

EXAM OF STATISTICS (DESCRIPTIVE STATISTICS AND REGRESSION)

2nd Physiotherapy

Version A

March, 26 2019

Name:

DNI:

Group:

Duration: 1 hour and 15 minutes.

- (5 pts.) 1. The time required by a drug A to be effective has been measured (in minutes) in a sample of 150 patients. The table below summarize the results.

Response time	Patients
$(0, 5]$	5
$(5, 10]$	15
$(10, 15]$	32
$(15, 20]$	36
$(20, 30]$	42
$(30, 60]$	20

- Are there outliers in the sample? Justify the answer.
- What is the minimum time for the 20% of patients with highest response time?
- What is the average response time? Is the mean representative?
- Can we assume that the sample comes from a normal population?
- If we take another sample of patients with mean 18 min and standard deviation 15 min, in which group is greater a response time of 25 min?

Use the following sums for the computations: $\sum x_i = 3105$ min, $\sum x_i^2 = 83650$ min², $\sum (x_i - \bar{x})^3 = 206851.65$ min³ y $\sum (x_i - \bar{x})^4 = 8140374.96$ min⁴.

- (1.5 pts.) 2. In a regression study about the relation between two variables X and Y we got $\bar{x} = 7$ and $r^2 = 0.9$. If the equation of the regression line of Y on X is $y - x = 1$, compute

- The mean of Y .
- The equation of the regression line of X on Y .
- What value does this regression model predict for $x = 6$? And for $y = 10$?

- (3.5 pts.) 3. In a tennis club the age (X) and the height (Y) of the ten players conforming the female youth team has been measured.

Age (years)	9	10	11	12	13	14	15	16	17	18
Height (cm)	128	144	148	154	158	161	165	164	166	167

- Plot the scatter plot (Height on Age).
- Which regression model bests fits these data, the linear or the logarithmic?
- What is the expected height of a player 12.5 years old according to the best of two previous models?

Use the following sums for the computations:

$\sum x_i = 135$ years, $\sum \log(x_i) = 25.7908$ log(years), $\sum y_j = 1555$ cm, $\sum \log(y_j) = 50.4358$ log(cm),
 $\sum x_i^2 = 1905$ years², $\sum \log(x_i)^2 = 67.0001$ log(years)², $\sum y_j^2 = 243191$ cm², $\sum \log(y_j)^2 = 254.4404$

$$\begin{aligned} & \log(\text{cm})^2, \\ & \sum x_i y_j = 21303 \text{ years} \cdot \text{cm}, \sum x_i \log(y_j) = 682.9473 \text{ years} \cdot \log(\text{cm}), \sum \log(x_i) y_j = 4035.0697 \log(\text{years}) \text{cm}, \\ & \sum \log(x_i) \log(y_j) = 130.2422 \log(\text{years}) \log(\text{cm}). \end{aligned}$$