

Problem 1

$$\text{a) Total market demand } Q = \begin{cases} 0, P > 60 \\ 144000 - 2400P, 50 < P \leq 60 \\ 194000 - 3400P, P \leq 50 \end{cases}$$

b) 1 case: both groups are served

$$\pi = (194000 - 3400P) \times P - 5000 - 20 \times (194000 - 3400P) \rightarrow \max(P)$$

$$\text{FOC: } 194000 - 6800P + 68000 = 0 \Rightarrow P = \frac{655}{17} = 38,53 \Rightarrow \pi = \frac{315}{17} \times 63000 - 5000 = \frac{19760000}{17} = 1162352,94$$

2 case: only high-valuation group is served (type 2)

$$\pi = (144000 - 2400P) \times (P - 20) - 5000 \rightarrow \max(P)$$

FOC:  $144000 - 4800P + 48000 = 0 \Rightarrow P = 40$ . But at this price consumers of type 1 also buy the good. Thus, we should consider 1 case.

$$\text{c) } \pi = (144000 - 2400P_1) \times (P_1 - 20) + (50000 - 1000P_2) \times (P_2 - 20) - 5000 \rightarrow \max(P_1, P_2)$$

$$\text{FOC: } \begin{cases} 144000 - 4800P_1 + 48000 = 0 \\ 50000 - 2000P_2 + 20000 = 0 \end{cases}$$

$$\Rightarrow P_1 = 40; P_2 = 35 \Rightarrow \pi = 48000 \times (40 - 20) + 15000 \times (35 - 20) - 5000 = 1180000$$

d) Profit is higher in part (c). Profit cannot be lower under third-degree price discrimination compared to uniform pricing because a price discriminating monopolist is free to set prices equal across markets. Therefore, he has at least as much profit under price discrimination as under uniform pricing.

Problem 2

Price discrimination can never make the monopolist worse off as this essentially gives it more flexibility. However, in this particular case the monopolist would set identical prices to the two groups no matter if it can or cannot price discriminate. Hence, profits are also the same and the monopolist is indifferent.