

Practice Problem Set 3

Notes: *Please note that the questions are based on the material in Lectures 4-5. There are three questions in this practice problem set. You do not need to submit this problem set; this is only for your practice; the solutions to the problems will be posted on Canvas after Oct 23.*

Question 1: Suppose the demand function is

$$q^D(p) = Kp^{-c},$$

where K and c are positive constants. What is the elasticity of demand? When is demand elastic?

Question 2: Consider a monopoly with cost function

$$C(q) = 100 + 80q - 50q^2 + 0.5q^3,$$

and the demand set for its product is

$$D = \{(q, p) | 2p + q^2 - 20q = 100\}.$$

Find the level of production that maximizes the firm's profit if the upper limit on its output is

(a) 30

(b) 50

Question 3: Suppose that there is an efficient, perfectly competitive firm that cannot produce more than 6 units of its product each week. The cost function is

$$C(q) = 100 + 20q - 6q^2 + q^3$$

Determine

(a) the fixed cost

(b) the profit function

(c) the startup point

(d) the equation that needs to be satisfied at the breakeven point (*note that the question does not ask you to exactly find the breakeven point because it requires solving a cubic equation, and that is beyond the scope of this course.*)