

**STATISTICS APPLIED TO BUSINESS
ADMINISTRATION. ACADEMIC YEAR 2022-2023
PRACTICAL EXERCISE 3 (20 MINUTES)**

Date: _____

Complete name: _____ ID number: _____

EXERCISE 1 (4 POINTS)

Let $X \in \gamma(a, r)$, with characteristic function given by $\psi_X(u) = (1 - 5iu)^{-r}$, and $\text{Var}(X) = 25$.

1. **(2 points)** Find the distribution of the r.v. X and compute its mean.
2. **(2 points)** What is the value of $P(-10 \leq X \leq 10)$?

EXERCISE 2 (6 POINTS)

Let X_1, X_2, X_3, X_4 and X_5 be five independent r.v. such that: $X_1 \in N(-2, \sigma^2 = 4)$, $X_2 \in N(0, \sigma^2 = 9)$, $X_3 \in N(5, \sigma^2 = 1)$, $X_4 \in \chi_2^2$ and $X_5 \in \gamma(\frac{1}{2}, 4)$.

1. (2 points) Find the value of k such that $P(X_2^2 > k) = 0.10$.

2. (2 points) Let $V = \frac{X_2}{\sqrt{\left(\frac{X_1+2}{2}\right)^2 + X_5}}$. Compute $P(-0.883 \leq V \leq 2.82)$.

3. (2 points) Let $W = \frac{\left[\left(\frac{X_1+2}{2}\right)^2 + (X_3 - 5)^2 + X_5\right]}{5 X_4}$. Find the value of k such that $P(W > k) = 0.90$.