Answer on Question #59323 -Economics - Microeconomics

Given the following demand and supply functions:

QDX = 1600 - 3PX + 0.4PY - 0.3PZ + 0.003I
QSX = 500 + 15PX - 2W - 0.3R
Where: PY = $160; PZ = $55; I = $4850; W = $11; R=$145

a) What is the equilibrium price?
b) What is the equilibrium quantity?
c) Calculate the point price elasticity of demand, at the equilibrium values (using the equilibrium price and equilibrium quantity in part (a). Show your calculation.
d) Find the point income elasticity of demand. Interpret your result.

Solution

A. To calculate the equilibrium price we have to solve the equation

$$QDX = QSX$$
$$1600 - 3PX + 0{,}4PY - 0{,}3PZ + 0{,}003I = 500 + 15PX - 2W - 0{,}3R$$
$$1600 - 3PX + 0{,}4 \times 160 - 0{,}3 \times 55 + 0{,}003 \times 4850 = 500 + 15PX - 2 \times 11 - 0{,}3 \times 145$$
$$1600 - 3PX + 64 - 16{,}5 + 14{,}55 = 500 + 15PX - 22 - 43{,}5$$
$$1227{,}55 = 18PX$$
$$PX = 68{,}2$$

B. The equilibrium quantity is
$$QDX = 1600 - 3 \times 68{,}2 + 64 - 16{,}5 + 14{,}55 = 1457{,}45$$

C. The point price elasticity of demand, at the equilibrium values we use the formula:
$$E(P) = Q'(P)\frac{P}{Q(P)}$$
The first derivative of the demand function is
$$Q'(P) = -3$$
$$E = -3 \times \frac{68{,}2}{1457{,}45} = -0{,}14$$

D. The point income elasticity of demand is calculated as:

$$E(I) = Q'(I)\frac{I}{Q}$$

The first derivative of the demand function is

$$Q'(I) = 0{,}003$$

$$E(I) = 0{,}003 \times \frac{4850}{1457{,}45} = 0{,}00998 \approx 0{,}01$$

So, when income increase of 1% on the demand increases 0,01%

Answer
   a. $68,2
   b. 1457,45
   c. -0,14
   d. 0,01