
R Tutorial 8

Instructions:

- Answer all questions.
- Ensure that your findings and results are clearly stated and thoroughly discussed. Please support your arguments using suitable R code with the relevant outputs, interpretations, plots and graphs whenever possible. You should support your argument using appropriate theory that is appropriately referenced.
- The R commands that you use in obtaining your results for all questions must be documented in a R script file. These scripts must be clearly commented. Ensure that any output is clearly stated and interpreted separately from the code as additional comments.
- Include the task name, your name and surname, and your student number in your R script file.
- You MUST label each answer by question number and, where a question has multiple parts, label each part of the question CLEARLY.
- On completion of your assignment, please submit onto RUconnected. If there are any issues uploading onto RUconnected, you may email your submission to: s.izally@ru.ac.za. Please submit your R script file and any other saved data files and plots mentioned in the questions below. Your student number should be included in the name of each file that you submit.
- Each student must complete an individual assignment. You will be assessed based on the quality and/or correctness of the R code, its outputs, and your explanations and interpretations. Acknowledge any help you may have received. Feel free to note any help you may have given to other students in the course.
- This assignment must be submitted by Tuesday, 17 September 2024 by 17:00. Late submissions will be penalized.
- Please note the Rhodes University and the Rhodes University Department of Statistics plagiarism policies.

Questions:

1. If $X \sim B(n = 20, p = 0.25)$, then using R
 - (a) Use the `barplot` command to graph this probability distribution. Label the x-axis as " x ", the y-axis as "Probability" and give the graph the following title: "Binomial PDF".
 - (b) $P(X = 12)$.
 - (c) $P(X = 13)$.
 - (d) $P(X = 14)$.
 - (e) A vector named `TheProbs` whose components are $P(X = 12)$, $P(X = 13)$ and $P(X = 14)$.
 - (f) $P(X = 12) + P(X = 13) + P(X = 14)$.
 - (g) $P(X \leq 12)$.
 - (h) $P(X < 16)$.
 - (i) $P(X \geq 14)$.
2. The probability that a patient recovers from a disease is 0.73. Suppose that twenty people are known to have contracted this disease.
 - (a) What is the probability that exactly thirteen recover?
 - (b) What is the probability that at least nine recover?
 - (c) What is the probability that at least twelve but not more than nineteen recover?
 - (d) What is the probability that at most fifteen recover?
 - (e) What is the expect number of recoveries?
 - (f) What is the variance of the number of recoveries?