

Poisson Distribution – Exercises (1 page; 17/2/26)

(1) Each week Isaac buys a lottery ticket, where the prize $\pounds X$ has a Poisson distribution with mean 1.

What is the probability that his average win over 10 weeks is more than $\pounds 1$?

(2) What are the (main) conditions for a Poisson model to be appropriate?

(3) If $X \sim Po(\lambda)$, what is the most common value of X ?

(a) If $\lambda = 5$ (b) If $\lambda = 5.5$

(4) The probability of there being a typographical error on a particular page of a 500 page book is assumed to be 0.09. Using a suitable approximation, what is the probability that at least one book out of 10 (each having 500 pages) contains more than 60 errors in total?

(5) If a Binomial variable $X \sim B(n, p)$ is to be approximated by a Poisson variable, give an algebraic reason why p has to be small.

(6) A random sample of 100 observations is taken from a Poisson distribution with mean 3.3

Find the (exact) probability that the mean of the sample is greater than 3.5