

Study Question – Demand Equation

A firm's demand is described by this equation:

$$Q_d = 1100 - 5P + .1I + .2P_y$$

“I” is income of buyers

P_y is the price of another good

Currently, P is 10, I is 1000, and P_y is 20

- a) Calculate the price elasticity of demand
- b) Calculate the income elasticity of demand
- c) Calculate the cross elasticity of demand
- d) The firm is considering raising its price from 10 to 20. Calculate the price elasticity of demand between this price range.

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$$Q_d \text{ is currently } 1100 - 5(10) + .1(1000) + .2(20) = 1154$$

$$a) E_d = dQ/dP \times P/Q = -5 \times (10/1154) = -.04333$$

$$b) E_i = dQ/dI \times I/Q = .1 \times (1000/1154) = .08666$$

$$c) E_c = dQ/dP_y \times P_y/Q = .2 \times (20/1154) = .003466$$

$$\text{At a price of 20, } Q_d \text{ is } 1100 - 5(20) + .1(1000) + .2(20) = 1104$$

$$d) E_d = (1154 - 1104) / [(1154 + 1104)/2] \quad / \quad (10-20)/[(10+20)/2]$$

$$= -.06643$$