Topic: **BASIC TECHNIQUES FOR ANALYSING NUMERICAL DATA**

Task 1

According to the study of the physical development of 200 boys - teenagers aged 15 in Orenburg, a number of growth distributions were built. It is necessary to calculate:

|  |  |
| --- | --- |
| V | P |
| 144-148 | 4 |
| 149-153 | 10 |
| 154-158 | 16 |
| 159-163 | 30 |
| 164-168 | 85 |
| 169-173 | 35 |
| 174-178 | 15 |
| 179-183 | 5 |
| n = 200 | |

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine if there are any significant differences in the mean growth in boys adolescents in Orenburg and Orsk, if it is known that the average height of boys in the city of Orsk (M2) is 159.7 cm and the average error of the arithmetic mean (m2) is equal to ± 0.5 cm.

5. Analyze the data and draw a conclusion.

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Task 2

According to the study of physical development of 200 draftees in Orenburg, a number of conscripts were distributed according to body weight.

|  |  |
| --- | --- |
| V | P |
| 64-66 | 2 |
| 67-69 | 6 |
| 70-72 | 20 |
| 73-75 | 30 |
| 76-78 | 85 |
| 79-81 | 35 |
| 82-84 | 15 |
| 85-87 | 5 |
| 88-91 | 2 |
| n = 200 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine if there are significant differences in the mean weight of conscripts in Orenburg and Orsk, if it is known that the average weight of the recruits of Orsk (M2) is 79.5 kg. and the average error of the arithmetic mean (m2) is ± 0.5 kg.

5. Analyze the data and draw a conclusion.

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Task 3

Based on the data on the duration of treatment of 45 patients with angina (in days), a number of distributions were constructed in the polyclinic. It is necessary to calculate:

|  |  |
| --- | --- |
| V | P |
| 3-5 | 5 |
| 6-8 | 8 |
| 9-11 | 15 |
| 12-14 | 9 |
| 15-17 | 5 |
| 18-20 | 3 |
| n = 45 | |

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine if there are significant differences in the mean duration of treatment for angina in a given out-patient clinic and a polyclinic from another area, if it is known that the average duration of treatment for angina in a polyclinic in another district (M2) was 12.5 days and the mean error of the arithmetic mean (m2) is equal to ± 0.5 days.

5. Analyze the data and draw a conclusion.

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Task 4

Based on the data on the growth of 56 female first year students, a number of distributions were constructed.

|  |  |
| --- | --- |
| V | P |
| 158-160 | 4 |
| 161-163 | 6 |
| 164-166 | 21 |
| 167-169 | 11 |
| 170-172 | 9 |
| 173-175 | 4 |
| 176-178 | 1 |
| n = 56 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine whether there are significant differences in the mean growth in female students and male students, if it is known that the average growth of male students (M2) is 176.6 cm and the average error of the arithmetic mean (m2) is ± 0.5 cm .

5. Analyze the data and draw a conclusion.

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Task 5

Based on the data on the body weight of 120 eight-year-old girls, a series of distributions was constructed.

|  |  |
| --- | --- |
| V | P |
| 21-23 | 4 |
| 24-26 | 15 |
| 27-29 | 64 |
| 30-32 | 28 |
| 33-35 | 5 |
| 36-38 | 4 |
| n = 120 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine whether there are significant differences in the mean body weight for 8-year-old girls and boys, if it is known that the average body weight of boys is 31.5 kg and the mean error of the arithmetic mean (m2) is ± 0.5 kg.

5. Analyze the data and draw a conclusion.

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Task 6

Based on the data on the duration of treatment (in days) in the clinic, 55 patients with chronic gastritis have a number of distributions.

|  |  |
| --- | --- |
| V | P |
| 5-7 | 3 |
| 8-10 | 8 |
| 11-13 | 10 |
| 14-16 | 23 |
| 17-19 | 7 |
| 20-22 | 3 |
| 23-25 | 1 |
| n = 55 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. The mean deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine if there are significant differences in the mean duration of treatment for gastritis and gastric ulcer if it is known that the average duration of gastric ulcer (M2) is 18 days and the mean error of the arithmetic mean (m2) is ± 0.7 days.

5. Analyze the data and draw a conclusion.

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Task 7

Based on the data on the heart rate of 100 students, a distribution series was constructed.

|  |  |
| --- | --- |
| V | P |
| 60-62 | 5 |
| 63-65 | 8 |
| 66-68 | 16 |
| 69-71 | 28 |
| 72-74 | 18 |
| 75-77 | 12 |
| 78-80 | 8 |
| 81-83 | 5 |
| n = 100 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine whether there are significant differences in the mean heart rate for students (M1) and military personnel (M2), if it is known that the average heart rate for military personnel is 71 beats per minute and the average error of the arithmetic mean (m2) is ± 1 beat per minute.

5. Analyze the data and draw a conclusion.

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Task 8

Based on the data on the frequency of breathing of 200 skiers during the competition a number of distributions was constructed.

|  |  |
| --- | --- |
| V | P |
| 15-16 | 1 |
| 17-18 | 7 |
| 19-20 | 19 |
| 21-22 | 31 |
| 23-24 | 87 |
| 25-26 | 33 |
| 27-28 | 13 |
| 29-30 | 7 |
| n = 200 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine whether there are significant differences in the mean respiratory rate in skiers before and during the competition, if it is known that the average respiration rate of skiers before the competition (M2) is 18 and the mean error of the arithmetic mean (m2) is ± 1.

5. Analyze the data and draw a conclusion.

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Task 9

Based on the data on the growth of 110 weightlifter athletes a number of distribution was built.

|  |  |
| --- | --- |
| V | Р |
| 158-160 | 7 |
| 161-163 | 11 |
| 164-166 | 20 |
| 167-169 | 37 |
| 170-172 | 16 |
| 173-175 | 11 |
| 176-178 | 6 |
| 179-181 | 2 |
| n = 110 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine whether there are significant differences in the growth rates of weightlifters and non-sportsmen if it is known that their average height (M2) is 176.7 cm and the average error of the arithmetic mean (m2) is ± 0.7 cm.

5. Analyze the data and draw a conclusion.

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Task 10

Based on the data on the duration of treatment (in days), 100 patients with pneumonia in the hospital a number of distributions was built.

|  |  |
| --- | --- |
| V | P |
| 9-11 | 4 |
| 12-14 | 6 |
| 15-17 | 19 |
| 18-20 | 48 |
| 21-23 | 14 |
| 24-26 | 7 |
| 27-29 | 2 |
| n = 100 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine if there are significant differences in the mean duration of treatment for pneumonia and chronic bronchitis if it is known that it (M2) is 16 days and the average error of the arithmetic mean (m2) is ± 1 day.

5. Analyze the data and draw a conclusion.

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Task 11

Based on data on systolic blood pressure (SBP) of 188 women with neurocirculatory dystonia syndrome, a series of distributions was built.

|  |  |
| --- | --- |
| V | P |
| 71 – 80 | 5 |
| 81 – 90 | 44 |
| 91 – 100 | 79 |
| 101 – 110 | 20 |
| 111 – 120 | 18 |
| 121 – 130 | 15 |
| 131 – 140 | 5 |
| 141 – 150 | 2 |
| n = 188 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine whether there are significant differences in mean SBP values in patients and healthy women if it is known that the average SBP in healthy individuals is 120 mm Hg. and the average error of the mean value (m2) is ± 1 mm Hg.

5. Analyze the data and draw a conclusion.

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Task 12

Based on the data on the level of hemoglobin (g / l), 78 male swimmers have built a number of distributions.

|  |  |
| --- | --- |
| V | P |
| 120-129 | 6 |
| 130-139 | 8 |
| 140-149 | 18 |
| 150-159 | 20 |
| 160-169 | 14 |
| 170-179 | 9 |
| 180-189 | 3 |
| n = 78 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine if there are significant differences in the mean hemoglobin levels in swimmers and non-sportsmen if it is known that the average hemoglobin level is 140 g / l and the mean error of the arithmetic mean (m2) is ± 0, 5 g / l.

5. Analyze the data and draw a conclusion.

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Task 13

Based on the data on the average level of systolic blood pressure (mmHg), a distribution series was constructed in men aged 50.

|  |  |
| --- | --- |
| V | P |
| 100-109 | 3 |
| 110-119 | 11 |
| 120-129 | 22 |
| 130-139 | 34 |
| 140-149 | 63 |
| 150-159 | 34 |
| 160-169 | 18 |
| 170-179 | 15 |
| n = 200 | |

It is necessary to calculate:

1. Average arithmetic value (M1) by the method of moments.

2. Standard deviation (δ) by the method of moments.

3. The average error of the arithmetic mean (m1).

4. Determine whether there are significant differences in the mean systolic blood pressure in men aged 50 years and in men aged 25 years, if it is known that the mean systolic pressure in them (M2) was 121.8 mm Hg. Art. and the mean error of the arithmetic mean (m2) is ± 0.4 mm Hg. Art.

5. Analyze the data and draw a conclusion.