Department of Statistics & Operations Research

College of Science

King Saud University

STAT – 145: Biostatistics

Final Examination

Second Semester 1435 – 1436

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| --- | --- | --- |
| Student's Name |  | |
| Student's Number |  | |
| Section's Number |  | Serial Number **:** |
| Teacher's Name |  | |

Instructions:

* There are 40 multiple choice questions.
* Time allowed is 180 minutes. (*3 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 classroom.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|  |  |  |  |  |  |  |  |  |  |

Good luck

* A sample of 16 college students were asked about time they spent doing their homework. It was found that the average to be 4.5 hours. Assuming normal population with standard deviation 0.5 hours.

1. **The point estimate for is:**

(A) 0 hours (B) 10 hours (C)0.5 hours (D) 4.5 hours

1. **The standard error ofis:**

(A)0.125 hours (B) 0.266 hours (C) 0.206 hours (D) 0.245hours

1. **The correct formula for calculating confidence interval for µ is:**

(A)(B)

(C) (D)

1. **The95% confidence interval for µ is:**

(A)(4.255,4.745) (B) (4.469,4.531)

(C) (4.632,4.832) (D)(4.531,4.891)

**…………………………………………………………………………………………**

* In an experiment comparing two feeding methods (مقارنة طريقتين للتغذية) forCows, eight pairs of twins (توائم)were used- One twin receiving Method Aand the other receiving Method B. At the end of a given time ,the Cows were slaughtered and cooked ,and the meat was rated for its taste(with a higher number indicating a better taste):

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Taste score for calves fed | | | | | | | | |
| Twin pair | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Method A | 27 | 37 | 31 | 38 | 29 | 35 | 41 | 37 |
| Method B | 23 | 28 | 30 | 32 | 27 | 29 | 36 | 31 |

Let and (where = Method A – Method B). Assuming normality, to test with level α = 0.05 if the Method Aincreases the taste scores:

1. **The estimate of standard error of () is:**

(A)(B) (C) (D)

1. **The computed value of the test statistic is:**

(A) – 5.452 (B) 5.456 (C) 1.929 (D) –1.929

1. **Accept if (Acceptance region):**

(A) (B) (C) D)

1. **Conclusion is**

(A) Reject (B) Do not reject (Accept)

(C) Reject both and (D) No decision

1. **The 95 % confidence interval for is:**

(A) (1.554, 5.55) (B) (2.765, 6.995) (C) (1.75, 8.01) (D) (2.994, 6.766)

**…………………………………………………………………………………………**

* A researcher was interested in comparing the mean score of female students, with the mean score of male students in a certain test. Assume the populations of score are normal with equal variances. Two independent samples gave the following results:

|  |  |  |
| --- | --- | --- |
|  | Female | male |
| Sample size |  |  |
| Mean |  |  |
| Variance |  |  |

1. **The point estimate of is:**

(A) 2.63 (B) -2.59 (C) 2.59 (D) 0.59

1. **The estimate of the pooled variance () is:**

(A) 17.994 (B) 18.494 (C) 17.794 (D) 18.094

1. **The 95% confidence interval for is :**

**(A)** (-21.54,26.717) (B) (- 2.345, 7.525) (C) ( - 3.02 ,8.2) (D) (-1.973, 7.153)

* **For the same question and α = 0.05, if the researcher has the doubt that andare different, then:**

1. **The hypotheses are :**

(A) Ho: (B) Ho: (C)Ho:< (D)Ho:≤

HA:HA:< HA:>HA:>

1. **The value of the test statistic is:**

(A) 1.3 (B)1.029 (C) 0.46 (D) 0.93

1. **Our decision is:**

(A) Reject B) Do not reject (Accept)

(C) Accept both and (D) Reject both and

**----------------------------------------------------------------------------**

* A standardized chemistry test was given to girls and boys. The girls made an average of , while the boys made an average grade of . Assume the population standard deviations are and for girls and boys respectively. To test the null hypothesis against the alternative hypothesis at level of significance:

1. **The standard error of**

(A) 0.2266 (B) 2 (C) 1.5733 (D) 1.2543

1. **The value of the test statistic is:**

(A) -1.59 (B) 1.59 (C) 1.25 (D) 4.21

1. **The equals:**

(A) 0.9441 (B) 0.1118 (C) 0.0027 (D) 0.0559

1. **Our decision is:**

(A) Reject B) Do not reject (Accept)

(C) Accept both and (D) Reject both and

**………………………………………………………………………………………**

* In a first sample of 100 store customers, 43 used a MasterCard. In a second sample of 100 store customers, 58 used a Visa card. To find the 95% confidence interval for difference in the proportion () of people who use each type of credit card?

1. **The value of α is :**

(A) 0.95 (B) 0.5 (C) 0.05 (D) 0.025

1. **The 95% confidence interval for the proportion difference is:**

(A) (-0.150,0.137) (B) (-0.287,-0.013) (C) (0.421,0.518) (D) (-0.129,0.150)

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* In a first sample of 200 men, 130 said they used seat belts and a second sample of 300 women, 150 said they used seat belts. To test the claim that men are more safety-conscious than women, at0.05 level of significant.

1. **The Hypothesis is:**

(A)H0:(B) H0: (C) H0: (D) H0:

HA:HA:HA:HA:

1. **The value of the test statistic is:**
2. -3.31 (B)5.96 (C)1.15 (D) 3.31
3. **The decision is:**

**(**A) Reject B) Do not reject (Accept)

(C) Accept both and (D) Reject both and

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* If the hemoglobin level of pregnant women is normally distributed, and ifthe mean and standard deviation of a sample of 25 pregnant women were ­­(g/dl), (g/dl).Using,to test if the average hemoglobin level for the pregnant women is greater than 10 (g/dl).

1. **The hypotheses are :**

(A) Ho: μ=10 (B) Ho:μ=10 (C)Ho:μ<10 (D)Ho:μ≤10

HA: μ10 HA:μ<10 HA:μ>10 HA:μ>10

.

1. **The test statistic is:**

(A)(B) (C)(D)

1. **The value of the test statistic is:**

(A) 10 (B) 1.5 (C)7.5 (D)37.5

1. **The rejection of H0 if :**

(A) z< -1.645 (B) z> 1.645 (C) t < -1.7109 (D) t>1.7119

1. **Our decision is:**

(A) Reject B) Do not reject (Accept)

(C) Accept both and (D) Reject both and

**…………………………………………………………………………………………**

* Suppose that the hemoglobin levels (in g/dl) of healthy Saudi females are approximately normally distributed with mean of 13.5 and a standard deviation of 0.7. If 15 healthy adult Saudi female is randomly chosen,then

1. **The mean of (or ) is:**
2. 0.7 (B) 13.5 (C) 15 (D) 3.48

(A) 0.99720 (B) 0.99440 (C) 0.76115 (D) 0.52231

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* Toothpaste (معجون الأسنان) company claims thatmorethan75% of the dentists recommend their product to the patients. Suppose that 161 out of 200 dental patients reported receiving a recommendation for this toothpaste from their dentist. Do you suspect that the proportion is actually morethan75%. Use 0.05 confidence level.

1. **The sample proportion is:**

(A) 0.75 (B) 0.195 (C) 0.805 (D) 0.25

1. **The correct hypothesis for this test is:**

(A)(B) (C) (D)

1. **The value of the test statistic is:**
2. 1.963 (B) -1.796 (C) 1.796 (D) -1.963
3. **Our decision is:**

(A) Reject the claimB) Do not reject the claim

(C) Accept both and (D) Reject both and

**…………………………………………………………………………………………**

* In a study, it was found that 31% of the adult population in a certain city has a diabetic disease. 100 people are randomly sampled from the population. Then

1. **The mean for the sample proportion (**) is:

(D) 0.1 (C) 0.69 (B) 0.31 (A) 0.4

(A) 0.02619 (B) 0.02442 (C) 0.0256 (D) 0.7054

* A researchers group has perfected a new treatment of a disease which they claim is very efficient. As evidence, they say that they have used the new treatment on 50 patients with the disease and cured 25 of them. To calculate a 95% confidence interval for the proportion of the cured.

1. **The point estimate of  *p* is equal to:**

(A) 0.25 (B)0.5 (C) 0.01 (D) 0.33

1. **The reliability coefficient () is equal is :**

(A) 1.96 (B) 1.645 (C) 2.02 (D) 1.35

1. **The 95% confidence interval is equal to:**

(A) (0.1114,0.3886) (B) (0.3837,0.6163) (C) (0.1614,0.6386) (D)(0.3614,0.6386)

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End of the questions