ECO630 Contract Theory

Exercise 1 (Adverse Selection — 25 points)**.** Consider a second-hand car market. The quality q of the car can be low (L) or high (H), that is, $q \in \{L, H\}$. The seller and buyer's value for different quality is given in Table 1. The seller knows the quality of the

	$q = L$	$q = H$
v_s	30	60
v_b	40	100

Table 1: Distribution of Values

car while the buyer knows that with probability p the quality is L, with probability $1-p$ the quality is H. Suppose the seller makes a take-it-or-leave-it offer (a single price).

1. What is the equilibrium price if $p = \frac{1}{2}$?
2. What is the equilibrium price if $p = \frac{3}{4}$?

Exercise 2 (Price Discrimination—35 points)**.** Suppose a monopolist with constant unit cost (normalized to zero) serves one customer whose inverse demand is either $P_1(x) = 2-x$ or $P_2(x) = 4 - x$, so that $U_1(T, x) = 2x - \frac{1}{2}x^2 - T$ and $U_2(T, x) = 4x - \frac{1}{2}x^2 - T$ if the customer consumes x units and pays a total price T. The customer knows whether he is type 1 or 2, and his reservation utility is normalized to zero.

1. Determine the first-best price-quantity combinations $\widetilde{M} = \{(\tilde{T}_1, \tilde{x}_1), (\tilde{T}_2, \tilde{x}_2)\}$.

For the following questions, the monopolist only knows that the customer is of type 1 and type 2 with equal probability.

2. Suppose the monopolist offers $\widetilde{M}$ to the customer. What is the monopolist's profit? Is $\widetilde{M}$ optimal for the monopolist? Why (not)?
3. Suppose the monopolist offers a single two-part tariff (f, t) where f denotes the fixed price, and t the variable unit price. Derive the optimal tariff.