Regression analysis, Module 1, “Statistical models”

(The attached PDF file has better formatting.)

Homework assignment: probabilities

Fox uses the data in Table 1.1 on page 5 to infer that judges grant leave at different rates.

A. If all judges grant leave in 25% of cases, and the differences among judges are random fluctuations, what is the probability a judge (Desjardins) grants leave in 49% or more of cases?
B. If all judges grant leave in 25% of cases, and the differences among judges are random fluctuations, what is the probability that a judge (Pratte) grants leave in 9% or fewer of cases?

Write an algebraic expression for the solution. You need not compute a numerical solution.

Note: Judge Desjardins heard 47 cases and granted leave in 49% × 47 = 23 cases.

- Write the expression for 23 successes in 47 cases with a probability of 25%.
  - This is a binomial probability with π = 25%.
- Write the summation for 23 through 47 successes. You need not evaluate the sum.
  - The sum goes from 23 successes to 47 successes.

Judge Pratte heard 57 cases and granted leave in 9% × 57 = 5 cases.

- Write the expression for 5 successes in 57 cases with a probability of 25%.
- Write the summation for 0 through 5 successes. You need not evaluate the sum.
  - The sum goes from 0 successes to 5 successes.

Note: The PMF of the binomial distribution is $\binom{n}{k} p^k (1-p)^{n-k}$

where n is the number of trials and p is the probability of success on each trial.

You do not have to compute any figures for this homework assignment.