

Statistics I, Group 04. Prof. M. Creel

Fourth Short Exam, Mon. 11 Jan., 2010

NAME:

DNI:

Signature:

Do not begin working on the exam until told to do so. Read the whole exam. Brief clarifying questions are allowed before work begins. Once all questions have been answered, you may begin work. Answer in the space provided, and please try to write clearly. You may answer in English, Catalan or Spanish.

1. The volume of beer put into bottles by a machine follows a normal distribution with mean 34cl and standard deviation 1.5cl. Cans that contain less than 33cl are rejected.

(a) what is the probability that a can is rejected?

- (b) Suppose the machine can be adjusted to control the mean volume put into a can. What is the mean volume needed so that 1.5% of cans will contain less than 33cl?

2. For the sample $S = \{1, 2, 4, 5, 6, 8, 9, 11, 20\}$

(a) what is the mean?

(b) what is the median?

(c) what is the first quartile?

(d) what is the third quartile?

(e) what is the sample variance?

3. The joint density function of the discrete random variables X and Y is

$$f_{XY}(x,y) = \begin{cases} kxy, & x \in \{1,2\}, y \in \{1,2,3\} \\ 0 & \text{otherwise} \end{cases}$$

where k is a constant.

(a) find the conditional density function of Y given that $X = x$.

(b) what is the probability that $Y = 2$ given that $X = 2$?

(c) what is the conditional expectation of Y given that $X = 2$?

4. The joint density function of the discrete random variables X and Y is given in the table

$f_{XY}(x,y)$		y		
		0	1	2
x	0	0.2	0	0.2
	1	0	0.3	0
	2	0	0.1	0.2

(a) are X and Y independent random variables? Explain.