

## 9.4 Menu Pricing Example

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$$P_H = 20 - 2q_H \quad P_L = 20 - 4q_L \quad n_L = 4 \quad n_H = 2 \quad MC = 2$$

$$P_L = 20q_L - 2q_L^2 \quad P_L = V(q_L)$$

$$20q_H - q_H^2 - P_H = 20q_L - q_L^2 - P_L \quad V_H(q_H) - P_H = V_H(q_L) - P_L$$

$$20q_H - q_H^2 - 20q_L - q_L^2 + 20q_L - 2q_L^2 = P_H$$

$$\hookrightarrow P_H = 20q_H - q_H^2 - q_L^2$$

$$\pi = \underset{n_H}{2}(20q_H - q_H^2 - q_L^2) + \underset{n_L}{4}(20q_L - q_L^2) - 2[4q_L + 2q_H]$$

$$\frac{d\pi}{dq_H} = 2(20 - 2q_H) - 2(2) = 0 \quad \rightarrow q_H = 9$$

$$\frac{d\pi}{dq_L} = 2 \cdot 2q_L + 4(20 - 4q_L) - 2(4) = 0 \quad \rightarrow q_L = 3.6$$

$$P_L = 20(3.6) - 2(3.6^2) = 46.08$$

$$P_H = 20(9) - 9^2 - 3.6^2 = 86.04$$