Exercises

1) Consider the insurance market model that we discussed in the class. The probability of accident for a car owner is $\theta \in [0,1]$. The probability density function of θ is

$$PDF = a\theta.$$

a) What is a? (Hint: $CDF = \int PDF$ and $Pr(0 \leq \theta \leq 1) = 1$.)

b) Assume that the highest insurance premium that a car owner would pay is $(1 + a)\theta$. What is the expected damage for a randomly chosen insurance customer when the insurance premium is p? Formally, compute:

$$E[\theta|\theta \geq p/(1 + a)].$$

c) If the insurance companies make zero profit, what is the equilibrium level of the insurance premium, p? In other words, what is the solution to

$$p - E[\theta|\theta \geq p/(1 + a)] = 0.$$

d) Based on your solution to part (b), what is the expected number of people who would buy the car insurance?

e) Suppose that an insurance company slightly decreases its premium to attract more customers. Explain why this is a bad idea.

2) Suppose that you are looking for a job. The wage is, however, uncertain. In particular, the monthly wages in the market vary between 3 (thousand TL) and 6 (thousand TL) for a recent college graduate. The probability density function (PDF) of wages is

$$PDF = a \times (w - 3)(6 - w)$$

a) What is a? (Hint: $CDF = \int PDF$ and $Pr(3 \leq w \leq 6) = 1$.)

b) You go to your first job interview. What is the probability that the offer will be less than 5?

c) In your first interview your offer was indeed 5. Now you go to your second job interview but there will not be a third interview. Assuming you will accept the highest offer, what is the expected value of your wage before the second interview?