1) A monopolist can segment its market into two sub-markets, call them 1 & 2. The demand in the submarkets is:

\[ P_1 = 20 - \frac{q_1}{2} \] \& \[ P_2 = 35 - q_2. \]

Also, \( C = 200 + 5Q \), with \( Q = q_1 + q_2. \)

a) Find the profit-maximizing \( P_1, P_2, q_1, q_2, \) & \( \pi \), & find \( E^D_p \) in each sub-market at the profit-maximizing \( P \) & \( q. \)

b) Which sub-market gets the lowest \( P? \) Why?

c) If the firm’s capacity is 25, find the profit-maximizing \( P_1, P_2, q_1, q_2, \) & \( \pi. \)

2) Using Figure 1, should the firm that can divide its buyers into two sub-markets sell 40 units in sub-market 1 & 60 units in sub-market 2?

3) Suppose a monopolist has demand of \( P = 340 - Q, \) & \( C = 40Q. \) Find the profit-maximizing \( P, \) \( Q, \) & \( \pi \) when:

a) the firm can not 2-part price; &

b) the firm can 2-part price & all consumers are identical. In this part find the optimal entry fee (f) if there are N consumers.

4) In Figure 2, there are 2 types of consumers, Alphas & Betas. If the seller can not segment its market, what will the prices for quality levels 1 & 2 (\( P_1 \) & \( P_2 \)) equal? If the seller can degrade lower quality to some level \( x_0 < x_1, \) when will it be profitable to do so, & what will \( P_0 \) & \( P_2 \) be?