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| **Описание: logo_unec****AZƏRBAYCAN DÖVLƏT İQTİSAD UNİVERSİTETİ** |
| **BEYNƏLXALQ İQTİSADİYYAT MƏKTƏBİ** |
| **BEYNƏLXALQ İQTİSADİYYAT (İNGİLİS DİLLİ) KAFEDRASI**Fənn: Sosiologiya Müəlim: Kaul MəmmədovQrup: 1044; 1063 **İMTAHAN SUALLARI** |

Mövzu 1: Basic probability theorems.

1. Addition theorem.

2. Geometric probability. Probability of the sum of joint events.

3. Multiplication theorem.

4. Conditional probability theorem.

5. Total probability theorem.

6. Bayes formula.

Mövzu 2: Discrete random variable.

7. Repeat test theorem.Binomial distributive law.

8. Mathematical expectation of a discrete random variable.

9. The expectation of the binomial distribution.

10. Centre of probability distribution.

11. Mathematical expectation of deviation of a discrete random variable.

12. Dispersion theorem for a discrete random variable.

13. Mathematical expectation and variance of a constant value.

14. Function of a random variable, its mathematical expectation and variance.

Mövzu 3: Problems on the classical definition of probability.

15. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls all will be of different colours.

16. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be 2 white, 1 black and 1 red.

17. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be 2 white, 1 blue and 1 red.

18. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be 1 white, 1 blue and 2 black.

19. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be 1 white, 1 black and 2 red.

20. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be 2 black, 1 blue and 1 red.

21. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be 1 black, 1 blue and 2 red.

22. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be at least 3 whites.

23. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be at least 3 blacks.

24. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be at least 3 reds.

25. In the urn there are 20 white, 15 black, 10 red and 5 blue balls. Find the probability that among the randomly taken out 4 balls will be at least 3 blues.

Mövzu 1: Continuous random variable and its characteristics

1. Continuous random variable. The probability of a continuous random variable falling into an open interval, a point and a closed interval.

2. Integral law of distribution, its properties and graph.

3. The probability of a random variable falling into a given interval under the integral distribution law.

4. Law of uniform density.

5. Geometric probability for the one-dimensional case.

6. The integral distribution law with uniform density and its graph.

7. The mathematical expectation of a continous random variable with a symmetric distribution density.

8. The mathematical expectation of the deviation of a continous random variable. Mathematical expectation of constant value.

9. Theorem on the variance of a continuous random variable. Variance of constant value.

10. The theorem on the median of a continous random variable with a symmetric distribution density.

Mövzu 2: Normal distribution law.

11. Density of the normal distribution, its properties and graph. The mode and median of normal distribunion.

12. Theorem on the density of the normal distribution.

13. The mathematical expectation of a continuous random variable with a normal distribution.

14. Variance and the quadratic deviation of a continuous random variable with a normal distribution law.

15. The error integral, its properties and the graph.

16. The probability of a continuous random variable falling into a given interval under a normal distribution.

17. The probability of a continuous random variable falling into a symmetric interval under a normal distribution.

Mövzu 3: Additional probability problems.

18. In 2 urns there are 10 balls. In the 1st urn 8 white and 2 black, in the 2nd urn 7 white and 3 black. Randomly removes 1 ball from each urn. What is the probability that there are at least 1 white among the taken out 2 balls.

19. In the urn of 100 balls, 10 balls are white. What is the probability that among the randomly drawn 4 balls 3 will not be white.

20. The probability of removing a white ball from an urn during each test is 0.1. What is the probability that there will not be a single white ball in 3 trials.

21. 4 independent tests are carried out. The probability of occurrence of event A for each test is 0.5. Determine the probability that event A will appear at least 2 times.

22. 5 independent tests are carried out. The probability of occurrence of event A at each test is 0.2. For the occurrence of event A there are enough 3 tests. Determine the probability of occurrence of the event A.

23. The probability of occurrence of event A for each test is 0.4. What is the probability that event A will occur 2 times in 2 trials?

24. 3 independent tests are carried out. The probability of occurrence of event A at each test is 0.3. Determine the probability that event A will occur at least once.

25. 1 test is carried out. The probability of the event A is 0.6. Determine the varipance of the random value of the number of occurrences of event A.

Mövzu 1: Laplace functions

1. The integral function (law) of the normal distributive law, its properties and the graph.

2. The 3σ rule.

3. The Laplace function and its connection with the error (probability) integral.

4. An expression for the probability of a continuous random variable falling under a normal distribution law at a given interval through the Laplace function.

5. Median (probable) deviation (error).The number ρ.

6. The expression for the probability of a continuous random variable falling under a normal distribution law at a given interval through the numbers E and ρ.

7. The reduced Laplace function.The expression for the probability of a continuos random variable falling under a normal distribution law at a given interval through the reduced Laplace function.

8. The 4E rule.

9. Scale of error dispersion.

10. The average arithmetic error.

11. The measure of accuracy. The relationship between error distribution characteristics.

Mövzu 2: Problems on the numerical characteristis of random variables

12. The random variable x is subject to the normal distribution law with a scattering center a=0.5 and variance σ2=$ \frac{1}{8}$. Determine, through the error integral, the probability that the value of the random variable x falls into the interval (0,4;0,6).

13. Determine, through the error integral, the probability of falling into a strip of width 3.5 meters if the shooting errors obey the normal distribution law with the parameters a=0 and σ =1.9.

14. 1 shot is produced on a 100-meter-wide strip. Dispersion obeys the normal law with a probable deviation over a range of 20 meters. Determine the probability of falling into this band on the scale of error dispersion.

15. The error of the instrument for measuring the range obeys the normal law with a mean error of E=10 meters. Determine on the scale of error dispersion the probability that the range determined by this device will deviate from the true no more than 15 meters.

16.The probability distribution table is:

 x 1 2 3

 p p1 p2 p3

M[x]=2.3 ; M[x2]=5.9.

Find the probabilities p1,p2,p3 .

17. Find the variance of the discrete random variable x from the probability distribution table:

 x -5 2 3 4

 p 0.4 0.3 0.1 0.2

18. Find the variance of the discrete random variable x from the probability distribution table:

 x -2 0 3 4

 p 0.4 0.3 0.1 0.2

19. A continuous random variable x is given by a function f(x) =$ \frac{2}{3}\sin(3x)$ in the interval (0;$\frac{π}{3}). $Find the probability that x will take a value belonging to the interval ($\frac{π}{6};\frac{π}{4}).$

20. Find the probability that a random variable x falls into the interval (2.5;3), if

 F(x) = $\left\{\begin{array}{c}0 for x<2,\\(x-2)^{2} for 2\leq x\leq 3\\1 for x>3,\end{array}\right.,$

where F(x) is the antiderivative of the distribution density.

21. The random variable x is given by a function f(x)=2x2 in the interval (0;1), and outside this interval f(x)=0. Find the mathematical expectation of a random variable.

22.The random variable x is given by an integral distribution function:

 F(x)=$\left\{\begin{array}{c}0 for x\leq -1,\\\frac{3}{4}\left(x+1\right) for -1<x\leq \frac{1}{3}\\1 for x>\frac{1}{3}.\end{array}\right.$,

Find the probability that, as a result of the test, the value of x will assume the value enclosed in the interval (0;$\frac{1}{3})$.

23. The probability density of a random variable x is given:

 f(x) = $\left\{\begin{array}{c}0 for x<0,\\x-\frac{1}{4}x^{3} for 0\leq x\leq 2,\\0 for x>2.\end{array}\right.$

Find the median of the distribution density.

24. Find the variance of the random variable x given by the probability distribution table:

 x 2 3 5

 p 0.1 0.6 0.3

25.The random variable x is given by an integral distribution function:

 F(x)=$\left\{\begin{array}{c}0 for x<0,\\ x for 0\leq x\leq 1\\0 for x>1.\end{array}\right.,$

Find the variance of the random variable.