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 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

(a) Are there outliers in the sample? Justify the answer.

(b) What is the minimum time for the 20% of patients with highest response time?

(c) What is the average response time? Is the mean representative? What is the average response time of drug B? Is more or less respresentative than the one of drug A?

(d) Can we assume that the sample comes from a normal population?

(e) 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, $\sum x_i^2 = 83650$ min^2, $\sum (x_i - \bar{x})^3 = 206851.65$ min^3 y $\sum (x_i - \bar{x})^4 = 8140374.96$ min^4.

(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

(a) The mean of Y.

(b) The equation of the regression line of X on Y.

(c) ¿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

(a) Plot the scatter plot.

(b) Which regression model bests fits these data, the linear or the logarithmic?

(c) ¿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),
$\sum x_i^2 = 1905$ years^2, $\sum \log(x_i)^2 = 67.0001$ log(years)^2, $\sum y_j^2 = 243191$ cm^2, $\sum \log(y_j)^2 = 254.4404$ log(cm)^2,
$\sum x_i y_j = 21303$ years·cm, $\sum x_i \log(y_j) = 682.9473$ years· log(cm), $\sum \log(x_i) y_j = 4035.0697$ log(years)cm,
$\sum \log(x_i) \log(y_j) = 130.2422$ log(years) log(cm).