**Economic Modeling – list 5**

**1** Suppose we play at a slot machine whose winnings are normally distributed with mean $0 and standard deviation $1. What is the probability of winning:

a) less than $1,

b) between 50 cents and $1.50?

**2.** Average taxi time at Wrocław airport is 19.3 minutes, with a standard deviation of 7.3 minutes. Suppose that taxi time is normally distributed. What percentage of flights are on the runway for at least 30 min.?

**3.** Let X - amount of time (in minutes) a postal clerk spends with his customer. The time is known to have an exponential distribution with the average amount of time equal to 4 minutes.

a) find mean and median

b) Find the probability that a clerk spends four to five minutes with a randomly selected

customer.

**4.** Suppose that the amount of time one spends in a bank is exponentially distributed with mean 10 minutes. What is the probability that a customer will spend more than 15 minutes in the bank?

**5**. If X is a normal random variable with mean (m) 100 and standard deviation (σ) 6 find:

a) P(X<106), P(X > 96)

b) u if:

- P(X < u) = 0.75,

- P(X > u) = 0.4.

**6.** Given a normal distribution of values for which the mean is 70 and the standard deviation is 4.5. Find:  
    a) the probability that a value is between 65 and 80, inclusive.  
    b) the probability that a value is greater than or equal to 75.  
    c) the probability that a value is less than 62.

**7**. T23 follows a Students distribution with 23 degrees of freedom.

1. Calculate probability that: P(-1.06 < T23 < 2.5).
2. Find tα, if:

- P(T23 < tα) = 0,8;

- P(| T23 | < tα) = 0,9.

**8**. χ220 follows a chi-square distribution with 20 degrees of freedom.

a) Calculate probability that: P(8,26< χ220 < 31,41).

b) Find χ2α, if:

- P(χ220 > χ2α) = 0.8;

- P(|χ220| > χ2α) = 0,9.

**9**. F4,6 follows F distribution with 4 and 6 degrees of freedom.

a) Calculate probability that P(0.2 < F4,6  < 4). Hint: use Excel function.

b) Find Fα, if P(F4,6 > Fα) = 0,05.

**10**. The milk carton has a capacity of 1l +/-1% (standard deviation). What is the probability that the average capacity of 100 randomly selected cartons does not exceed 0.99l?