

Problem Set 8: Continuous Distributions
CSSS 505/ SOC 512
Due: March 3, 2021

1. Suppose that Verbal SAT scores are distributed as a Normal random variable with mean 550 and standard deviation 50.
 - (a) What is the probability that an SAT score falls between 500 and 600?
 - (b) What is the probability that an SAT score falls between 450 and 650?
 - (c) What is the probability that an SAT score is less than 400?
2. While driving to the Sounders game, you stop at a stoplight at 8:47:00. The time you will have to wait there follows a continuous uniform distribution from 8:47:00 to 8:50:00.
 - (a) What is the probability that you will have to wait at least a minute?

- (b) What is the probability that you will wait more than 2 minutes?
- (c) What is the probability that you will wait less than 4 minutes?
- (d) What is your expected wait time?
3. Suppose we ask 30 people whether they believe Mayor Durkan is doing a good job of running the city. 13 people said they “agree”, 6 said they were “neutral”, and 11 said they “disagree”. We believe the city is evenly split between the three viewpoints. Compute the chi-square test statistic to determine whether our belief is reasonable.
4. I just bought a new light bulb and am super excited to put it in my batman night lamp. The time until the light bulb burns out follows an exponential distribution and the average burn out time is 1000 days. What is the probability the light bulb dies within the first 60 days?

5. Suppose that the number of hours graduate students sleep is normally distributed with mean 6 and standard deviation 1.
- (a) What is the probability that a randomly chosen grad student slept 8 or more hours last night?
 - (b) What is the probability that a randomly chosen grad student slept less than 4 hours last night?
 - (c) What is the probability that a randomly chosen grad student slept between 5 and 7 hours last night?
6. Extra credit: Compute the normal probabilities from (1) and (5) using `pnorm` in R. Compute the p-value of the test in (3) using `pchisq` in R.