

EXAM OF STATISTICS (DESCRIPTIVE STATISTICS AND REGRESSION)

2nd Physiotherapy

Version A

March, 3 2020

Name:

DNI:

Group:

Duration: 1 hour.

- (5 pts.) 1. In a study on the reconstruction of the anterior cruciate ligament (ACL), the postoperative recovery time was evaluated depending on whether the patients underwent a meniscal suture or not. The table below contains the results:

| Postoperative months | Patients without suture | Patients with suture |
|----------------------|-------------------------|----------------------|
| 0 – 1 | 11 | 5 |
| 1 – 2 | 18 | 13 |
| 2 – 3 | 10 | 6 |
| 3 – 4 | 8 | 10 |
| 4 – 5 | 6 | 9 |
| 5 – 6 | 4 | 1 |
| 6 – 7 | 1 | 0 |
| 7 – 8 | 2 | 8 |

- Plot the ogive for the sample of patients without meniscal suture.
- Are there outliers in the number of postoperative months of patients without meniscal suture?
- In which of the two groups is more representative the mean of the postoperative months?
- Can we assume that the sample of patients with meniscal suture comes from a normal population?
- What value is relatively greater, 5 months for a patient without meniscal suture, or 6 for a patient with meniscal suture?

Use the following sums for the computations:

Without meniscal suture: $\sum x_i n_i = 156$ months, $\sum x_i^2 n_i = 601$ months², $\sum (x_i - \bar{x})^3 n_i = 313.32$ months³ y $\sum (x_i - \bar{x})^4 n_i = 1990.94$ months⁴.

With meniscal suture: $\sum y_i n_i = 178$ months, $\sum y_i^2 n_i = 853$ months², $\sum (y_i - \bar{y})^3 n_i = 340.26$ months³ y $\sum (y_i - \bar{y})^4 n_i = 2788.04$ months⁴.

- (5 pts.) 2. The table below shows the evolution of the number of coronavirus infections since the virus was detected.

| | | | | | | | | | |
|------------|-----|-----|------|------|-------|-------|-------|-------|-------|
| Days | 25 | 29 | 32 | 35 | 38 | 40 | 43 | 45 | 47 |
| Infections | 282 | 846 | 2798 | 7818 | 14557 | 20630 | 31481 | 37558 | 43103 |

- Which regression model, the linear or the exponential, is better to predict the number of coronavirus infections with time?
- According to the best of the two previous regression models, how many infections will there be after 100 days? Is this prediction reliable?
- If the number of deaths from coronavirus is linearly related to the number of infections, with a linear coefficient of determination 0.99, how much will increase or decrease the number of infections for each death more if it is known that the number of deaths increases 0.022 for each infection more.

Use the following sums for the computations:

$\sum x_i = 334$ days, $\sum \log(x_i) = 32.3517 \log(\text{days})$, $\sum y_j = 159073$ infections, $\sum \log(y_j) = 80.3657 \log(\text{infections})$,

$\sum x_i^2 = 12842$ days², $\sum \log(x_i)^2 = 116.6525 \log(\text{days})^2$, $\sum y_j^2 = 4966773651$ infections², $\sum \log(y_j)^2 = 743.3009 \log(\text{infections})^2$,

$\sum x_i y_j = 6842750$ days·infections, $\sum x_i \log(y_j) = 3086.808$ days· $\log(\text{infections})$, $\sum \log(x_i) y_j = 597633.103 \log(\text{days})\text{infections}$, $\sum \log(x_i) \log(y_j) = 291.8911 \log(\text{days}) \log(\text{infections})$.