Problem 1

A grocery store sells vegan cookies. Vegans have high valuation for vegan cookies, but non-vegans low valuation for vegan cookies. Specifically, the grocery store can sell a bag with 20 cookies and/or a bag with 10 cookies. One bag per customer. Non-vegans don't want 20 cookies, but vegans are interested in both the 10- and 20-cookie bag.

Let P_X denote the price of a bag of X cookies. (For example, P_{10} is the price of a 10-cookie bag.) A vegan has a cookie utility function of

$$U_H(X) = 8X - P_X, \quad X \in \{10, 20\},$$

and a non-vegan has a cookie utility function of

$$U_L(X) = 6X - P_X, \quad X \in \{10\}.$$

The proportion of vegans is α and the marginal cost of a vegan cookie is 4. Finally, suppose the store can prevent resale. (Perhaps they force you to eat them all right then and there because they are super-exclusive cookies and they don't want their secrets leaked.)

(a) Explain why the grocery store cannot engage in third-degree price discrimination.

(b) Express profit as a function of α if the grocery store sells only 20-cookie bags.

(c) Express profit as a function of α if the grocery store decides to sell 10-cookie bags to non-vegans and 20-cookie bags to vegans.

(d) Determine for which values of α the grocery store should target only vegans, and for which the grocery store should target both types of buyers.

Problem 2

State whether the following claims are true or false and explain why.

(a) A firm selling a good to consumers in two cities should set a higher markup in the city in which demand for the product is elastic.

(b) Two firms are geographically differentiated (e.g., gas stations on opposite sides of Davis). If travel costs decline, we should expect the cross-price elasticities of the two products to become more positive.

(c) A monopoly that can engage in first-degree price discrimination sells more units of a good than a monopoly that cannot price discriminate.

(d) Relative to a monopoly that can't price discriminate, first-degree price discrimination lowers welfare.

(e) Relative to the case in which a firm must charge the same price to everyone, third-degree price discrimination makes the firm better off, but all consumers worse off.

(f) The Nash equilibrium of a prisoner's dilemma has the highest combined payoffs.