UFPR

Bioestatística 2018-02-26

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Respostas 1 - 5

	a	b	c	d	e
1	☐	☐	☐	☐	☐
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5	☐	☐	☐	☐	☐
	a	b	c	d	e

1. *(2 pontos)* A machine fills milk into 1000ml packages. It is suspected that the machine is not working correctly and that the amount of milk filled differs from the setpoint $\mu_0 = 1000$. A sample of 166 packages filled by the machine are collected. The sample mean $\bar{y}$ is equal to 917.8 and the sample variance s^2_{n-1} is equal to 1374.86.

   Test the hypothesis that the amount filled corresponds on average to the setpoint. What is the value of the t test statistic?

   (a) 72.493
   (b) -28.563
   (c) 2.264
   (d) -2.378
   (e) -43.566

2. *(2 pontos)* Compute the Hessian of the function

$$f(x_1, x_2) = -8x_1^2 + 3x_1x_2 - 6x_2^2$$

   at $(x_1, x_2) = (-5, 5)$. What is the value of the lower right element?

   (a) 12
   (b) -12
   (c) 23
   (d) 3
   (e) -16

3. *(2 pontos)* A survey with 53 persons was conducted to analyze the design of an advertising campaign. Each respondent was asked to evaluate the overall impression of the advertisement on an eleven-point scale from 0 (bad) to 10 (good). The evaluations are summarized separately with respect to type of occupation of the respondents in the following figure.

   To analyze the influence of occupation on the evaluation of the advertisement an analysis of variance was performed:

```
  Res.Df    RSS Df Sum of Sq      F     Pr(>F)
1     52 41.407
2     49 24.168  3    17.239 11.651 7.0122e-06
```

   Which of the following statements are correct?

   (a) The test statistic is larger than 21.7.

(b) It can be shown that the evaluation of the respondents depends on their occupation. (Significance level 5%)

(c) The fraction of explained variance is smaller than 57%.

(d) The fraction of explained variance is larger than 17%.

(e) A one-sided alternative was tested for the mean values.

4. *(2 pontos)* The waiting time (in minutes) at the cashier of two supermarket chains with different cashier systems is compared. The following statistical test was performed:

```
        Two Sample t-test

data:  Waiting by Supermarket
t = -1.0822, df = 99, p-value = 0.2818
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -1.8725382  0.5508517
sample estimates:
 mean in group Sparag mean in group Consumo
             5.332709              5.993553
```

Which of the following statements are correct? (Significance level 5%)

(a) The absolute value of the test statistic is larger than 1.96.

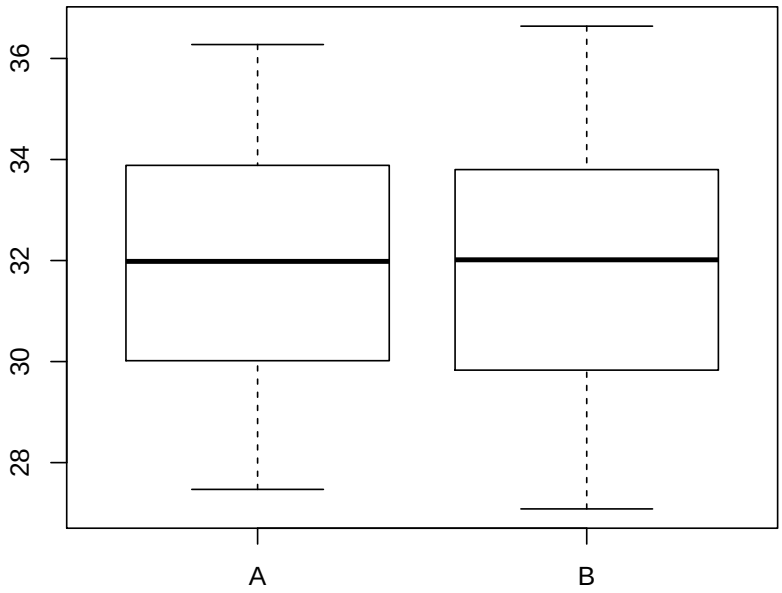
(b) A one-sided alternative was tested.

(c) The p value is larger than 0.05.

(d) The test shows that the waiting time is longer at Sparag than at Consumo.

(e) The test shows that the waiting time is shorter at Sparag than at Consumo.

5. *(2 pontos)* In the following figure the distributions of a variable given by two samples (A und B) are represented by parallel boxplots. Which of the following statements are correct? *(Comment: The statements are either about correct or clearly wrong.)*



(a) The location of both distributions is about the same.

(b) Both distributions contain no outliers.

(c) The spread in sample A is clearly bigger than in B.

(d) The skewness of both samples is similar.

(e) Distribution A is left-skewed.