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An electronic store can sell $q = \frac{10000}{(p+50)} - 30$ dollars phones at a price of p dollar per phone

(a) The current elastic or inelastic at this price point?

Ans: $\epsilon(p) = \frac{p}{q} \cdot \frac{dq}{dp}$, $q = 10000[(p+50)^{-1}] - 30$
 $\frac{dq}{dp} = 10000[-1(p+50)^{-2}]$

$$\epsilon(p) = \frac{p}{q} \cdot \frac{dq}{dp} = \frac{q(10000)}{(p+50)^2} \cdot \left(\frac{10000}{(p+50)} - 30\right)$$

$$p = \$150$$

$$\epsilon(150) = \frac{15}{8} > 1 \Rightarrow \text{Demand is elastic}$$

(b) If the price is lowered slightly, will revenue increase or decrease?

Elastic: If $P \downarrow$ $R \uparrow \Rightarrow$ Revenue increases.

(c) What about the profit assuming that $C'(q) > 0$ where $C(q)$ is the cost function?

$$\text{Profit} = P = R - C, \quad P'(p) = \underbrace{p'(q)}_{>0} - \underbrace{C'(p)}_{>0}$$

$$C'(p) = C(q) \cdot \left(\frac{dq}{dp}\right) \leftarrow \text{always} \text{ or given quantity}$$

$$\Rightarrow P'(p) > 0$$

$$\Rightarrow \text{Profit increases}$$