1) Suppose that you have the following demand curve:

\[ \ln Q = 8.5 - 0.35 \ln P + 0.02I \]

\( P \) is the current price and \( I \) is average income in thousands. Assume that average income is equal to $80,000 and that the current price is $45.

a) Calculate the current price elasticity and income elasticity.

\[ \varepsilon_p = \frac{\% \Delta Q}{\% \Delta P} = \frac{\Delta \ln Q}{\Delta \ln P} = -0.35 \]

\[ \varepsilon_I = \frac{\% \Delta Q}{\% \Delta I} = \frac{\Delta \ln Q}{\Delta I} I = 0.02 I = 0.02(80) = 1.6 \]

b) Suppose that average income rises by 15%. You decide that want to raise your price by 20%. What impact will this have on your sales (percentage)?

\[ \% \Delta Q = \varepsilon_p \% \Delta P + \varepsilon_I \% \Delta I \]

\[ \% \Delta Q = (-0.35)(20) + (1.6)(15) = 17\% \]

c) By how much could you raise (percentage) your price and maintain your current sale level?

\[ \% \Delta Q = \varepsilon_p \% \Delta P + \varepsilon_I \% \Delta I \]

\[ 0 = -0.35 \% \Delta P + 24 \Rightarrow \% \Delta P = 69\% \]
2) Suppose you have the following preferences for Pepsi and Coke:

\[ U(P, C) = 4C + 2P \]

a) Calculate the marginal rate of substitution for Pepsi.

\[ MRS = \frac{MU_x}{MU_y} = \frac{2}{4} = .5 \]

b) Calculate the elasticity of substitution for Pepsi.

\[ \varepsilon = \frac{\%\Delta \left( \frac{y}{x} \right)}{\%\Delta MRS} = \infty \]

c) Suppose that the price of Coke is $1.80. Sketch the demand curve for Pepsi.

\[
\begin{array}{c}
P \\
\$ .90 \\
\end{array}
\]

D

\[
\begin{array}{c}
Q \\
\end{array}
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