**Economic Modeling – list 3**

**1.** A fair coin is tossed three times and the events A and B are defined as follows:

***A:*** At least one head is observed

B: The number of heads observed is odd

Find P(A), P(B), P(A  B), P(), and P()

**2**. In the group of 100 men - five of them don’t speak German. In the group of 10 000 women - 25 of them don’t speak German. The pollster have to choose one person, which doesn’t speak German. Find the probability, that the person which was chosen doesn’t speak German.

**3**. ,  , .

a) Are the events A and B independent?

b) Find: , , , P(A|B), , , , 

**4** The sets A, B, and S are defined as follows:

 ,



Find:  ,  , , , 

**5**. There are white and green balls in the box. You have to choose three times one ball, but after every drawing you put the drawn ball back (sampling with replacement). The events A and B are defined as follows:

A: you chose at least one white ball

B: you chose at least two green balls.

Find: ,  ,  , , , , B-A

**6.** There are 4 white balls and two black. We sample without replacement two balls . Find the probabilities:

a) two balls will be black

b) the first ball will be white and the second – black.

**7**. A discrete random variable X can assume five possible values: 2,3,5,8, 10. Probability distribution is shown in table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | 2 | 3 | 5 | 8 | 10 |
| p(x) | 0,15 | 0,10 | ? | 0,25 | 0,25 |

**a.** What is p(5)?

b. What is ?

**8.** The random variable ***x*** has the following discrete probability distribution:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| X | 1 | 3 | 5 | 7 | 9 |
| p(x) | 0,1 | 0,2 | 0,4 | 0,2 | 0,1 |

Find: ; P(X < 3); P(X = 7); ; P(x > 2);.

**9**. Consider the probability distribution shown here.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | 1 | 2 | 4 | 6 |
| p(x) | 0,2 | 0,4 | 0,2 | 0,2 |

Find E(X) ,  and 

**10**. Win in the two lotteries A and B are described as follows:

***pi***

***pi***

0,4

0,3 0,3 0,3

0,2 0,2

**A:** 0,1 0,1 **B:** 0,1

***X*** 0  ***X***

0 1 2 3 4 0 1 2 3 4

Find the cumulative distribution function for variable X and Y