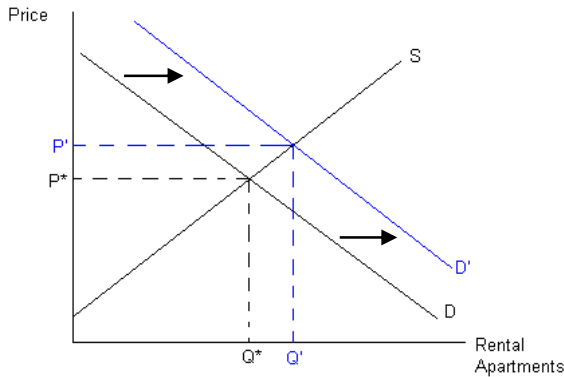
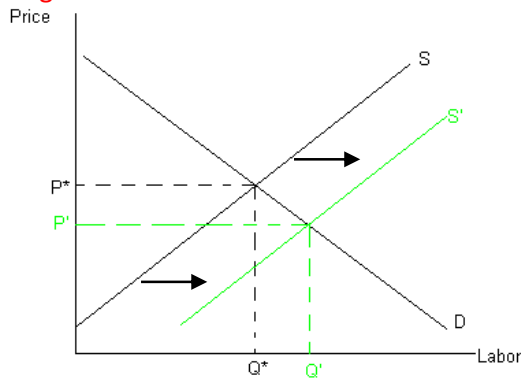


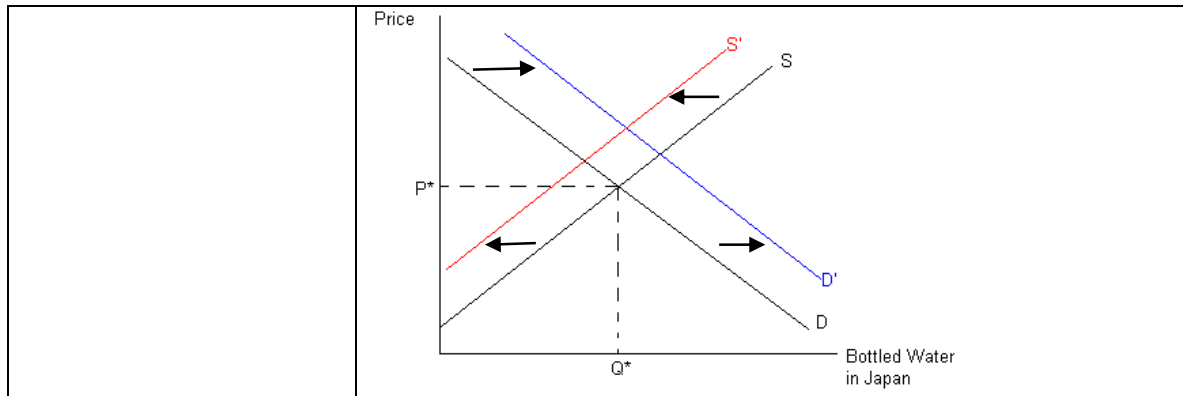
Principles of Microeconomics
Demand and Supply Practice Problems - Key

Question 1

Assume that each of the markets below is initially in equilibrium. Then for each market below, suppose that the indicated event occurs. Illustrate the effect of each event in a diagram and indicate the effects on the equilibrium price and quantity.

	Market	Event
i.	Rental apartments	<p>Mortgages are more difficult to qualify for due to the housing market crash.</p> <p>Since consumers have greater difficulty getting mortgages, they will have an increased demand for rentals (renting is a substitute for purchasing a home). The increase in demand for rentals will result in an increase in equilibrium price and quantity of rentals.</p>  <p>The diagram shows a supply curve (S) and a demand curve (D) for rental apartments. The vertical axis is labeled 'Price' and the horizontal axis is labeled 'Rental Apartments'. A new demand curve (D') is shown to the right of D, with an arrow indicating the shift. The equilibrium moves from (Q*, P*) to (Q', P'), where both price and quantity increase.</p>
ii.	Labor	<p>The U.S. experiences a resurgence of the Puritan work ethic.</p> <p>Note: In the labor market, firms demand labor and households supply labor. The price for labor is the wage.</p> <p>The resurgence of the Puritan work ethic will increase the supply of labor. The increased supply of labor will result in an increase in the equilibrium quantity of labor and a decrease in the equilibrium wage.</p>  <p>The diagram shows a demand curve (D) and a supply curve (S) for labor. The vertical axis is labeled 'Price' and the horizontal axis is labeled 'Labor'. A new supply curve (S') is shown to the right of S, with an arrow indicating the shift. The equilibrium moves from (Q*, P*) to (Q', P'), where both quantity and price (wage) decrease.</p>
iii.	Retirement Community housing units	<p>The first baby boomers (born 1946 to 1964) start to reach retirement age in 2011 and look to downsize their housing.</p> <p>As baby boomers reach retirement age and downsize their</p>

	<p>housing, they may look to living in retirement communities. Thus, there would be an increase in the demand for retirement community housing units. The increased demand will lead to an increase in the equilibrium price and quantity of retirement community housing units.</p>
iv.	<p>Beef</p> <p>Oprah's comments about fear of contracting mad cow disease through the consumption of hamburgers <i>coupled with</i> an increase in the price of cattle feed.</p> <p>Oprah's comments will likely decrease the demand for beef while the rising price of cattle feed (an input to production) will decrease the supply of beef. The combined changes in demand and supply will result in a decrease in the equilibrium quantity but the change in the equilibrium price is indeterminate.</p>
v.	<p>Bottled water in Japan</p> <p>The Japanese earthquake and resulting tsunami destroy stores of bottled water and bottled water plants <i>as well as</i> severely damage infrastructure that delivers clean water to Japanese households.</p> <p>With the destruction of facilities used to produce bottled water, the supply of bottled water decreases. The destroyed infrastructure used to deliver clean water will cause an increase in the demand for bottled water. The combined changes in demand and supply will result in an increase in the equilibrium price while the change in the equilibrium quantity is indeterminate.</p>



- a. Explain the adjustment process in the rental apartment market after the shock to the new equilibrium.
 Since consumers have greater difficulty getting mortgages, they will have an increased demand for rentals (renting is a substitute for purchasing a home). At the initial equilibrium price (P^*) and the new demand curve, the quantity demanded exceeds the quantity supplied – a shortage exists. In response to the shortage, the price begins to be bid up. The increasing price causes the quantity demanded to fall and the quantity supplied to increase (moving along the new demand and original supply curves) until they are equal and the new equilibrium is established.
- b. Explain the adjustment process in the labor market after the shock to the new equilibrium.
 The resurgence of the Puritan work ethic will increase the supply of labor. At the initial equilibrium wage (w^*) and the new supply curve, the quantity supplied exceeds the quantity demanded – a surplus exists. In response to the surplus, the wage falls. The falling wage causes the quantity demanded to increase and the quantity supplied to fall (moving along the new supply and original demand curves) until they are equal and the new equilibrium is reached.

Question 2

Suppose that the market demand for potatoes is given by $Q = 1000 - 250P$ and the market supply of potatoes is given by $Q = 150P$, where P is the price per bag of potatoes and Q is the number of bags per month.

- a. What are the equilibrium price and quantity for potatoes? Illustrate your answer graphically.
 In equilibrium, the quantity demanded is equal to the quantity supplied. We use this fact to solve for equilibrium.

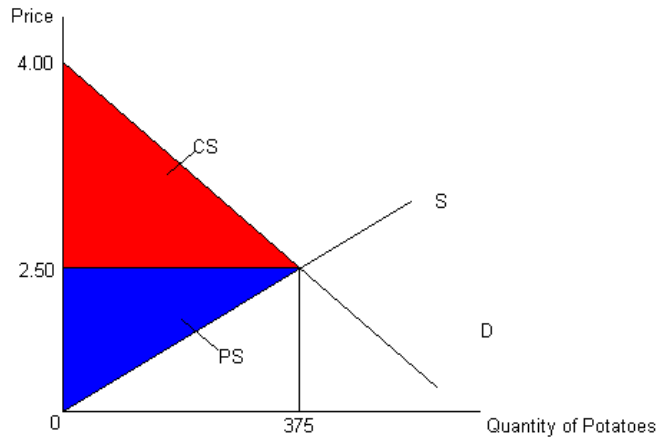
$$Q_d = Q_s$$

$$1000 - 250P = 150P$$

$$1000 = 400P$$

$$2.50 = P$$
 To find the equilibrium quantity, we substitute the equilibrium price into either the demand or supply equations and solve for Q .

$$Q = 1000 - 250(2.50) = 375$$



- b. What is the consumer surplus at the equilibrium in part (a)? Indicate the area of consumer surplus in the diagram from part (a).

$$CS = \frac{1}{2}(4.00 - 2.50)(375 - 0) = \$281.25$$

See the diagram from part (a) for an illustration of the CS.

- c. What is the producer surplus at the equilibrium in part (a)? Indicate the area of consumer surplus in the diagram from part (a).

$$PS = \frac{1}{2}(2.50 - 0)(375 - 0) = \$468.75$$

See the diagram from part (a) for an illustration of the PS.

- d. In the context of the problem, provide three reasons why the demand for potatoes might increase. There are many reasons for demand to increase. In this particular context, some reasons why the demand for potatoes might increase would include (1) an increase in the price of rice (a substitute), (2) a decrease in the price of meat (a complement), (3) an increase in the population, (4) an increase in average household incomes (assuming that potatoes are a normal good), (5) a change in consumer tastes towards potatoes (which might be the result of information that potatoes are good for one's health), or (6) an expectation that one's incomes will increase or that prices of potatoes will increase in the future (and thus the demand for potatoes today will increase).
- e. In the context of the problem, provide three reasons why the supply of potatoes might decrease. Here too there are many reasons why supply might decrease. In this particular context, some reasons why the supply of potatoes might fall include (1) the price of fertilizer (or any other input to potato production) rises, (2) a weather event or natural disaster that destroys part of the crop, (3) several potato farmers exit the potato market, or (4) the price of a substitute in production – say wheat – increases.

Question 3

The demand and supply schedules for broccoli are given in the following tables. Use this information to answer the questions below.

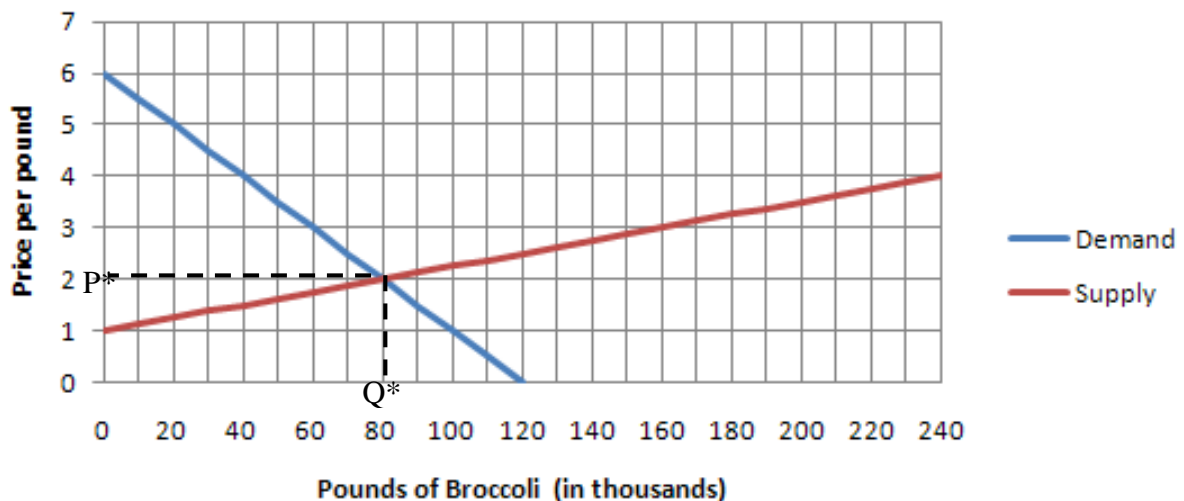
Price (per pound)	Quantity Demanded (1000 pounds)	Quantity Supplied (1000 pounds)
1.00	100	0
1.50	90	40

2.00	80	80
2.50	70	120
3.00	60	160
3.50	50	200
4.00	40	240

- a. What are the equilibrium price and quantity in the broccoli market? Illustrate your answer graphically.

In equilibrium, the quantity demanded is equal to the quantity supplied. This occurs at a price of \$2.00 per pound and a quantity of 80,000 pounds.

Market for Broccoli



- b. Explain why the market will be in disequilibrium at a price of \$3.50 per pound.
At a price of \$3.50 per pound, the quantity supplied is 200 while the quantity demanded is 50. Thus, there is a surplus of broccoli at this price. In equilibrium, the quantity demanded is equal to the quantity supplied.
- c. Explain how the market will adjust from a price of \$3.50 per pound to the equilibrium identified in part (a).
At a price of \$3.50 per pound, there is a surplus of broccoli. In response to the surplus, the price starts to be bid down. As the price falls, the quantity demanded rises and the quantity supplied falls. The price will continue to fall until the entire surplus is eliminated and equilibrium is reached.
- d. New studies indicate that broccoli has significant healing powers if it is consumed daily. How will these studies affect the broccoli market? Explain the adjustment process to the new equilibrium.
The studies indicating the health benefits of broccoli will result in an increase in the demand for broccoli. At the initial equilibrium price (\$2), there will be a shortage of broccoli. In response to the shortage, the price will be bid up and cause quantity demanded to fall while the quantity supplied rises. The price will continue to increase until the shortage is eliminated and the new equilibrium is reached. The result is a higher equilibrium price and quantity.
- e. Suppose instead that tighter immigration restrictions reduce the number of farm laborers. How will these restrictions affect the broccoli market? Explain the adjustment process to the new equilibrium.

As the supply of farm laborers falls, the wages paid to those laborers will increase. The increase in the wage is an increase in an input to broccoli production which will cause the supply of broccoli to fall. At the initial equilibrium price (\$2), the quantity demanded will exceed the quantity supplied. In response to the shortage, the price of broccoli will be bid up. As the price rises, the quantity demanded falls and the quantity supplied increases (moving along the original demand curve and new supply curve). The price continues to rise until the shortage is eliminated and quantity demanded is equal to quantity supplied.