

ECON 253: Homework 3

1. If calls to your cell phone are a Poisson process with a constant rate $\lambda=2$ calls per hour, what's the probability that, if you forget to turn your phone off in a 1.5 hour movie, your phone rings during that time?
2. The weights of packages of ground beef are normally distributed with mean 1 kg and standard deviation 0.10. Suppose we collect a random sample of 25 packages.
 - a) What is the probability that a randomly selected package weighs between 0.80 and 0.85 kg?
 - b) What is the probability that the average weight in the sample is between 0.80 and 0.85 kg?
3. The customers of a restaurant are charged for the amount of salad they take. Sampling suggests that the amount of salad taken by the customers is uniformly distributed between 150 grams and 300 grams. What is the probability that a customer will take between 200 and 280 grams of salad?
4. The time between arrivals of cars at a full-service gas pump follows an exponential probability distribution with a mean time between arrivals of 3 minutes. What is the probability that the time between two successive arrivals will be 2 minutes or less?
5. A random sample of 270 homes was taken from a large population of homes to estimate the proportion of homes with unsafe wiring. If, in fact, 20% of homes have unsafe wiring, what is the probability that the sample proportion will be between 16% and 24% of homes with unsafe wiring?
6. The number of minutes per week that customers spend on the company website can be assumed to be normally distributed. Suppose that a random sample of 30 customers have an average of 185.1 minutes. Build a 95% confidence interval around the population mean in the following three cases:
 - a) By assuming that the population variance is 7.
 - b) By assuming that the population variance is unknown and the sample variance is 7.
 - c) By assuming that the population variance is unknown and the sample variance is 7. But this time the sample size is 60.