b. The supply of pineapples in Hawaii increases, causing pineapple prices to fall. Lower prices mean that the demand for pineapples in Hawaiian households will increase, which will reduce the supply of pineapples and increase their price.

3.5 MARKET EQUILIBRIUM

LEARNING OBJECTIVE: Be able to explain how a market that is not in equilibrium responds to restore an equilibrium.

5.1 Illustrate the following with supply and demand curves:

a. With increased access to wireless technology and lighter weight, the demand for 2-in-1 laptop computers has increased substantially. 2-in-1 laptops have also become easier and cheaper to produce as new technology has come online. Despite the shift of demand, prices have fallen.

b. Cranberry production in Massachusetts totaled 1.91 million barrels in 2017, a 16 percent decrease from the 2.22 million barrels produced in 2016. Demand also decreased, but by less than than supply, raising 2017 prices to $48.70 per barrel from $44.50 in 2016.

c. During the high-tech boom in the late 1990s, San Jose office space was in high demand and rents were high. With the national recession that began in March 2001, however, the market for office space in San Jose (Silicon Valley) was hit hard, with rents per square foot falling. In 2005, the employment numbers from San Jose were rising slowly and rents began to rise again. Assume for simplicity that no new office space was built during the period.

d. Before economic reforms were implemented in the countries of Eastern Europe, regulation held the price of bread substantially below equilibrium. When reforms were implemented, prices were deregulated and the price of bread rose dramatically. As a result, the quantity of bread demanded fell and the quantity of bread supplied rose sharply.

e. The steel industry has been lobbying for high tariffs on imported steel. Russia, Brazil, and Japan have been producing and selling steel on world markets at $593 per metric ton, well below what equilibrium would be in the United States with no imports. If no imported steel was permitted into the country, the equilibrium price would be $1,006 per metric ton. Show supply and demand curves for the United States, assuming no imports; then show what the graph would look like if U.S. buyers could purchase all the steel that they wanted from world markets at $593 per metric ton; label the portion of the graph that represents the quantity of imported steel.

5.2 Do you agree or disagree with each of the following statements? Briefly explain your answers and illustrate each with supply and demand curves.

a. The price of a good rises, causing the demand for another good to fall. Therefore, the two goods are substitutes.

b. A shift in supply causes the price of a good to fall. The shift must have been an increase in supply.

c. During 2009, incomes fell sharply for many Americans. This change would likely lead to a decrease in the prices of both normal and inferior goods.

d. Two normal goods cannot be substitutes for each other.

e. If demand increases and supply increases at the same time, price will clearly rise.

f. The price of good A falls. This causes an increase in the price of good B. Therefore, goods A and B are complements.

5.3 Through October 2014, the U.S. government administered two programs that affected the market for cigarettes. Media campaigns and labeling requirements, which are still in place, aim at making the public aware of the health dangers of cigarettes, and until 2014 the Department of Agriculture also maintained price supports for tobacco. Under this program, the supported price was above the market equilibrium price and the government limited the amount of land that could be devoted to tobacco production. Were these two programs at odds with the goal of reducing cigarette consumption? As part of your answer, illustrate graphically the effects of both policies on the market for cigarettes.

5.4 For each of the following statements, draw a diagram that illustrates the likely effect on the market for eggs. Indicate in each case the impact on equilibrium price and equilibrium quantity.

a. The surgeon general warns that high-cholesterol foods cause heart attacks.

b. The price of bacon, a complementary product, decreases.

c. The price of chicken feed increases.

d. Caesar salads become trendy at dinner parties. (The dressing is made with raw eggs.)

e. A technological innovation reduces egg breakage during packing.

***5.5** Suppose the demand and supply curves for eggs in the United States are given by the following equations:

$$Q_d = 100 - 20P$$
$$Q_s = 10 + 40P$$

where Q_d = millions of dozens of eggs Americans would like to buy each year; Q_s = millions of dozens of eggs U.S. farms would like to sell each year; and P = price per dozen eggs.

a. Fill in the following table:

Price (Per Dozen)	Quantity Demanded (Q_d)	Quantity Supplied (Q_s)
$ .50	____	____
$ 1.00	____	____
$ 1.50	____	____
$ 2.00	____	____
$ 2.50	____	____

b. Use the information in the table to find the equilibrium price and quantity.

c. Graph the demand and supply curves and identify the equilibrium price and quantity.

d. Use algebra to solve these equations for the equilibrium price and quantity.