

TASKS for the independent work

VARIANTS	
1	Віслогузова Анастасія Сергіївна
2	Гікалова Марія Вікторівна
3	Гречаник Уляна Максимівна
4	Лемба Ілля Віталійович
5	Облог Маргарита Віталіївна
6	Реброва Ксенія Артемівна
7	Рибальченко Дар'я Андріївна
8	Циганков Андрій Сергійович

Variant 1

Task 1. A distribution law of a discrete random variable X is given.

- 1) Calculate a mathematical expectation $M(X)$, $M(X^2)$, a variance $D(X)$ (using 2 ways) and a root-mean-square deviation $\sigma(X)$, a mode $Mo(X)$, a median $Me(X)$.
- 2) Find a distribution probability function $F(X)$ and draw its graph.
- 3) Calculate the following probabilities: $P(7 < X < 20)$.
- 4) Draw the distribution polygon.

X	1	5	9	11	18	23	25
P	0,19	0,24	0,12	0,10	0,19	0,06	0,10

Task 2. The random variable X is the number of occurrences of the event A in 7 independent trials. The probability of the occurrence of the event A in each trial equals **0,22**. Tasks:

- 1) construct the binomial distribution law of a random variable X ;
- 2) draw the distribution polygon of a random variable X ;
- 3) calculate a mathematical expectation $M(X)$, a variance $D(X)$ and a root-mean-square deviation $\sigma(X)$ of a random variable X .

Task 3. The mathematical expectation of a normal random variable equals a , the root-mean-square deviation equals σ .

- a) Define the variance $D(X)$ and the variation coefficient $v(X)$;
- b) find formulas of functions $f(x)$ and $F(x)$;
- c) plot graphs of $f(x)$ and $F(x)$;
- d) the probability that a random variable X lies in the interval $(\alpha; \beta)$;
- e) find limits of all values of variable X on the interval $(a \pm 3\sigma)$ with the probability 99,73% (approximately equals 100 %) using *three sigma rule*

No	a	σ	$(\alpha_1; \beta_1)$	ϵ
Variant 1	30	6	(23, 35)	2

TASKS for the independent work

Variant 2

Task 1. A distribution law of a discrete random variable X is given.

- 1) Calculate a mathematical expectation $M(X)$, $M(X^2)$, a variance $D(X)$ (using 2 ways) and a root-mean-square deviation $\sigma(X)$, a mode $Mo(X)$, a median $Me(X)$.
- 2) Find a distribution probability function $F(X)$ and draw its graph.
- 3) Calculate the following probabilities: $P(20 < X < 30)$.
- 4) Draw the distribution polygon.

X	2	7	9	13	19	21	26
P	0,15	0,17	0,13	0,12	0,06	0,13	0,24

Task 2. The random variable X is the number of occurrences of the event A in 7 independent trials. The probability of the occurrence of the event A in each trial equals 0,39. Tasks:

- 1) construct the binomial distribution law of a random variable X ;
- 2) draw the distribution polygon of a random variable X ;
- 3) calculate a mathematical expectation $M(X)$, a variance $D(X)$ and a root-mean-square deviation $\sigma(X)$ of a random variable X .

Task 3. The mathematical expectation of a normal random variable equals a , the root-mean-square deviation equals σ .

- a) Define the variance $D(X)$ and the variation coefficient $v(X)$;
- b) find formulas of functions $f(x)$ and $F(x)$;
- c) plot graphs of $f(x)$ and $F(x)$;
- d) the probability that a random variable X lies in the interval $(\alpha; \beta)$;
- e) find limits of all values of variable X on the inter($a \pm 3\sigma$) with the probability 99,73% (approximately equals 100 %) using *three sigma rule*

No	a	σ	$(\alpha_1; \beta_1)$	ε
Variant 2	21	7	(11, 19)	3

TASKS for the independent work
Variant 3

Task 1. A distribution law of a discrete random variable X is given.

- 1) Calculate a mathematical expectation $M(X)$, $M(X^2)$, a variance $D(X)$ (using 2 ways) and a root-mean-square deviation $\sigma(X)$, a mode $Mo(X)$, a median $Me(X)$.
- 2) Find a distribution probability function $F(X)$ and draw its graph.
- 3) Calculate the following probabilities: $P(10 < X < 24)$.
- 4) Draw the distribution polygon.

X	2	5	9	11	17	20	24
P	0,27	0,17	0,10	0,08	0,26	0,07	0,05

Task 2. The random variable X is the number of occurrences of the event A in 7 independent trials. The probability of the occurrence of the event A in each trial equals **0,71**. Tasks:

- 1) construct the binomial distribution law of a random variable X ;
- 2) draw the distribution polygon of a random variable X ;
- 3) calculate a mathematical expectation $M(X)$, a variance $D(X)$ and a root-mean-square deviation $\sigma(X)$ of a random variable X .

Task 3. The mathematical expectation of a normal random variable equals a , the root-mean-square deviation equals σ .

- a) Define the variance $D(X)$ and the variation coefficient $v(X)$;
- b) find formulas of functions $f(x)$ and $F(x)$;
- c) plot graphs of $f(x)$ and $F(x)$;
- d) the probability that a random variable X lies in the interval $(\alpha; \beta)$;
- e) find limits of all values of variable X on the interval $(a \pm 3\sigma)$ with the probability 99,73% (approximately equals 100 %) using *three sigma rule*

No	a	σ	$(\alpha_1; \beta_1)$	ϵ
Variant 3	24	6	(11, 18)	4

TASKS for the independent work
Variant 4

Task 1. A distribution law of a discrete random variable X is given.

- 1) Calculate a mathematical expectation $M(X)$, $M(X^2)$, a variance $D(X)$ (using 2 ways) and a root-mean-square deviation $\sigma(X)$, a mode $Mo(X)$, a median $Me(X)$.
- 2) Find a distribution probability function $F(X)$ and draw its graph.
- 3) Calculate the following probabilities: $P(18 < X < 24)$.
- 4) Draw the distribution polygon.

X	2	7	8	11	17	21	26
P	0,09	0,21	0,28	0,06	0,12	0,11	0,13

Task 2. The random variable X is the number of occurrences of the event A in 7 independent trials. The probability of the occurrence of the event A in each trial equals **0,23**. Tasks:

- 1) construct the binomial distribution law of a random variable X ;
- 2) draw the distribution polygon of a random variable X ;
- 3) calculate a mathematical expectation $M(X)$, a variance $D(X)$ and a root-mean-square deviation $\sigma(X)$ of a random variable X .

Task 3. The mathematical expectation of a normal random variable equals a , the root-mean-square deviation equals σ .

- a) Define the variance $D(X)$ and the variation coefficient $v(X)$;
- b) find formulas of functions $f(x)$ and $F(x)$;
- c) plot graphs of $f(x)$ and $F(x)$;
- d) the probability that a random variable X lies in the interval $(\alpha; \beta)$;
- e) find limits of all values of variable X on the inter($a \pm 3\sigma$) with the probability 99,73% (approximately equals 100 %) using *three sigma rule*

No	a	σ	$(\alpha_1; \beta_1)$	ϵ
VARIANT 4	19	5	(17, 30)	2

TASKS for the independent work
Variant 5

Task 1. A distribution law of a discrete random variable X is given.

- 1) Calculate a mathematical expectation $M(X)$, $M(X^2)$, a variance $D(X)$ (using 2 ways) and a root-mean-square deviation $\sigma(X)$, a mode $Mo(X)$, a median $Me(X)$.
- 2) Find a distribution probability function $F(X)$ and draw its graph.
- 3) Calculate the following probabilities: $P(15 < X < 25)$.
- 4) Draw the distribution polygon.

X	2	7	8	11	17	21	26
P	0,09	0,21	0,28	0,06	0,12	0,11	0,13

Task 2. The random variable X is the number of occurrences of the event A in 7 independent trials. The probability of the occurrence of the event A in each trial equals **0,36**. Tasks:

- 1) construct the binomial distribution law of a random variable X ;
- 2) draw the distribution polygon of a random variable X ;
- 3) calculate a mathematical expectation $M(X)$, a variance $D(X)$ and a root-mean-square deviation $\sigma(X)$ of a random variable X .

Task 3. The mathematical expectation of a normal random variable equals a , the root-mean-square deviation equals σ .

- a) Define the variance $D(X)$ and the variation coefficient $v(X)$;
- b) find formulas of functions $f(x)$ and $F(x)$;
- c) plot graphs of $f(x)$ and $F(x)$;
- d) the probability that a random variable X lies in the interval $(\alpha; \beta)$;
- e) find limits of all values of variable X on the interval $(a \pm 3\sigma)$ with the probability 99,73% (approximately equals 100 %) using *three sigma rule*

No	a	σ	$(\alpha_1; \beta_1)$	ε
Variant 5	20	7	(19, 26)	5

TASKS for the independent work
Variant 6

Task 1. A distribution law of a discrete random variable X is given.

- 1) Calculate a mathematical expectation $M(X)$, $M(X^2)$, a variance $D(X)$ (using 2 ways) and a root-mean-square deviation $\sigma(X)$, a mode $Mo(X)$, a median $Me(X)$.
- 2) Find a distribution probability function $F(X)$ and draw its graph.
- 3) Calculate the following probabilities: $P(7 < X < 15)$.
- 4) Draw the distribution polygon.

X	1	5	8	12	15	23	24
P	0,05	0,09	0,27	0,15	0,23	0,14	0,07

Task 2. The random variable X is the number of occurrences of the event A in 7 independent trials. The probability of the occurrence of the event A in each trial equals **0,77**. Tasks:

- 1) construct the binomial distribution law of a random variable X ;
- 2) draw the distribution polygon of a random variable X ;
- 3) calculate a mathematical expectation $M(X)$, a variance $D(X)$ and a root-mean-square deviation $\sigma(X)$ of a random variable X .

Task 3. The mathematical expectation of a normal random variable equals a , the root-mean-square deviation equals σ .

- a) Define the variance $D(X)$ and the variation coefficient $v(X)$;
- b) find formulas of functions $f(x)$ and $F(x)$;
- c) plot graphs of $f(x)$ and $F(x)$;
- d) the probability that a random variable X lies in the interval $(\alpha; \beta)$;
- e) find limits of all values of variable X on the interval $(a \pm 3\sigma)$ with the probability 99,73% (approximately equals 100 %) using *three sigma rule*

No	a	σ	$(\alpha_1; \beta_1)$	ε
VARIANT 6	25	5	(11, 16)	4

TASKS for the independent work
Variant 7

Task 1. A distribution law of a discrete random variable X is given.

- 1) Calculate a mathematical expectation $M(X)$, $M(X^2)$, a variance $D(X)$ (using 2 ways) and a root-mean-square deviation $\sigma(X)$, a mode $Mo(X)$, a median $Me(X)$.
- 2) Find a distribution probability function $F(X)$ and draw its graph.
- 3) Calculate the following probabilities: $P(15 < X < 23)$.
- 4) Draw the distribution polygon.

X	2	6	10	12	17	23	25
P	0,16	0,13	0,07	0,22	0,09	0,14	0,19

Task 2. The random variable X is the number of occurrences of the event A in 7 independent trials. The probability of the occurrence of the event A in each trial equals **0,29**. Tasks:

- 1) construct the binomial distribution law of a random variable X ;
- 2) draw the distribution polygon of a random variable X ;
- 3) calculate a mathematical expectation $M(X)$, a variance $D(X)$ and a root-mean-square deviation $\sigma(X)$ of a random variable X .

Task 3. The mathematical expectation of a normal random variable equals a , the root-mean-square deviation equals σ .

- a) Define the variance $D(X)$ and the variation coefficient $v(X)$;
- b) find formulas of functions $f(x)$ and $F(x)$;
- c) plot graphs of $f(x)$ and $F(x)$;
- d) the probability that a random variable X lies in the interval $(\alpha; \beta)$;
- e) find limits of all values of variable X on the inter($a \pm 3\sigma$) with the probability 99,73% (approximately equals 100 %) using *three sigma rule*

No	a	σ	$(\alpha_1; \beta_1)$	ε
Variant 7	20	7	(19, 27)	5

TASKS for the independent work
Variant 8

Task 1. A distribution law of a discrete random variable X is given.

- 1) Calculate a mathematical expectation $M(X)$, $M(X^2)$, a variance $D(X)$ (using 2 ways) and a root-mean-square deviation $\sigma(X)$, a mode $Mo(X)$, a median $Me(X)$.
- 2) Find a distribution probability function $F(X)$ and draw its graph.
- 3) Calculate the following probabilities: $P(20 < X < 35)$.
- 4) Draw the distribution polygon.

X	2	5	8	14	18	20	27
P	0,05	0,18	0,05	0,11	0,08	0,20	0,33

Task 2. The random variable X is the number of occurrences of the event A in 7 independent trials. The probability of the occurrence of the event A in each trial equals **0,63**. Tasks:

- 1) construct the binomial distribution law of a random variable X ;
- 2) draw the distribution polygon of a random variable X ;
- 3) calculate a mathematical expectation $M(X)$, a variance $D(X)$ and a root-mean-square deviation $\sigma(X)$ of a random variable X .

Task 3. The mathematical expectation of a normal random variable equals a , the root-mean-square deviation equals σ .

- a) Define the variance $D(X)$ and the variation coefficient $v(X)$;
- b) find formulas of functions $f(x)$ and $F(x)$;
- c) plot graphs of $f(x)$ and $F(x)$;
- d) the probability that a random variable X lies in the interval $(\alpha; \beta)$;
- e) find limits of all values of variable X on the interval $(a \pm 3\sigma)$ with the probability 99,73% (approximately equals 100 %) using *three sigma rule*

No	a	σ	$(\alpha_1; \beta_1)$	ε
Variant 8	34	6	(24, 31)	3