

Statistics Competition 2022.

Questionnaire checking

A - Upper secondary

1 - Basic knowledge test

Version: 1 Language: en

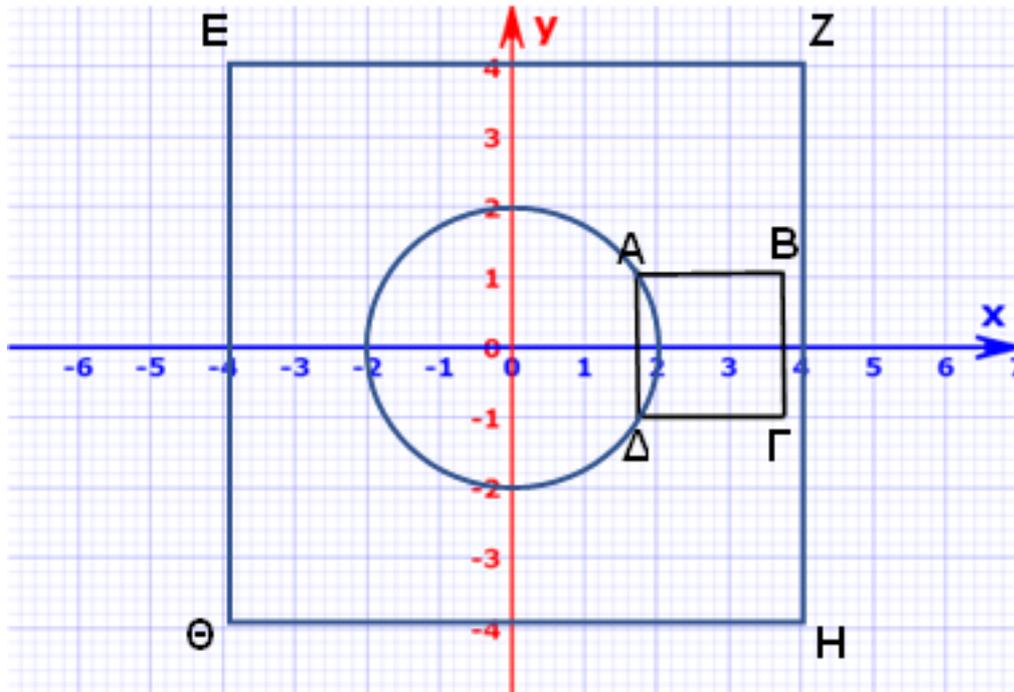
1. Consider a finite sequence of six natural numbers. The three of them are known, and they are: 4, 5 and 24, while the other three numbers are different from each other and unknown. It is also known that the mean of the six-number sequence is 10, and their median belongs to the interval (7,8). Which of the following numbers cannot be included in the number sequence?
 - A. 5
 - B. 17
 - C. 10
 - D. 8

2. Let the numbers: 11, 15, 19, 27, 36, 49, 68, 71, 94. If we invert the digits of a specific number, then the median of the above numbers will change, and the new mean value will differ from the old one by five units. This specific number is:
 - A. 19
 - B. 49
 - C. 27
 - D. 36

3. In a city, there are category 4 and category 5 hotels only. The mean daily rent of all hotel rooms in the city is €56 higher than the mean daily rent of category 4 hotel rooms, and the mean daily rent of all hotel rooms in the city is €104 less than the mean rental price of hotel rooms of category 5. A traveller arriving in the city chooses to rent a room at random. The possibility of renting a room in a category 4 hotel cannot be:
 - A. 65%
 - B. 35%
 - C. 75%

D. 55%

- 4. An electronic point on an orthogonal coordinate system makes random steps of a unit length each time moving up, down, right, and left in all possible directions. Originally the point is located at the centre of the axes and makes a random step into one of the possible directions. The probability of the point to be found located again at the centre of the axes after its next three random steps is:**
- A. 0,125
- B. 0,141
- C. 0,167
- D. 0,5
- 5. Suppose that we have drawn on an orthogonal coordinate system all triangles having vertices with integer coordinates (x, y) , $0 \leq x \leq 3$ and, $0 \leq y \leq 4$, and one of their sides lies on the x-axis. If we choose at random one of these triangles, the probability of this triangle to have an integer area is:**
- A. 0,479
- B. 0,521
- C. 0,670
- D. 0,396
- 6. An electronic plotter prints random dots on the following coordinate system inside the rectangle $EZH\Theta$. The side of the square $AB\Gamma\Delta$ is equal to the radius of the circle (O,R) . If at a given moment, 1600 dots were plotted inside the rectangle $EZH\Theta$, the dots expected to be plotted outside the circle (O,R) and outside the square $AB\Gamma\Delta$, approximately are:**



- A. 405
- B. 414
- C. 1194
- D. 1186

7. Suppose that 4 schoolboys and 6 schoolgirls will be placed in two examination rooms, A and B, in distinguished positions. Room A has a capacity of 8 seats, and room B has a capacity of 4 seats. If all the boys are to be placed in the same room, the number of all possible placements are:

- A. 14728
- B. 448
- C. 967680
- D. 34352640

8. We create all possible pairs of integers (x, y) , where $x \neq y$, choosing from the set $A = \{1, 2, 3, \dots, 400\}$. The probability of choosing a pair where one of the integers is not the cube of the other is:

- A. $\frac{13299}{13300}$
- B. $\frac{6649}{6650}$

C. $\frac{39997}{40000}$

D. $\frac{79997}{80000}$

9. In a branch of a multinational company, ten executives speak German, eleven executives speak French, fourteen executives speak English, three executives speak all three languages, and twenty executives speak only one of the three languages. If we randomly select a company executive, the chances of him speaking at least two languages are:

A. 0,115

B. 0,231

C. 0,346

D. 0,130

10.

Let the functions $f(x) = \sin x$ and $g(x) = \cos x$. If we randomly select a number in the interval $[-2\pi, \pi]$, then the probability that this number corresponds to an x-coordinate at which the two functions intersect is:

A. 0

B. $\frac{1}{\pi}$

C. $\frac{3}{2\pi}$

D. $\frac{2}{3\pi}$

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Questionnaire checking

B - Lower secondary

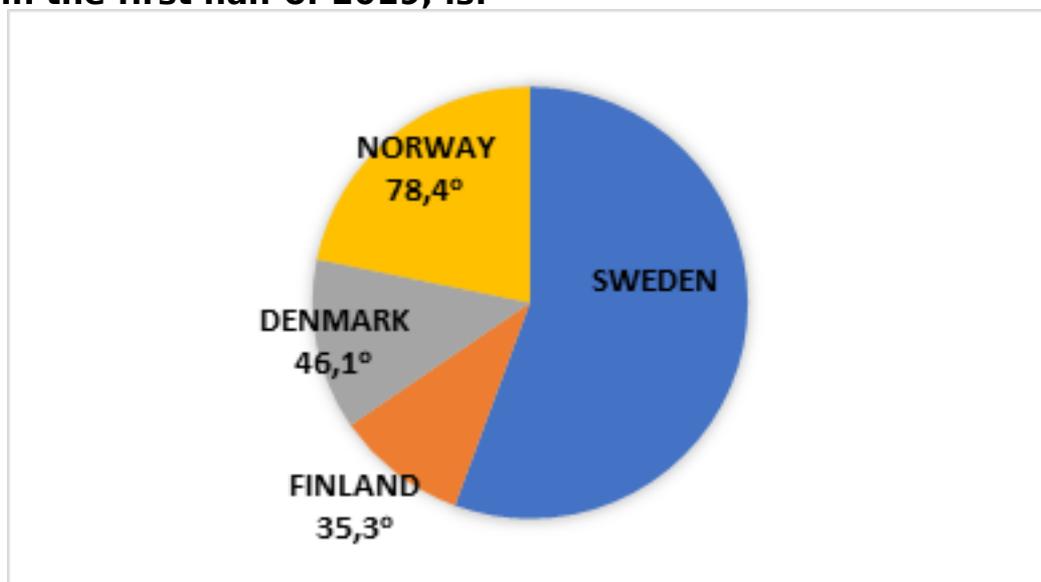
1 - Basic knowledge test

Version: 1 Language: en

1. A questionnaire was used for a survey conducted at secondary schools in Cyprus to investigate the impact of the COVID-19 pandemic on students' customs. For this purpose, a sample of 27527 students was selected, and 3000 students were invited to participate in the research. Out of these, 1523 students agreed to answer the questions. In this survey, the population and the sample are:

- A. population: 3000 students, sample: 1523
- B. population: 24527 students, sample: 3000
- C. population: 3000 students, sample: 1523
- D. population: 27527 students, sample: 1523

2. The following pie chart gives the distribution of tourists from the 4 Nordic countries that visited Cyprus during the first half of 2019 (the numbers below each country's name correspond to the degrees of each sector). If all the tourists who visited Cyprus during the first half of 2019 were 1.631.023 of whom 59923 were Swedes, then the percentage of tourists from Sweden and Finland, in relation to the total number who visited Cyprus, in the first half of 2019, is:



- A. 4,32%
- B. 6,61%
- C. 77,39%
- D. 4,31%

3. The following table presents the grades received by students in a common test in Mathematics conducted between four classrooms of the same school level. The percentage of students whose grade on the test was higher than the mean value of the test is:

Grades	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Students	-	-	1	-	-	1	2	1	1	3	-	7	7	9	12	5	4	4	2	1

- A. 73,33%
- B. 61,67%
- C. 90%
- D. 85%

4. An electronic point on an orthogonal coordinate system makes random movements of a unit length each time it moves up, down, right and left in the possible directions. The probability of moving in any direction is the same. At this moment, the point is at the origin. The probability of the point, in the following two random movements, to be located again at the origin is:

- A. $\frac{1}{4}$
- B. $\frac{1}{3}$
- C. $\frac{2}{7}$
- D. $\frac{4}{7}$

5. Eighty (80) students in the first grade of an upper secondary school who follow the Orientation Group 1 (OG1) decided next year to follow either the Direction 1 (DIR1) or the Direction 2 (DIR2). Of these students, 20 out of 48 girls said they would follow DIR2 next year, and 8 boys said they would follow DIR1. We take at random one of these 80 students. The probability that the student taken would follow the DIR2 for next year is:

A. 0,55

B. 0,35

C. 0,65

D. 0,45

6. Three numbers are taken at random from the set $A = \{3,4,5,12,13\}$. The probability that these three numbers are the lengths of a right-angled triangle is:

A. $\frac{2}{5}$

B. $\frac{1}{5}$

C. $\frac{4}{5}$

D. $\frac{2}{9}$

7. The real numbers -7, -2, x, 3, y, 13, are in ascending order. Their mean value is 2, and their median is also 2. The values of x and y, respectively, are:

A. 1 and 6

B. -2 and 7

C. 1 and 4

D. -1 and 6

8. According to the Health Monitoring Unit of the Ministry of Health, the distribution, by gender and age, of deaths due to COVID-19 disease, until 26/10/2021, is given by the following table. If a person died because of the COVID-19 disease is taken at random from the relevant register death lists, the probability that this person is a male, given that he was under 80 years old, is:

	Men	Women	Total
Under 60 years	39	17	56
60 -79 years	185	72	257
Above 80 years	139	118	257
Total	363	207	570

- A. 0,72
- B. 0,39
- C. 0,62
- D. 0,86

9.

Two fair dice are rolled simultaneously, and their outcome is added. Let x be the sum of the outcome of the two dice. If the probability of x is $\frac{1}{9}$ that is

$p(x) = \frac{1}{9}$ and $x < 7$ then x is equal to:

- A. 6
- B. 5
- C. 9
- D. 8

10.

Of the 80 students of the first grade of a lower secondary school, 38 have a personal account on Facebook, 14 have a personal account on Instagram and Facebook, and 10 students do not have a personal account on either Facebook or Instagram.

If a student, from the first grade of this school, is taken at random, the probability that he or she has an account only on Facebook or only on Instagram is:

- A. 0,7
- B. 0,875
- C. 0,175
- D. 0,4