

0.1 Probability Distributions: Tutorial Sheet

1. During the day, cars pass along a point on a remote road at an average rate of one per 20 minutes. Calculate the probability that
 - (i) The time between the arrival of 2 cars is greater than 1 hour.
 - (ii) The time between the arrival of 2 cars is less than 10 minutes
 - (iii) The time between the arrival of 2 cars is greater than 20 minutes, but less than 40 minutes.
2. Suppose X has an $\text{Exp}()$ distribution.
 - (i) Derive $E(X)$ and $\text{Var}(X)$. [Use the fact that
 - (ii) Using induction, show that the k -th moment of X is given by
 - (iii) Show that X has the memoryless property.
3. A die is thrown until either a six is obtained or five rolls are done (a truncated geometric distribution). Let X be the number of rolls.
 - (i) Define the cumulative distribution function of X .
 - (ii) Find the median of X .