Statistics II

Quiz I Example

For each wrong answer there is a discount of 0.25

Personal data

Surname(s):

Given name(s):

Signature:

verificado

Student number

0 __ __ __ __ __ __

0	☒	☐	☐	☐	☐	☐	☐	0
1	☐	☐	☐	☐	☐	☐	☐	1
2	☐	☐	☐	☐	☐	☐	☐	2
3	☐	☐	☐	☐	☐	☐	☐	3
4	☐	☐	☐	☐	☐	☐	☐	4
5	☐	☐	☐	☐	☐	☐	☐	5
6	☐	☐	☐	☐	☐	☐	☐	6
7	☐	☐	☐	☐	☐	☐	☐	7
8	☐	☐	☐	☐	☐	☐	☐	8
9	☐	☐	☐	☐	☐	☐	☐	9

In this section **no** changes or modifications can be made!

Scrambling: 0 0

Category: 001

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Only clearly marked and positionally accurate crosses will be processed!

Answers 1 - 10

	a	b	c	d	e
1	☐	☐	☐	☐	☐
2	☐	☐	☐	☐	☐
3	☐	☐	☐	☐	☐
4	☐	☐	☐	☐	☐
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6	☐	☐	☐	☐	☐
7	☐	☐	☐	☐	☐
8	☐	☐	☐	☐	☐
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1. *(2 points)* Consider the following results for the variable *Time reading newspapers (minutes)* obtained from a random sample of 25 newspaper readers.

Table 1 - Descriptives

			Statistic	Std. Error
Time reading newspapers (minutes)	Mean		61,40	4,523
	95% Confidence Interval for Mean	Lower Bound	**(Lb)**	
		Upper Bound	70,74	
	5% Trimmed Mean		60,72	
	Median		60,00	
	Variance		511,500	
	Std. Deviation		22,616	
	Minimum		30	
	Maximum		105	
	Range		75	
	Interquartile Range		38	
	Skewness		,562	,464
	Kurtosis		-,691	,902

Based on the results in Table 1, identify which of the following options is correct for the value of **(Lb)**:

(a) (Lb) = 56.88
(b) (Lb) = 52.06
(c) (Lb) = 52.53
(d) (Lb) = 53.66
(e) (Lb) = 61.40

2. *(2 points)* Which of the following statements is true regarding the assumptions for constructing a confidence interval for a population mean:

(a) Only the assumption that the population from which the sample was taken follows a normal distribution.
(b) Only the assumption that the sample is random.
(c) Only the assumption that the population variance is known.
(d) The assumptions that the sample is random, and the population is normally distributed.
(e) The assumptions that the sample is random, the population is normally distributed, and the population variance is known.

3. *(2 points)* The Association of Weekly Newspaper Companies is convinced that the proportion of weekly newspaper readers in the Portuguese population is 0.35. To confirm this statement, a random sample of 100 individuals was randomly collected from population and the following 95% CI was obtained:]0.15; 0.35[. Which of the following three statements is correct regarding this confidence interval:

i) The sample proportion is equal to 0.30.
ii) The CI's margin of error is equal to 0.20.
iii) The range of the CI is 0.10.

(a) Only statement i) is correct.
(b) Only statement ii) is correct.
(c) Statements ii) and iii) are both correct.
(d) The three statements are correct.
(e) None of the three statements is correct.

4. *(2 points)* It is intended to construct a 95% confidence interval for the difference between the means of two population groups. The population distribution of the two groups is unknown, but their population variances are known. Which of the following pivotal variables is suitable for constructing this confidence interval:

(a) $\frac{(\bar{X}_1-\bar{X}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{(n_1-1)S\prime_1^2+(n_2-1)S\prime_2^2}{n_1+n_2-2}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} \cap \left(t_{n_1+n_2-2}\right)$

(b) $\frac{(\bar{X}_1-\bar{X}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{(n_1-1)S\prime_1^2+(n_2-1)S\prime_2^2}{n_1+n_2-2}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} \dot{\cap}\, n(0,1)$ for any n_1 and n_2

(c) $\frac{(\bar{X}_1-\bar{X}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{(n_1-1)S\prime_1^2+(n_2-1)S\prime_2^2}{n_1+n_2-2}\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} \dot{\cap}\, n(0,1)$ if $n_1 > 30$ and $n_2 > 30$

(d) $\frac{(\bar{X}_1-\bar{X}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{S\prime_1^2}{n_1}+\frac{S\prime_2^2}{n_2}}} \dot{\cap}\, n(0,1)$ if $n_1 > 30$ and $n_2 > 30$

(e) None of the other options is correct.

5. *(2 points)* Consider the following random confidence interval for a population variance constructed for a random sample of 25 individuals:

$$]IC_{\lambda}[_{\sigma^2} = \left]\frac{24S'^2}{36.4}; \frac{24S'^2}{13.8}\right[$$

Which of the following statements is correct regarding the interpretation of this confidence interval:

(a) There is a probability of 0.95 that this interval contains the value of the population parameter to be estimated.
(b) There is a probability of 0.90 that this interval contains the value of the population parameter to be estimated.
(c) There is a probability of 0.95 that the value of the population parameter falls within this interval.
(d) There is a probability of 0.90 that the value of the population parameter falls within this interval.
(e) None of the other options is correct.

6. *(2 points)* In an attempt to gain more market share, the management of a supermarket chain needs to know whether men spend more on buying organic products than women. To this end, 200 clients were randomly selected from its database (100 men and 100 women). The means and standard deviations for monthly expenses, in euros, on organic products are presented in the following table:

Men	Women
$\bar{x}_M = 70$	$\bar{x}_W = 55$
$s'_M = 18$	$s'_W = 12$

Assume that the population variances are different. What is the 95% confidence interval for the difference between the mean monthly expenditures on biological products made by individuals of the two sexes?

(a)]10.76; 19.24[
(b)]13.93; 16.07[
(c)]14.10; 15.90[
(d)]11.44; 18.56[
(e)]14.48; 15.52[

7. *(2 points)* In estimating the mean value of a normal population (with known σ) through a confidence interval, what happens to the range of the interval if we increase its confidence level?

   (a) Decreases.
   (b) Increases.
   (c) Maintains the same value.
   (d) Nothing can be concluded.
   (e) Depends on the value of the parameter μ.

8. *(2 points)* 30 ISCTE students were asked about the time they usually take between home and university. The following information was obtained:

$$\sum_{i=1}^{30} x_i = 990 \qquad \sum_{i=1}^{30} (x_i - \bar{x})^2 = 300$$

   The 95% confidence interval for the standard deviation of the time that ISCTE students usually take between home and university is:

   (a) $]6.383; 17.857[$.
   (b) $]2.526; 4.226[$.
   (c) $]6.565; 18.750[$.
   (d) $]2.562; 4.330[$.
   (e) None of the other options is correct.

9. *(2 points)* There are approximately 500 000 voters in a certain region of the country. In a survey of 2 000 respondents, 840 said they would vote in the next municipal elections.

   What is the minimum number of electors to be polled, if one intends, for a confidence level of 90%, a maximum margin of error of 10% in estimating the proportion of electors who will vote in the next elections?

   (a) 271.
   (b) 348.
   (c) 406.
   (d) 66.
   (e) 40.

10. *(2 points)* During a presidential election year, many predictions are made for voters' voting intentions. In a sample of n_1 = 120 registered voters in the AA District, 107 indicated that they supported the current president. In another sample of n_2 = 141 voters registered in the BB Electoral District, only 73 indicated support for the current president. The 95% confidence interval for the difference between the population proportions of the two districts, p1 − p2, is:

   (a)] 0.2745; 0.4734 [.
   (b)] 0.2069; 0.5409 [.
   (c)] 0.3089; 0.4398 [.
   (d)] 0.2905; 0.4574 [.
   (e) None of the other options is correct.