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

**الثلاثاء: 15 / 3 / 1436 هـ الساعة : 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.

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

**Answer the Following Questions:**

1. One of the following is not true about standard normal distribution:

|  |  |  |
| --- | --- | --- |
| (A) Area under the curve =1 |  | (B) Has variance 0 and mean 1 |
| (C) It is symmetric around 0 |  | (D) It is a continuous distribution |

1. From the plot of the normal distributions below





μ1

μ2

|  |  |  |  |
| --- | --- | --- | --- |
| (A) μ1< μ2 | (B) μ1> μ2 | (C) σ1 2 > σ22 | (D) σ1 2 < σ22 |

**=======================**

* To estimate the blood glucose level (in mml/l) of Saudi adults, we measure the blood glucose level of 50 Saudi adults, then in this experiment:

1. The variable is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) Saudi Arabia | (B) blood glucose level | (C) Saudi Adults | (D) 50 Saudi Adults |

1. The type of the variable is:

|  |  |  |
| --- | --- | --- |
| (A) Qualitative ordinal |  | (B) Quantitative continuous |
| (C) Quantitative discrete |  | (D) none of these |

1. The sample size is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) Saudi Arabia | (B) blood glucose level | (C) Saudi Adults | (D) 50 Saudi Adults |

**=======================**

* We measure the number of visits to the clinic made by 14 pregnant women in their pregnancy period:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 15 | 12 | 13 | 11 | 14 | 9 | 17 |
| 13 | 14 | 16 | 12 | 14 | 8 | 15 |

Then:

1. The sample mean is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 12.857 | (B) 14.077 | (C) 17 | (D) 13.0714 |

1. The sample mode is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 12 | (B) 14 | (C) 12,13,14 | (D) no mode |

1. The sample median is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 13 | (B) 14 | (C) 13.5 | (D) 12.5 |

1. The sample variance is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 7.055 | (B) 5.9235 | (C) 2.4338 | (D) 6.379 |

**=======================**

* The following table gives the results of a survey to study the ages and hemoglobin levels of patients of a certain clinic:

|  |  |  |
| --- | --- | --- |
|  | Mean | Standard Deviation |
| Age (year) | 30 | 6 |
| hemoglobin level (g/dl) | 60 | 10 |

1. The hemoglobin levels of the patients are

|  |  |  |
| --- | --- | --- |
| (A) more variable than ages |  | (B) less variable than ages |
| (C) the same variable as ages |  | (D) none of these |

**=======================**

* A population of patients is classified by the level of blood pressure and the type of juice they drink in the morning in a certain day.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of juice | | | | | Blood pressure |
| Total | Apple(A) | Pineapple(P) | Tomato(T) | Orange(O) |
| 100 | 35 | 40 | 15 | 10 | Low(L) |
| 220 | 65 | 55 | 60 | 40 | Moderate(M) |
| 180 | 25 | 30 | 50 | 75 | High(H) |
| 500 | 125 | 125 | 125 | 125 | Total |

If one of these patients is randomly chosen

1. In symbols, the event "drink orange juice or have low blood pressure" is

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

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.25 | (B) 0.07 | (C) 0.1 | (D) 0.12 |

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.58 | (B) 0.25 | (C) 0.61 | (D) 0.13 |

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.56 | (B) 0.44 | (C) 0.25 | (D) 0.75 |

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.35 | (B) 0.1 | (C) 0.15 | (D) 0.28 |

**=======================**

* Let  be the proportions of vaccinated children تطعيم الأطفال) ( in Riyadh, and statistical inference about  is wanted, so a random sample are drawn from this population of size  children which showed 280 children from Riyadh are vaccinated. Denote by to the sample proportions of vaccinated children in Riyadh, then:

1. A point estimate of the population proportion  is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.6 | (B) 300 | (C) 0.7 | (D) 280 |

1. If , then 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 1.645 | (B) 1.96 | (C) 95% | (D) 0.95 |

1. The upper bound of 95% confidence interval for  is equal to:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.5639 | (B) 0.7449 | (C) 0.636 | (D) 0.6551 |

1. The lower bound of 95% confidence interval for  is equal to:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.5639 | (B) 0.7449 | (C) 0.636 | (D) 0.6551 |

**=======================**

* In a certain population, it is known that 30% of the trainees are failed to complete the program. Let *X*= number of trainees who failed to complete the program. If a sample of 15 trainees of this program are selected randomly, then

1. The probability that 5 trainees fail to complete the program

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.876 | (B) 0.995 | (C) 0.667 | (D) 0.206 |

1. The mean of is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 3.15 | (B) 5.14 | (C) 15 | (D) 4.5 |

1. The variance of *X* is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 3.15 | (B) 5.14 | (C) 15 | (D) 4.5 |

**=======================**

* Suppose that the number of visits of families to a public park in a month has a Poisson (4) distribution. Then

1. The probability that three families visits to a public park in a month is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.0144 | (B) 0.1954 | (C) 0.9982 | (D) 0.0126 |

1. The mean of visits of families to a public park in two months is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 8 | (B) 4 | (C) 2 | (D) 6 |

1. The standard deviation of visits of families to a public park in a month is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 2 | (B) 4 | (C) 1.6 | (D) 2.3664 |

**=======================**

* In a population of smoker and lung cancer patients. The following Venn diagram shows the events: A = “lung cancer” B = “smoker”, find the following probabilities:

B

A

0.12

0.03

0.04

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.12 | (B) 0.15 | (C) 0.16 | (D) 0.84 |

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.15 | (B) 0.16 | (C) 0.85 | (D) 0.84 |

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.8 | (B) 0.03 | (C) 0.75 | (D) 0.04 |

1. 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.8 | (B) 0.03 | (C) 0.75 | (D) 0.04 |

1. The event "smoker" and the event "lung cancer" are

|  |  |  |  |
| --- | --- | --- | --- |
| (A) not independent | (B) disjoin | (C) independent | (D) equally likely |

**=======================**

* If Z has a standard normal distribution, then:

1. P(Z > -5.32) =

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 1 | (B) 0 | (C) 0.0176 | (D) 0.9671 |

1. The area to the left of the point -2.22 is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.0272 | (B) 0.0132 | (C) 0.1975 | (D) 0.9864 |

**=======================**

* If X, the count of red cells in blood, is approximately normally distributed with a mean of 4, and a standard deviation of 0.5. The probability that the count of red cells in blood

1. Will be less than 3 is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.0228 | (B) 0.9772 | (C) 2 | (D) -2 |

1. Will be between 3.5 and 5.5 is

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 0.3994 | (B) 0.3446 | (C) 0.84 | (D) 0.16 |

**=======================**

* The blood pressure for healthy Saudi women is distributed normally with variance 625. A random sample of 20 healthy women has mean 118. Then

1. The assumptions are

|  |  |  |
| --- | --- | --- |
| (A) The distribution is not normal and is known |  | (B) The distribution is normal and is known |
| (C) The distribution is not normal and is unknown |  | (D) The distribution is normal and is unknown |

1. If , then 

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 1.645 | (B) 1.96 | (C) 90% | (D) 0.9 |

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

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 133.3846 | (B) 116.6154 | (C) 127.1958 | (D) 108.8042 |

**=======================**

* Let be the mean patient stay time (مدة بقاء المريض) in a central hospital, and a random sample of size 50 patients stayed in the hospital was drawn. The sample gave the mean 4.3 days and the standard deviation 2.5 , then:

1. The point estimate of the population mean  is:

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 4.3 | (B) 2.5 | (C) 3.7 | (D) 5.6 |

1. The formula for the confidence interval use is

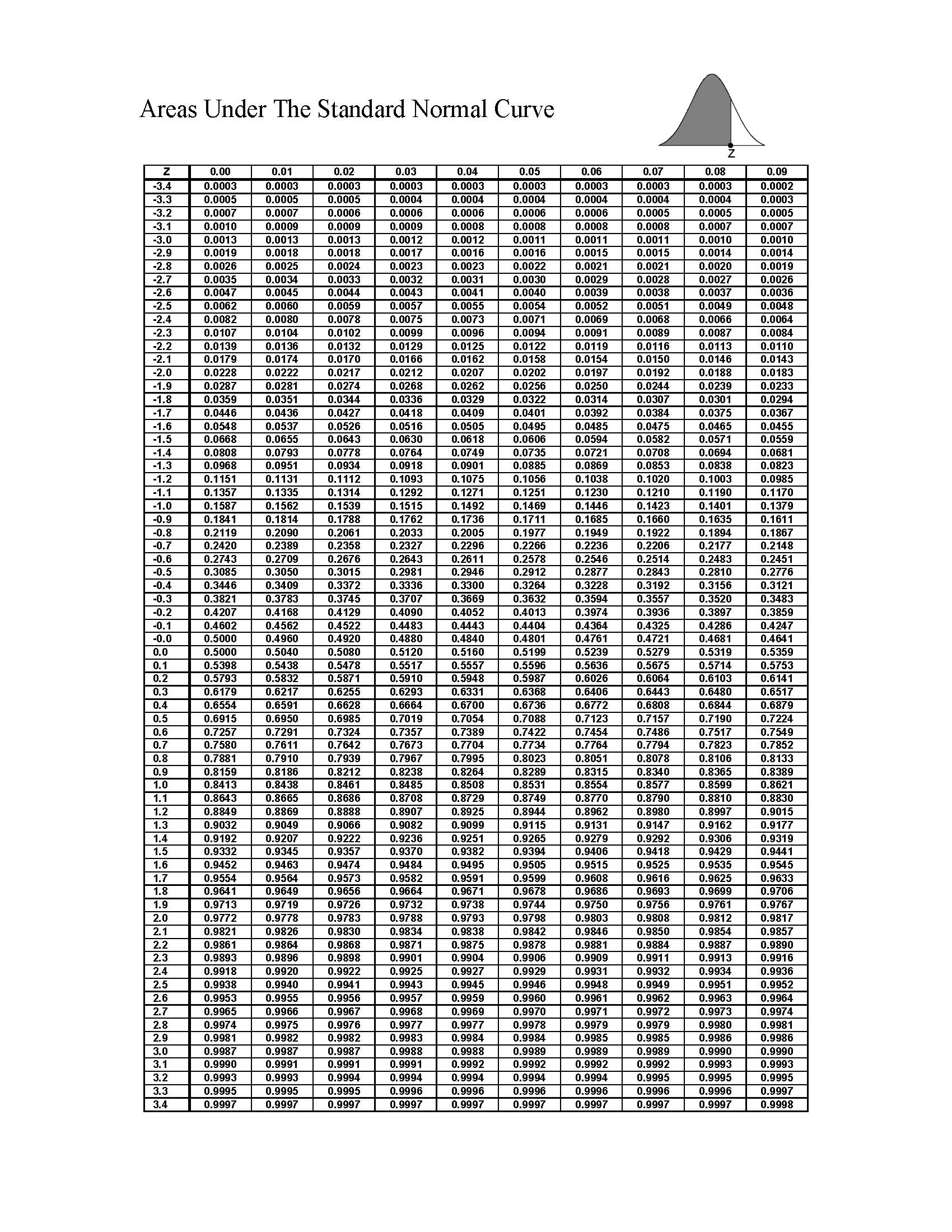
|  |  |  |  |
| --- | --- | --- | --- |
| (A) | (B) | (C) | (D) |

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

|  |  |  |  |
| --- | --- | --- | --- |
| (A) 2.846 | (B) 3.7184 | (C) 0.5639 | (D) 4.8816 |

**=======================**

End of Questions

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