

STAT 830

Problems: Assignment 1

This first problem set is partly review. I want to see how you answer relatively elementary problems. I don't plan to discuss these with anyone before they are handed in and I want complete clear explanations about what you are doing and assuming. Nothing I have said in class is particularly relevant to problems 1 and 2.

1. The concentration of cadmium in a lake is measured 17 times. The measurements average 211 parts per billion with an SD of 15 parts per billion. Could the real concentration of cadmium be below the standard of 200 ppb? I want an answer in the form of a paragraph with NO formulas, no Greek letters. An answer is not 1 word long. I also want this turned in in the form of a document produced in L^AT_EX.
2. Suppose X and Y are independent Geometric(p) random variables. In other words for non-negative integers j and k

$$P(X = j \text{ and } Y = k) = P(X = j)P(Y = k) = p^2(1 - p)^{j+k}.$$

WARNING: there are two standard definitions of Geometric distributions. The formula above specifies which I am talking about.

- (a) Let $U = \min(X, Y)$, $V = \max(X, Y)$ and $W = V - U$. Express the event $U = j$ and $W = k$ in terms of X and Y .
 - (b) Compute $P(U = j)$ and $P(W = k)$ and prove that the event $U = j$ and the event $W = k$ are independent.
3. From the text p14 # 3.
 4. From the text p14 # 8.
 5. From the text: page 14,15 #10
 6. From the text p16 # 18.

Due date: 14 September 2011 in class.