Study Guide 5

Applications

1. The consumption function for a small country is given by

$$C = \ln\left(\frac{e^{0.95Y}}{e^{0.2Y}+5}\right),$$

where Y is national income, measured in \$ billions.

a. How much is consumed when $Y = 10$?

b. What is the marginal propensity to consume when $Y = 10$?

c. By approximately how much will consumption increase if income increases from \$10 billion to \$10.4 billion? By how much will savings increase?

d. Compute the limit $\lim_{Y\to\infty} \frac{dC}{dY}$, and interpret the result.

2. A firm's production function is $q = 30(4m - 16)^{1/3}$, where q is measured in $1000s$ of units and m is the firm's labor input measured in 40-hour work weeks (e.g., if $m = 5$, then the firm's employees are working a combined 200 hours a week and if $m = 17.2$, then the firm's employees are working a combined 4288 hours a week). Find the *labor-elasticity of output* for this firm when $m = 20$. Use your answer to estimate the *percentage* change in output, if the firm increases its labor input by 30 hours a week.

3. The demand equation for a monopolist's product is $p = 250 - 0.2q$.

a. Find the price-elasticity of demand (as a function of q).

b. What is the price elasticity of demand when $p = \$50$? Is demand elastic, inelastic, or does demand have unit elasticity at this point?

c. Suppose that the price is lowered (from \$50) to \$49.25. Use your answer to part b. to estimate the *percentage* change in demand.

d. What effect will this change in price have on the firm's revenue? Be as precise as you can, and explain your answer.