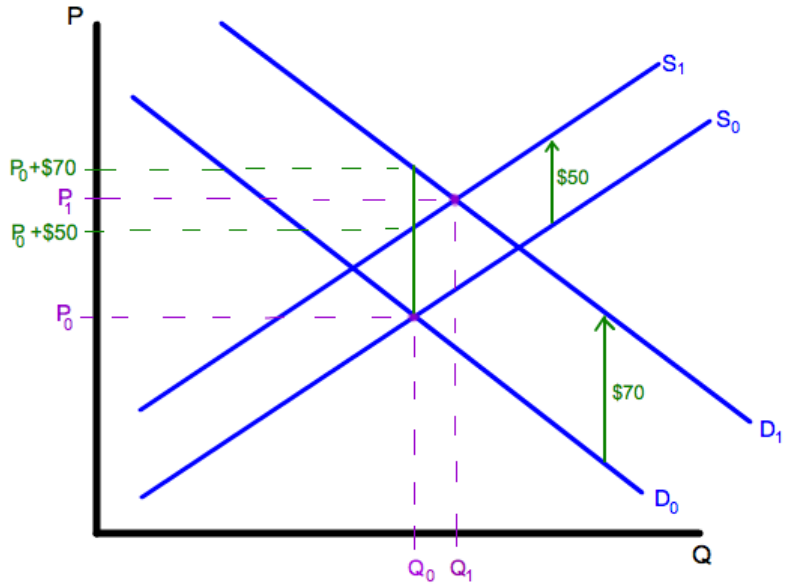


3) Suppose that after you graduate college you become employed by a business that wants to make a change to a product. This change will make the product more costly to produce, but will increase the product's demand.
For this problem, suppose that you work for the sole producer of winter coats in the area. Also, assume that both the demand for winter coats and the supply of winter coats are linear relationships. Your boss patents the brilliant idea of the electric winter coat, and is considering whether or not the company should switch from producing regular winter coats to producing electric winter coats instead. These electric winter coats cost $50 more per coat to produce. You do some market research and conclude that switching from regular coats to electric coats will increase the demand for the firm's coats. You must now report back to your boss.
   a. Under what scenario will switching to producing the electric coats benefit both your firm and your customers? Draw this scenario on a supply and demand diagram and explain your reasoning.

   If the switch to electric coats causes demand for the company's coats to increase by more than $50, both the firm and the customers are better off.

   First, we know that producing the electric coats increases the firm's cost of producing each coat by $50, thus their minimum acceptable price increases by $50.

Next, consider any increase in demand greater than $50; let's say demand increases by $70. This rightward shift in demand and leftward shift in supply cause the price of coats to rise by an amount more than $50 but less than $70, as illustrated in the following graph.



The firm is better off in this scenario because although it costs them $50 more to produce each coat, the price they receive increases by more than $50. They also sell a greater quantity of coats. Customers are better off because they value the new electric coats $70 more than the previous coats that were produced, and they can acquire these electric coats by paying less than $70 more.

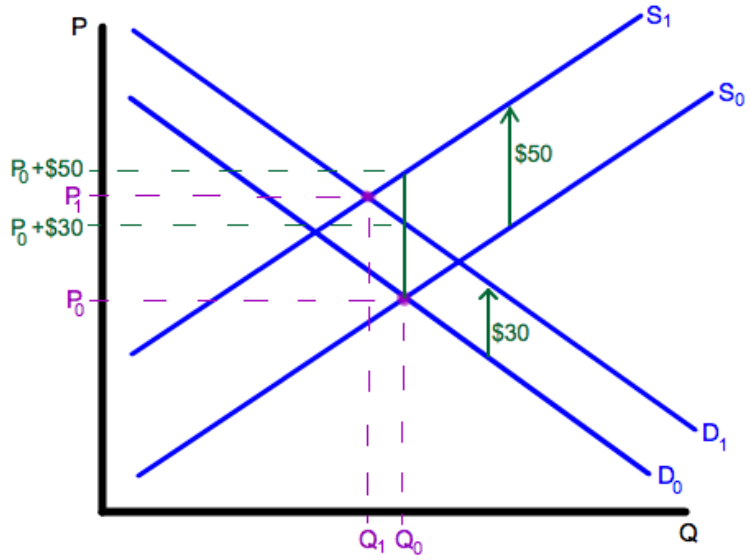
b. Under what scenario will switching to producing the electric coats be detrimental to both your firm and your customers? Draw this scenario on a supply and demand diagram and explain your reasoning.

(Hint: Consider three scenarios here. One scenario where consumers are willing to increase the amount they are willing to pay for each coat by exactly $50, another scenario where consumers are willing to pay an additional amount that is less than $50 for each coat, and a third scenario where consumers are willing to pay an additional amount that is greater than $50 for each coat.)

If the switch to electric coats causes the amount consumers are willing to pay per coat to increase by less than $50, both the firm and the customers are worse off.

Consider any increase in the amount that consumers will pay that is less than $50 per coat: e.g., let's say that the amount they are willing to pay increases

by $30 per coat. We know that both the demand curve and the supply curve for coats shift: given the size of these shifts we now know that the price per coat increases by more than $30 per coat and less than $50 per coat. This is illustrated in the following graph.



In this scenario the firm is worse off because it costs them an additional $50 to make each electric coat, and they are only receiving $30 more for them. The quantity that they sell also decreases. Customers are also worse off in this scenario because they only value the new coats $30 more, but they now face a price more than $30 higher for the coats.

4) Market Supply and Demand:
   a. You are given the following information about the 10 buyers of raspberries in your area. The two equations given for each buyer's demand are equivalent, just written in different forms. What is the market demand for raspberries? Draw the market demand curve and label each kink point. Label each line segment on your graph with the equation describing it.

Buyer	Demand for Raspberries	Demand for Raspberries
1	p = 10 - 5q	q = 2 - (1/5)p
2	p = 20 - (1/2)q	q = 40 - 2p
3	p = 10 - q	q = 10 - p
4	p = 30 - (1/4)q	q = 120 - 4p
5	p = 30 - 5q	q = 6 - (1/5)p
6	p = 20 - q	q = 20 - p
7	p = 10 - (1/5)q	q = 50 - 5p
8	p = 20 - 2q	q = 10 - (1/2)p
9	p = 30 - q	q = 30 - p
10	p = 10 - (1/3)q	q = 30 - 3p

First, it will be helpful to add together the demand schedules that have the same intercept with the price axis; these can be easily identified by looking at the equations in the second column of the chart (the y-intercept form). Then because we are doing a horizontal summation of the demand curves we will need to use the x-intercept form (the third column) to find the market demand for each price range.

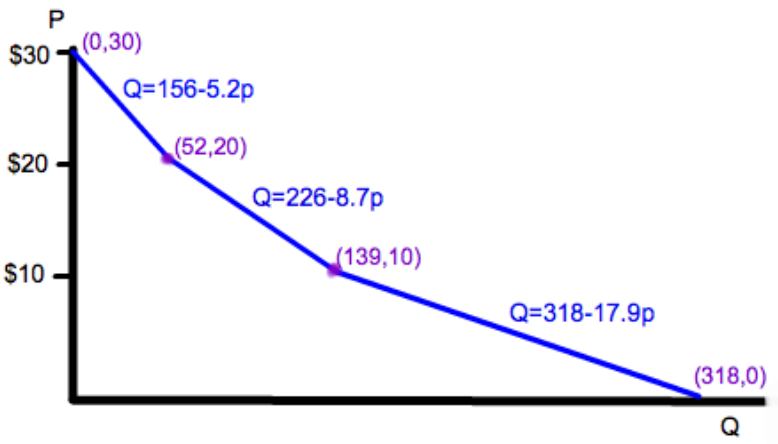
Those with an intercept with the price axis of 10 are buyers 1, 3, 7, and 10.
Adding together their demand schedules yields: Q = 92 - 9.2p.
Those with an intercept with the price axis of 20 are buyers 2, 6, and 8.
Adding together their demand schedules yields: Q = 70 - 3.5p.
Those with an intercept with the price axis of 30 are buyers 4, 5, and 9.
Adding together their demand schedules yields: Q = 156 - 5.2p.

By identifying the intercepts with the price axis, we know that when the price is above $30, no one buys the good. When the price is between $30 and $20 only buyers 4, 5, and 9 are in the market, so in this price range we only need to consider their joint demand curve: Q =156 - 5.2p.

When the price is between $20 and $10 buyers 4, 5, 9 along with buyers 2, 6, and 8 are in the market, so we need to consider the joint demand schedule of all 6 of these buyers in this price range. Adding together Q = 156 - 5.2p and Q = 70 - 3.5p yields the joint demand schedule for theses 6 buyers: Q = 226 - 8.7p.

When the price is below $10, all buyers are now willing to buy the good, so when the price is below $10 we need to consider the joint demand schedules of all buyers. Adding together Q = 226 - 8.7p and Q = 92 - 9.2p yields the joint demand schedule for all the buyers: Q = 318 - 17.9p.

Now when the market demand schedule is drawn, for prices between $30 and $20 the demand schedule Q = 156 - 5.2p is in use. For prices between $20 and $10 more buyers enter the market and the demand schedule Q = 226 - 8.7p is in use. Then for prices below $10 all buyers are willing to purchase the good, and the demand schedule Q = 318 - 17.9p is in use.



The kink points can be found by asking how much would be demanded at prices $20 and $10. When p = 20, Q =156 - 5.2(20) = 52 = 226 - 8.7(20), so we have the point (52,20). When p =10, Q = 226 - 8.7(10) = 139 = 318 - 17.9p, so we have the point (139,10).

b. You are given the following information about the 5 suppliers of raspberries in your area. The two equations given for the amount supplied by each seller are equivalent, just written in different forms. What is the market supply for raspberries? Draw the market supply curve and label each kink point. Label each line segment on your graph with the equation describing it.

Seller	Supply of Raspberries	Supply of Raspberries
1	$p = q + 3$	$q = p - 3$
2	$p = (1/2)q + 3$	$q = 2p - 6$
3	$p = 4q + 1$	$q = (1/4)p - (1/4)$
4	$p = (1/5)q + 3$	$q = 5p - 15$
5	$p = 2q + 1$	$q = (1/2)p - (1/2)$

Just as in finding the market demand, it will be helpful to first add together the supply schedules that have the same intercept with the price axis.

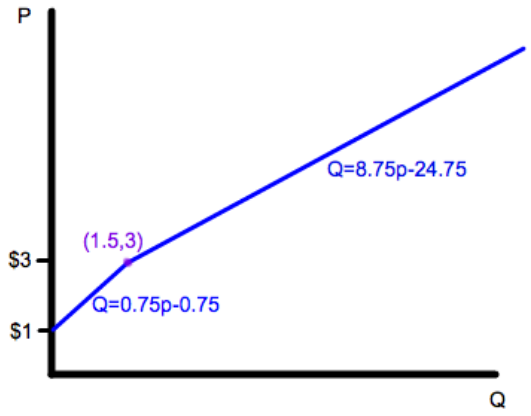
The supply schedules that have an intercept of 3 with the price axis are those of sellers 1, 2, and 4. Adding together their supply schedules from the third column of the chart yields: Q = 8p - 24.

The supply schedules that have an intercept of 1 with the price axis are those of sellers 3 and 5. Adding these two supply schedules together yields: Q = 0.75p - 0.75.

By identifying the intercepts with the price axis, we know that when the price is below $1 no seller is willing to supply the good. When the price is between $1 and $3 only sellers 3 and 5 are willing to supply the good, and so we only need to consider the joint supply schedule for these two seller in that price region, which is Q = 0.75p - 0.75.

When the price is above $3 all five sellers are willing to supply the good, and so we need to consider the joint supply schedule of all the buyers in this price range. This joint supply of all five sellers can be found by adding Q = 8p - 24 and Q = 0.75p - 0.75, resulting in Q = 8.75p - 24.75.

Now when the market supply schedule is drawn, for prices between $1 and $3 the supply schedule Q = 0.75p - 0.75 is in use. When prices get above $3 the remaining suppliers enter the market, so for prices above $3 the supply schedule Q = 8.75p - 24.75 is in use.



The kink point (1.5, 3) can be found by asking how much will be supplied when the price is $3. This amount is 0.75(3) - 0.75 = 1.5 = 8.75(3) - 24.75.

c. With the market supply and demand curves that you found in parts (a) and (b) solve for the equilibrium market price and quantity.

The equilibrium price is $14.37, and the equilibrium quantity is 100.98.

We know that the equilibrium price and quantity will be determined where the market demand and market supply curves intersect. The problem is that the equations for these curves vary by price range, and so we first need to determine the price range that the equilibrium will fall into.

First, we connect (1.5, 3) to the two kink points of demand curve (52,20), and (139,10). Then we find the slopes of the two lines: 17/50.5, and 7/137.5. We know the slope of supply (1/8.75) lies between the two values, so the supply and demand must intersect somewhere between (52,20) and (139,10).

8.75 p+24.5= 226-8.7 p
P=14.37
And Q=100.98

Part III: Measuring GDP

5) The following is information about all transactions that took place in the tiny country of Mendota in 2016.

Item	Description	Amount
A	Consumer purchases of ice skates	$12,000
B	Exports of ice skates	$1,700
C	Wages to figure skaters	$9,900
D	Transfer payments from the government to those who cannot skate	$1,200
E	Interest income	$700
F	Government spending on cheese	$7,300
G	Profits of firms	$9,400
H	Investment by firms	$5,700
I	Rent paid to igloo owners	$3,000
J	Imports of fishing poles	$3,700

a. Which of the above items would we include in GDP using the expenditure approach? Calculate the 2016 GDP of Mendota using the expenditure approach.

Items A, B, F, H, and J should be considered.
GDP = $12,000 + $1,700 + $7,300 + 5,700 - $3,700 = $23,000
(Notice that we subtract Imports in this calculation.)

b. Which of the above items would we include in GDP using the income/factor payments approach? Calculate the 2016 GDP of Mendota using the income approach.

Items C, E, G, and I should be considered.
GDP = $9,900 + $700 + $9,400 + $3,000 = $23,000

c. Suppose that in 2017 the above information used in your calculation of GDP under the expenditure approach is exactly the same, except for one change. Instead of purchasing ice skates from firms, some ice skate buyers decide to barter with other individuals for their skates. Now consumer purchases of ice skates equals $6,000 while the market value of all the skates traded through bartering equals $6,000. Using the expenditure approach, calculate the 2017 GDP for Mendota.

The ice skates acquired through barter do not count towards consumer spending in the GDP calculation; therefore 2017 GDP is $6,000 lower than 2016 GDP. GDP in 2017 equals $17,000.