**Economic Modeling – list 4**

**1.** Probability that a randomly chosen product in a shop has expired is 0,1. Calculate the probability that for 5 chosen products expired:

1. at most 2,
2. exactly 2 ,
3. at least 3,
4. none,
5. more than 3.

Define the random variable and its distribution. Calculate expected value and variance.

**2.** 25% of damage insurance are due to robbery. What is the probability that among 10 damages there are:

1. no robberies,
2. more than 3 but not more than 6 robberies,
3. 3 robberies?

**3.** 3% of cars in Poland has an ASR (Acceleration Slip Regulation) system. One day a diagnostic station has checked 200 cars. What is the probability that:

1. 2 cars had ASR,
2. more than 2 cars had ASR,
3. none of cars had ASR?

**4.** The are 2:1 odds to leave casino as a loser. Calculate the expected value and the dispersion for 60 randomly chosen players.

**5.** LeBron James scores 75% of free throws. What is the probability that he will score:

1. all of 10 free throws,
2. at the third attempt?

**6.** We draw 5 cards from a deck. What is the probability that we get at least 3 spades?

**7**. The waiting time for the order realization in the pizzeria is a random variable and ranges from 15 to 35 minutes. Assuming that the probability of receiving the ordered food is uniform distributed, determine a distribution density function of the waiting time for a pizza. Specify what is the expected waiting time. Calculate the probability of that someone will wait between 20 to 25 minutes.

**8**. The uptime of a device (in hours) is a random variable with exponential distribution with parameter λ = 0.5. Calculate:

1. expected value,
2. standard deviation,
3. probability that the uptime is greater than 5 hours.

**9**. Time of service in a bank – X – is exponential distributed with the mean of 4 minutes.

a) Find variance and median,

b) Find: P(X > 10), P(X > 8), P(2< X < 6),

c) Find x0 fir which: P(X > x0) = 0,4, P(X < x0) = 0,3,

**10**. A random variable X is standard normal distributed. Find u for which:

P(X < u) = 0,1; P(X > u) = 0,025; P(X > u) = 0,8