EXAM OF STATISTICS
(DESCRIPTIVE STATISTICS AND REGRESSION)

Pharmacy/Biotechnology 1st year **Version B** **October, 25 2021**

Name: DNI: Group:

Duration: 1 hour.

(5 pts.) 1. The table below shows the number of daily sugary drinks drunk by a sample of 16-years-old people.

Drinks	n_i	f_i	N_i	F_i
0		0.1		
1			48	
2				0.725
3	24			
4				0.975
5			120	

(a) Complete the table explaining how.

(b) Plot the cumulative frequency polygon.

(c) Are there outliers?

(d) Study the normality of the distribution.

(e) If another sample of 18-years-old people has a mean 2.1 drinks and a variance 1.5 drinks^2, in which distribution is more representative the mean?

(f) Who consumes a higher relative amount of sugary drinks, a 16-years-old who consumes 3 drinks a day or a 18-years-old who consumes 4?

Use the following sums for the computations: $\sum x_i = 225$ drinks, $\sum x_i^2 = 579$ drinks^2, $\sum (x_i - \bar{x})^3 = 80.16$ drinks^3 and $\sum (x_i - \bar{x})^4 = 616.32$ drinks^4.

(4 pts.) 2. The rowan is a species of tree that grows at different altitudes. In order to study how the rowan adapts to different habitats, we have collected a sample of branches of 12 trees at different altitudes in Scotland. In the laboratory, the respiration rate of each branch was observed during the night. The following table shows the altitude (in meters) of each branch and the respiration rate (in nl of O_2 per hour per mg of weight).

Altitude	90	230	240	260	330	400	410	550	590	610	700	790
Respiration rate	110	200	130	150	180	160	230	180	230	260	320	370

(a) Is there a linear relationship between altitude and respiration rate of rowan. How is this relationship?

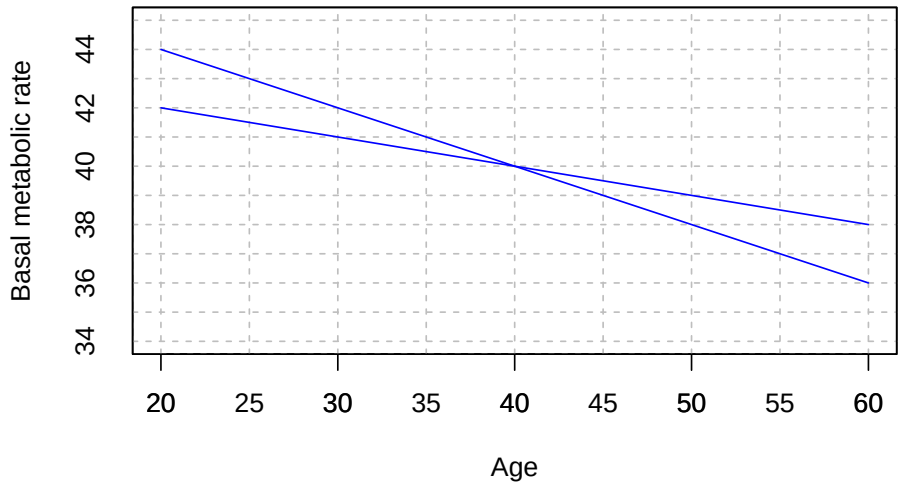
(b) How much increases the respiration rate per each increment of 100 meters in the altitude?

(c) What respiration rate is expected for a rowan at 500 meters of altitude? And for a rowan at the sea level?

(d) Are these predictions reliable?

Use the following sums for the computations (X=Altitude and Y=Respiration rate): $\sum x_i = 5200$ m, $\sum y_i = 2520$ nl/(mg· h), $\sum x_i^2 = 2760000$ (m)^2, $\sum y_i^2 = 594600$ nl/(mg· h)^2 and $\sum x_i y_j = 1253400$ m· nl/(mg· h).

(1 pts.) 3. The relationship between basal metabolic rate and age is being studied in a sample of healthy men and the following regression lines have been obtained



(a) Compute the means of the basal metabolic rate and the age.

(b) How is the fit of the two lines?