|  |  |  |
| --- | --- | --- |
| **الإختبار النهائي** |  | **جامعة الملك سعود** |
| **الفصل الدراسي الثاني 1435/1436 هـ** | **كلية العلوم** |
| **قسم الإحصاء و بحوث العمليات** | **مادة 106 احص** |

**الثلاثاء 8 – 8 – 1436 هـ 8 – 11**

**اسم الطالبة : -----------------------------------------------------------------------------------**

**رقم الطالبة : -----------------------------------------------------------------------------------**

**رقم الشعبة : ----------------------------- رقم التسلسل : ---------------------------------------**

**أستاذة المقرر : ---------------------------------------------------------------------------------**

**INSTRUCTIONS:**

* **Answer** all questions.
* **Mobile phones** are **not allowed** in the classroom.
* **Time allowed** is **3 Hours**.
* For each question, **put the code** of the **correct answer** in capital letters:

**A, B, C,** and **D** in the following table beneath the question number.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Answer | C | A | D | B | A | D | B | D | C | C |
|  | | | | | | | | | | |
| Question | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Answer | C | A | D | B | D | D | B | C | D | B |
|  | | | | | | | | | | |
| Question | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Answer | A | C | C | C | D | D | A | B | B | C |
|  | | | | | | | | | | |
| Question | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| Answer | A | C | D | D | A | D | C | B | C | A |

Good Luck

**Answer all the following questions:**

1. The Binomial distribution

|  |
| --- |
| (A) is a continuous distribution |
| (B) is determined by the parameters and |
| (C) has only two outcomes (success and failure) |
| (D) all of these are true |

1. Two normal random variables X with mean 5 and variance 25 and Y with mean 2 and variance 25, then X lies on the …

|  |  |  |  |
| --- | --- | --- | --- |
| (A) right of Y | (B) left of Y | (C) top of Y | (D) bottom of Y |

1. By using Venn diagram,

|  |  |
| --- | --- |
| (A) | (C) |
| (B) | (D) |

For a population of kidney stone patients, X=the number of stones removed. We randomly choose a patient and the cumulative distribution is given below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *x* | 0 | 1 | 2 | 5 |
|  | 0.45 | 0.68 | 0.72 | 1 |

Find:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.23 | (B) 0.72 | (C) 0.04 | (D) 0 |

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.23 | (B) 0.68 | (C) 0.45 | (D) 0 |

1. The expected number of X is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 1 | (B) 7.12 | (C) 2.16 | (D) 1.71 |

In a large population of people, 20% of them use dental floss regularly(خيط تنظيف الأسنان) . If we randomly choose 10 of these people and let X = the number of people who use dental floss regularly, then:

1. The probability distribution of X, is

|  |  |
| --- | --- |
| (A) | (C) |
| (B) | (D) |

1. The values that *x* takes are:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) | (B) | (C) | (D) |

1. The probability that exactly 3 persons use dental floss regularly

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.7987 | (B) 0.00079 | (C) 0.2013 | (D) 0.6491 |

The number of patients who need to make a liver transplant surgery (جراحة زراعة الكبد)from 10 hospitals is measured:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 4 | 10 | 2 | 1 | 9 | 16 | 4 | 3 | 4 |

1. The sample mean is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 4.478 | (B) 10 | (C) 5.5 | (D) 4.719 |

1. The sample mode is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 2 | (B) no mode | (C) 4 | (D) 2, 4 |

1. The sample standard deviation is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 4.72 | (B) 4.48 | (C) 4.51 | (D) 3.6 |

For two events A and B, let and , then:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.08 | (B) 0.28 | (C) 0.37 | (D) 0.2 |

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.08 | (B) 0.28 | (C) 0.37 | (D) 0.2 |

1. The events A and B are:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) independent | (B) disjoint | (C) equally likely | (D) dependent |

If Z has a standard normal distribution, then

1. The area under the curve to the right of 0.24 is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.9452 | (B) 0.0516 | (C) 0.5948 | (D) 0.4052 |

|  |  |  |  |
| --- | --- | --- | --- |
| (A) -1.63 | (B) 0.9403 | (C) 0.0526 | (D) 1.62 |

Let X be a continuous random variable, where and , Then:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.53 | (B) 0.4 | (C) 0 | (D) 0.84 |

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.53 | (B) 0.4 | (C) 0 | (D) 0.84 |

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.53 | (B) 0.4 | (C) 0 | (D) 0.84 |

In a population of Saudi woman aged 18-30, X = the serum cholesterol level is normally distributed with mean 5.3 and standard deviation 2.5. For a randomly chosen woman, find

1. The probability that the serum cholesterol level is less than 0.

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.0170 | (B) 0.5 | (C) 0.9830 | (D) 0 |

1. The probability that the serum cholesterol level is larger than 7.1

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.65542 | (B) 0.4 | (C) 0.2358 | (D) 0.35621 |

In a sample of 70 lung cancer patients, the proportion of survived patients was 0.2. Then:

1. The correct formula for calculating 95% confidence interval is:

|  |  |
| --- | --- |
| (A) | (C) |
| (B) | (D) |

1. The value of tabulated Z is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) | (B) | (C) | (D) |

1. The upper bound of the confidence interval is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.0478 | (B) 0.1063 | (C) 0.0937 | (D) 0.2937 |

For a certain obstetrics ward (جناح التوليد), X = the number of babies born with a certain defect in a month has a Poisson (0.3) distribution:

1. The probability that less than one baby born with this defect

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.3 | (B) 0.77 | (C) 0.6 | (D) 0.74 |

1. The expected number of babies born with this defect in a month

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.3 | (B) 0.77 | (C) 0.6 | (D) 0.74 |

1. The standard deviation of babies born with this defect in 2 months

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.55 | (B) 0.77 | (C) 0.6 | (D) 0.3 |

Let be the mean patient stay time (مدة بقاء المريض) in a central hospital, and statistical inference about is interested, so a random sample of size 50 patients stayed in the hospital was drawn. The sample gave the mean  days and the variance , then:

1. The point estimate of  is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 10.24 | (B) 4.3 | (C) 3.2 | (D) 50 |

1. The estimation of standard deviation of the sampling distribution of  is equal to:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 1.4482 | (B) 3.413 | (C) 0.4525 | (D) 0.2048 |

1. The lower bound of 90% confidence interval for is equal to:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 3.5556 | (B) 3.413 | (C) 0.4525 | (D) 0.8869 |

For a sample of 200 mothers at delivery, the age is measured and recorded in the following table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Row | Age | Frequency | Relative frequency | Cumulative frequency |
| 1 | 15 - 19 | 25 |  |  |
| 2 | 20 - 24 | 57 |  |  |
| 3 | 25 - 29 |  |  |  |
| 4 |  | 32 |  | 177 |
| 5 | 35 - 39 |  | 0.08 |  |
| 6 | 40 - 44 | 7 |  |  |

1. The 4th class interval is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 29 - 34 | (B) 30 - 35 | (C) 30 - 34 | (D) 29 - 35 |

1. The number of mothers with age less than or equal 29

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 57 | (B) 25 | (C) 82 | (D) 145 |

1. The percentage of mothers with age more than or equal 35

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 25 | (B) 12.5% | (C) 0.125 | (D) 11.5% |

A group of people with a certain disease is classified by the income level and the main source of their drinking water:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Income Level  Source | Low (L) | Low Middle (N) | Middle (M) | High (H) | Total |
| Bottled Water (B) | 25 | 95 | 123 | 73 | 316 |
| Well Water (W) | 16 | 10 | 27 | 28 | 81 |
| Dam Water (D) | 48 | 58 | 30 | 7 | 143 |
| Total | 89 | 163 | 180 | 108 | 540 |

If one of these people is randomly chosen, give

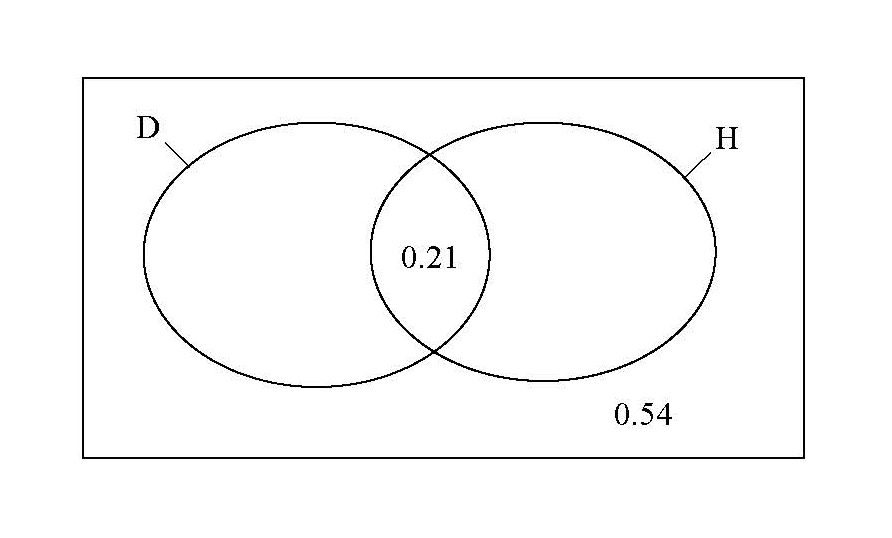
|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.2778 | (B) 0.0556 | (C) 0.05 | (D) 0.3333 |

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.3086 | (B) 0.5852 | (C) 0.0296 | (D) 0 |

1. The two events W and M are

|  |  |  |  |
| --- | --- | --- | --- |
| (A) disjoint | (B) dependent | (C) independent | (D) equally likely |

In a population of people, 25% have a diabetes mellitus (D) (مرض السكري), 42% have a high blood pressure (H) and 21% have a diabetes mellitus and high blood pressure. We have the following incomplete Venn diagram:



If we randomly choose one person, find the probability that the person chosen:

1. has not a diabetes mellitus

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.54 | (B) 0.75 | (C) 0.25 | (D) 0.42 |

1. has not high blood pressure and has diabetes mellitus

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.11 | (B) 0.25 | (C) 0.04 | (D) 0.21 |

1. has high blood pressure knowing that he has not diabetes mellitus

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.28 | (B) 0.84 | (C) 0.39 | (D) 0.04 |

