Department of Statistics & Operations Research

*College of Science*

King Saud University

Stat 109 – First Midterm Examination

|  |  |
| --- | --- |
| Student's Name |  |
| Student's Number |  |
| Section's Number |  |
| Teacher's Name |  |
| Student's Attendance Number |  |

Instructions:

* There are 25 multiple choice questions.
* Time allowed is 90 minutes. (1.5 Hours).
* For each question, put the code of the correct answer in the following table beneath the question number. Please, use capital letters: A, B, C, and D.
* Do not copy answers from your neighbors; they have different question forms.
* Mobile Telephones are not allowed in the exam's classroom.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **A** | **A** | **B** | **C** | **D** | **B** | **C** | **B** | **C** | **B** |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| **D** | **B** | **C** | **A** | **D** | **Any answer** | **B** | **D** | **B** | **D** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 21 | 22 | 23 | 24 | 25 |
| **A** | **B** | **C** | **A** | **C** |

\*\*\*\*\*\* Consider the following marks for a sample of students carried out on 10 quizzes:

(**Answer questions Q.1 – Q.6**)

6, 7, 6, 8, 5, 7, 6, 9, 10, 6

1. The mean mark is:

**A) 7** B) 10 C) 6 D) 7.5

1. The median mark is:

**A) 6.5** B) 5.5 C) 7 D) 6

1. The mode for this data is:

A) 7 **B) 6** C) 0 D) 6 or 7

1. The range for this data is:

A) 15 B) 10 **C) 5** D) 0

1. The standard deviation for this data is:

A) 1.48 B) 2.44 C) 1 **D) 1.56**

1. The coefficient of variation for this data is:

A) 44.9 **% B) 22.3%**  C) 19% D) 47.3%

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. A sample is defined as:

A) the entire population of values

B**)** a measure of reliability of the population

**C)** a subset of data selected from a population

D) inferential statistics

1. The sample mean is a measure of

A) relative position

**B)** central tendency

C) dispersion

D) all of the above

1. The sample standard deviation is a measure of

A) relative position

B)central tendency

**C)** dispersion

D) all of the above

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\* A Fecal Occult Blood Screen Outcome Test is applied for 875 patients with bowel cancer. The same test was applied for another sample of 925 without bowel cancer. Obtained results are shown in the following table: (**Answer questions Q.10 – Q.14** )

|  |  |  |
| --- | --- | --- |
|  | Present Disease | Absent Disease |
| Test Positive | 850 | 10 |
| Test Negative | 25 | 915 |

1. The sensitivity of the test is

A) 0.85 **B) 0.971** C) 0.915 D) 0.988

1. The specificity of the test is

A) 0.850 B) 0.250 C) 0.915 **D) 0.989**

1. The probability of false positive is

A) 0.989 **B) 0.011** C) 0.250 D) 0.915

1. The probability of false negative is

A) 0.250 B) 0.971 **C) 0.029** D) 0.10

1. If the rate of the disease in the general population is equal to 15% then the predictive value positive of the test is

**A) 0.941** B) 0.995 C) 0.674 D) 0.150

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\*\*\*\*\*The following table classifies 1100 people according to their blood pressure and obesity.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Blood pressure | | |
| Low  *( L )* | Medium  *( M )* | High  *(H)* |
| Has obesity () | 50 | 150 | 300 |
| Does not have obesity | 250 | 240 | 110 |

If an individual is selected at random from this group, then the probability that he/she

(**Answer questions Q.15 – Q.16** )

1. has obesity or has medium blood pressure is equal to

A) 0.442 B) 0.50 C) 0.725  **D) 0.673**

1. has low blood pressure given that he/she has obesity is equal to

A) 0.90  **B) 0.1** C) 0.66 D) 0.44

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*\*In medical study about diet (loss of weight) it was indicated that most of persons are using two methods to loss of weight, medical drugs and sports. The medical drugs methods (M) was used by 60% of persons and the sports method (S) was used by 45% of persons, while the two methods were used by 27% of persons. If a person is selected randomly, then (**Answer questions Q.17-Q.19**)

1. The probability that a person used at least one method

A) 0.75 **B) 0.78** C) 0.25 D) 1.00

1. The probability that a person used medical drugs only

A) 0.75 B) 0.25 C) 1.00  **D) 0.33**

1. The events using medical drug method (M) and using sports method (S) are

A) Dependent **B) Independent** C) Disjoint D) None of this

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\*\*\*\*\* Consider the following Table showing a frequency distribution of weights in a sample of 20 cans of fruits:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Class interval | True Class Limits | Midpoint | Frequency | Relative Frequency | Cumulative Frequency |
|  | 19.2 – 19.4 |  |  | 1 |  |  |
|  | 19.5 – 19.7 |  |  |  | 0.10 |  |
|  | 19.8 – 20.0 |  |  | 8 |  |  |
|  |  |  |  | 4 |  |  |
|  |  |  |  |  |  |  |

(**Answer questions Q.20 – Q.25**)

1. The fifth class interval is:

A) 20.2 - 20.4 B) 20.1-20.3 C) 21.0 - 21.2 **D) 20.4 - 20.6**

1. The second true class interval is

**A) 19.45 - 19.75**  B) 19.5 – 19.7 C) 19.25 - 19.35 D) 20.2 - 20.4

1. The midpoint of the fourth class interval is:

A) 20.5 **B) 20.2** C) 19.9 D) 20.1

1. The frequency of the second class interval is:

A) 10 B) 4 **C) 2** D) 3

1. The relative frequency of the fourth class interval is:

**A) 0.20**  B) 0.15 C) 0.13 D) 0.40

1. The cumulative frequency of the final class interval is:

A) 13  B) 4 **C) 20** D) 100

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