∂ 2.2 figure it out

Draw a supply and demand diagram of the market for paperback books in a small coastal town.

a. Suppose that a hurricane knocks out electrical power for an extended period of time. Unable to watch television or use a computer, people must resort to reading books for entertainment. What will happen to the equilibrium price and quantity of paperback books?

b. Does this change reflect a change in demand or a change in quantity demanded?

c. Suppose that the expanded demand curve for paperback books can be expressed as $Q^D = 300 - 0.2P + 6P_n - 9P_b - 0.005I$, where P_n is the price of newspapers, P_b is the price of bookmarks, and I is income. Show that the law of demand holds using calculus.

d. Use calculus to argue whether newspapers are substitutes or complements to paperback books.

e. Use calculus to argue whether bookmarks are substitutes or complements to paperback books.

f. Suppose initially that the price of newspapers is $1, the price of bookmarks is $0.50, and income is $20,000. What is the equation for the original demand curve?

g. If the price of newspapers increases to $1.25, what is the equation for the new demand curve? In which direction has the demand curve shifted?

Solution:

a. Books are a substitute good for television shows and computer entertainment. Because there is no power for televisions or computers (effectively raising the price of these substitutes), the demand for books will rise, and the demand curve will shift out to the right. As the figure shows, this shift will result in a higher equilibrium price and quantity of books purchased.

b. Because the hurricane changes the availability (and therefore the effective price) of substitute goods, this shifts the amount of books demanded at any given price. This is a change in the demand for paperback books.

c. Since $\dfrac{\partial Q^D}{\partial P} = -0.2 < 0$, the law of demand holds.

d. Since $\dfrac{\partial Q^D}{\partial P_n} = 6 > 0$, newspapers are a substitute for paperback books.

e. Since $\dfrac{\partial Q^D}{\partial P_b} = -9 < 0$, bookmarks are a complement to paperback books.
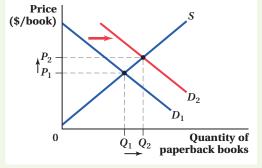
f. At these prices and income level,
$$Q^D = 300 - 0.2P + 6(1) - 9(0.50) - 0.005(20{,}000)$$
$$= 201.5 - 0.2P$$

g. At the new prices and income level,
$$Q^D = 300 - 0.2P + 6(1.25) - 9(0.50) - 0.005(20{,}000)$$
$$= 203 - 0.2P$$

This is a rightward shift of the demand curve.