The demand & supply functions are:

D(q) = –0.4q+ 23; S(q) = 0.03 q2 + 3

a. Find the equilibrium price and equilibrium quantity?

b. Then compute the consumer and producer surplus?

$$\text{Equilibrium Quantity}$$

$$D(q) = S(q)$$
$$-0.4q + 23 = 0.03q^2 + 3$$
$$3q^2 + 40q - 2000 = 0$$
$$(3q + 100)(q - 20)$$
$$\text{Equilibrium Quantity, } q_e = 20$$

$$D(20) = -0.4(20) + 23$$
$$\text{Equilibrium Price, } p_e = 15$$
$$\text{Consumer Surplus,}$$
$$\int_0^{q_e} D(q)dq - p_e q_e$$

$$\int_0^{20} -0.4q + 23dq - 15 * 20$$
$$[-0.2q^2 + 23q]_0^{20} - 300$$
$$[-0.2(400) + 23(20)] - 300$$
$$\text{Consumer Surplus, } 80$$
$$\text{Producer Surplus,}$$
$$p_e q_e - \int_0^{q_e} S(q)dq$$

$$15 * 20 - \int_0^{20} 0.03q^2 + 3$$
$$300 - [0.01q^3 + 3q]|_0^{20}$$
$$300 - [0.01(20) + 3(20)]$$
$$\text{Producer Surplus, } 160$$

Show diagrammatically the effect on the demand curve, the supply curve, the equilibrium price and the equilibrium quantity of each of the following events:

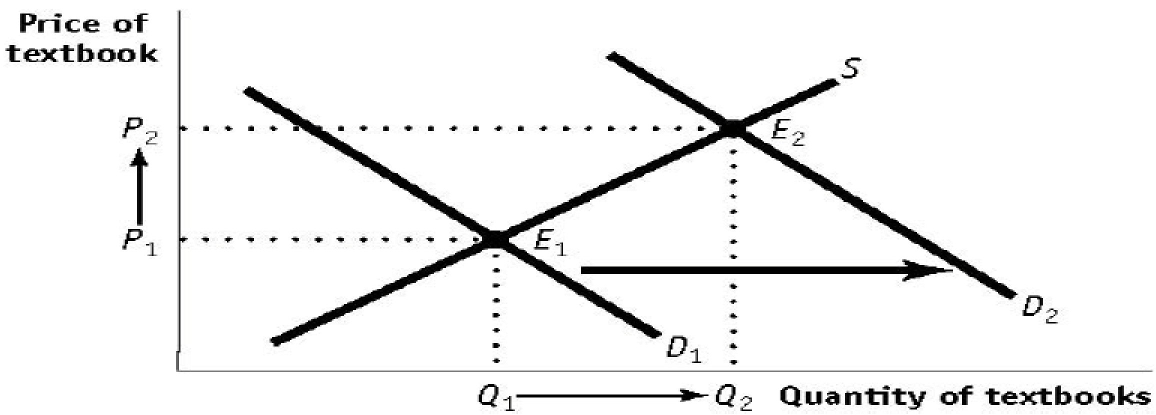
i) The market for Case and Fair economics textbook

- **a)** When your professor makes it required reading for all of his/her students.
- **b)** When printing costs for the textbook is lowered by the use of synthetic paper.

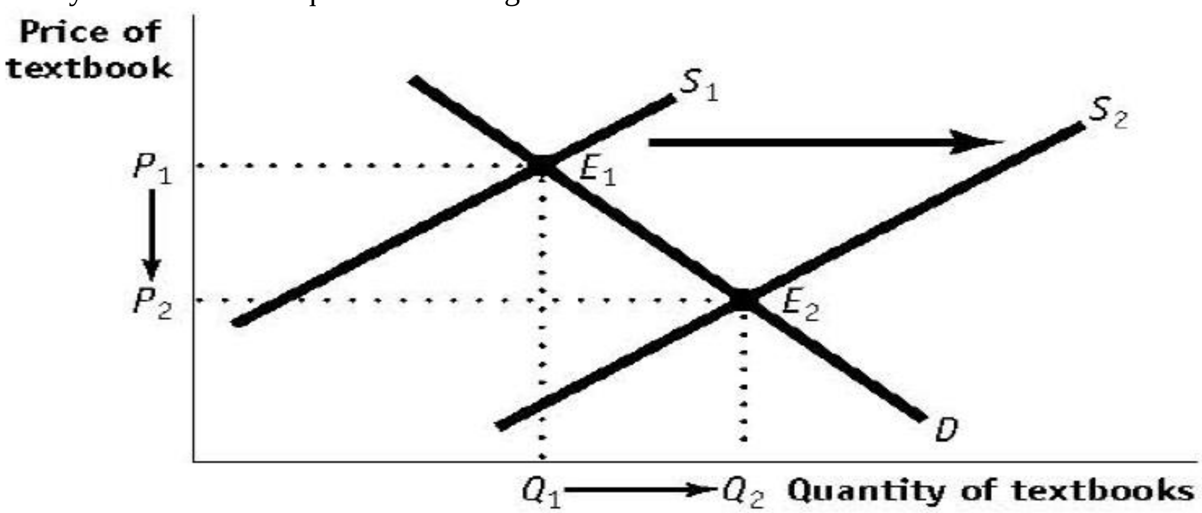
ii) The market for newspapers in your town

- **a)** When the salaries of the journalists go up.
- **b)** When a big event happened in your town which is reported in the newspapers.

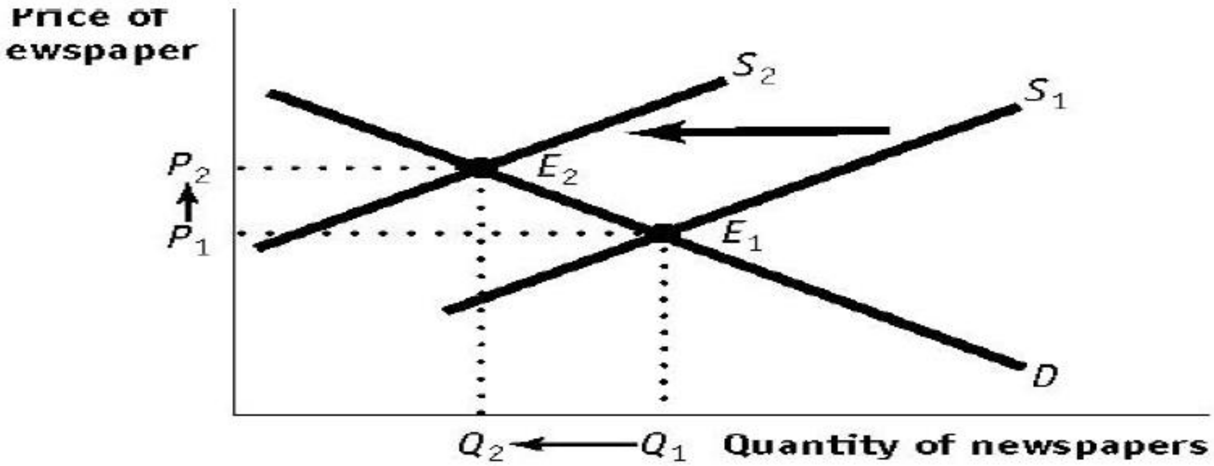
i- a) A greater quantity of textbooks will be demanded at any given price, representing a rightward shift of the demand curve from D1 to D2. Equilibrium price and quantity will rise as the equilibrium changes from E1 to E2.



i- b) The textbook publisher will offer more textbooks for sale at any given price, representing a rightward shift of the supply curve from S1 to S2. Equilibrium price will fall and equilibrium quantity will rise as the equilibrium changes from E1 to E2.



ii- a) Journalists are an input in the production of newspapers; an increase in their salaries will cause newspaper publishers to reduce the quantity supplied at any given price. This represents a leftward shift of the supply curve from S1 to S2 and results in a rise in the equilibrium price and a fall in the equilibrium quantity as the equilibrium changes from E1 to E2.



ii- b) Townspeople will wish to purchase more newspapers at any given price. This represents a rightward shift of the demand curve from D1 to D2 and leads to a rise in both the equilibrium price and quantity as the equilibrium changes from E1 to E2.