Answer on Question #74290, Economics / Microeconomics

Q: Given the demand equation,

$Q = 12{,}000 - 10P^2$

a). For this equation, write the expression for the point price elasticity of demand as a function of P

Answer:

Demand function is:

$Q = 12{,}000 - 10P^2$

The derivative of the demand function in respect to P is:

$$\frac{\Delta Q}{\Delta P} = -20P \dots\dots\dots\dots\dots (i)$$

The following is the equation for the price elasticity of demand:

$$E_P = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

$$E_P = -20P \times \frac{P}{Q}$$

$$E_P = -\frac{20P^2}{Q} \dots\dots\dots\dots\dots (ii)$$

b). over what range of prices is the demand inelastic?

Answer: Demand is in elastic when price range is (0; 10).

Firstly needs to determine quantity demanded at each associate price as below:

When Price = 0 then; Q = 12,000 When Price = 60 then; Q = 11,000

The price elasticity of demand is:

$$E_P = -10 \times \frac{0 + 10}{12000 + 11000} = -0.004$$