2015 Final Exam Q5c

A tailor is currently producing 80 suits per month and sells them for \$100 per suit. His monthly demand curve is given by $q = 100 - 2\sqrt{p}$. Find the current price elasticity of demand and use it to decide whether price should be raised or lowered to increase his revenue.

EX 2015 exam Q5c. (MER)

$q = 80$, $p = \$100$

$$q = 100 - 2\sqrt{p}$$

Find E_D and decide to raise or lower price.

Soln: $E_D = \frac{dq}{dp} \cdot \frac{p}{q}$

$$\therefore \frac{dq}{dp} = \frac{-2}{2\sqrt{p}} = \frac{-1}{\sqrt{p}} \rightarrow \therefore E = \frac{-1}{\sqrt{p}} \cdot \frac{p}{q}$$

$$= \frac{-100}{10 \cdot 80}$$

$$= -1/8$$

Since $|E_D| < 1$, they should increase the price.

2014 Final Exam Q3a

The price p (in dollars) and the demand q for a product are related by the following demand equation: $p^3 + q + q^3 = 38$. Find the price elasticity of demand in terms of p and q for this product.

$$p^3 + q + q^3 = 38$$

$E = \dfrac{dq}{dp} \cdot \dfrac{p}{q}$, so let's start by getting $\dfrac{dq}{dp}$.

$$3p^2 + \frac{dq}{dp} + 3q^2 \cdot \frac{dq}{dp} = 0$$

$$\frac{dq}{dp}\left[1 + 3q^2\right] = -3p^2$$

$$\therefore \frac{dq}{dp} = \frac{-3p^2}{1+3q^2}$$

$$\therefore \boxed{E = \frac{-3p^3}{[1+3q^2]\cdot q}}$$

2015 Midterm

Shark Inc. has determined that demand for its newest netbook model is given by

$$\ln q - \ln p + 0.005p = 4,$$

where q is the number of netbooks Shark can sell at a price of p dollars per unit. Shark has determined that this model is valid for prices $p \geq 200$. What price will maximize revenue?

Sol$^{\underline{n}}$: (Using $E_D = -1$)

$$\ln q - \ln p + 0.005p = 4$$

$$\frac{d}{dp} \quad \frac{p}{q} \cdot \frac{dq}{dp} - \frac{p}{p} + 0.005p = 0 \cdot p$$

$$E - 1 + 0.005p = 0$$

$\therefore$ ~~If~~ For max revenue, set

$$E = -1$$

$$\therefore \quad -2 + 0.005p = 0$$

$$\therefore p = \frac{2}{0.005} \boxed{= \$400}$$

2013 Final Exam Q5

q p

Currently 1800 people ride a commuter passenger ferry each day and pay \$4 for a ticket. The number of people q willing to ride the ferry at price p is determine by the relationship

$$p = \left(\frac{q-3000}{600}\right)^2.$$

The company would like to increase its revenue. Use the price elasticity of demand E_d to give advice to management on whether it should increase or decrease its price per passenger.

we need $\frac{dq}{dp}$ ...

$$1 = 2\left(\frac{q-3000}{600}\right)\left(\frac{1}{600}\right)\cdot\frac{dq}{dp}$$

$$\therefore \frac{dq}{dp} = \frac{360000}{2(q-3000)}$$

$$E = \frac{p}{q}\cdot\frac{dq}{dp} = \frac{p}{q}\cdot\left(\frac{360000}{2(q-3000)}\right)$$

$$= \frac{4}{18\cancel{00}}\cdot\frac{\cancel{3}6\cancel{0}0\cancel{0}\cancel{0}}{\cancel{2}(-12\cancel{0}\cancel{0})}$$

$$= \frac{4}{-12} = \boxed{-1/3}$$