

EXAM OF STATISTICS (PROBABILITY AND RANDOM VARIABLES)

2nd Physiotherapy

Version A

May, 06 2022

Name:

DNI:

Group:

Duration: 1 hour.

- (3 pts.) 1. A basketball player scores 12 points per game on average.
- (a) What is the probability that the player scores more than 4 points in a quarter?
 - (b) If the player plays 10 games in a league, what is the probability of scoring less than 6 points in some game?
- (3 pts.) 2. 8% of people in a population consume cocaine. It is also known that 4% of people who consume cocaine have a heart attack and 10% of people who have a heart attack consume cocaine.
- (a) Construct the probability tree for the random experiment of drawing a random person from the population and measuring if he or she consumes cocaine and if he or she has a heart attack.
 - (b) Compute the probability that a random person of the population does not consume cocaine and does not have a heart attack.
 - (c) Are the events of consuming cocaine and having a heart attack dependent?
 - (d) Compute the relative risk and the odds ratio of suffering a heart attack consuming cocaine. Which association measure is more suitable for this study? Interpret it.
- (4 pts.) 3. The creatine phosphokinase (CPK3) is an enzyme in the body that causes the phosphorylation of creatine. This enzyme is found in the skeletal muscle and can be measured in a blood analysis. The concentration of CPK3 in blood is normally distributed, and the interval centered at the mean with the reference values, that accumulates 99% of the population, ranges from 40 to 308 IU/L in healthy adult males.
- (a) Compute the mean and the standard deviation of the concentration of CPK3 in healthy males. Note: If you are not able to compute the standard deviation, use $\sigma = 50$ UI/L for the next parts.
 - (b) A diagnostic test to detect muscular dystrophy gives a negative outcome when the concentration of CPK3 is below 300 UI/L. Compute the specificity of the test.
 - (c) If the concentration of CPK3 in people with muscular dystrophy also follows a normal distribution with mean 350 IU/L and the same standard deviation, what is the sensitivity of the test?
 - (d) Compute the predictive values of the test and interpret them assuming that the muscular dystrophy prevalence is 8%.