**Mathematical Economics – Fake Exam 2020**

**Questions**

1) Assume that you want to sell your house in the real estate market but the offers by the customers are uncertain. The house prices (per m2) are uniformly distributed over [4000TL, 8000TL]. Suppose you will receive offers from two randomly chosen customers. The first customer offers 5500TL per m2.

1. What is the probability that you will get a lower offer from the second customer?
2. If you plan to sell your house to the highest bidder, what is the expected price that you will get?

2) Consider a group of drivers that have different probabilities of having an accident. Individuals of type H have a probability of having an accident of pH = 0.1. These individuals form 3/4 of the population. Individual of type L, the remaining 1/4 of the population, have a probability of having an accident of pL =0.05. Any individual who has an accident suffers an income loss of 8000TL. For each type the maximal insurance premium that they are willing to pay is 1/3 above their expected losses. Assume that there is asymmetric information: insurance ﬁrms cannot distinguish between the types of drivers. The same insurance contract must be offered to all individuals.

1. If the contract is to earn an expected proﬁt of zero, what insurance premium must be charged?
2. Is this competitive outcome efficient?

3) Suppose that the prevalence of European ancestry in Turkey is 30%. 23andMe is a private company that offers genetic tests which determine ancestry with 95% accuracy. If your 23andMe tests tells that you have an European lineage, what is the probability that your grandparents come from Europe?

4) Consider an economy where Ahmet and Hakan consume two goods, x and y. Assume that the utility function of Ahmet is

and the utility function of Hakan is

The initial endowments of Ahmet is . The initial endowments of Hakan is . The prices of x and y are and .

1. Find the competitive equilibrium.
2. Draw the Edgeworth box of this economy and show the competitive equilibrium and the initial endowments.
3. The equilibrium is efficient. Why? Explain.