10. A simple random sample of size n is a sample selected in such a way that all possible samples of size n are equally likely. If $N = 20$ and $n = 7$, find the following if (1) sampling is with replacement, and then if (2) sampling is without replacement.

   (a) Describe the sample space. Specificially, what is the job? What is the task? What does an outcome in the sample space "look like"? Are repeats allowed? Are outcomes ordered or unordered?

   (b) Find $\mathcal{C}(\mathcal{S})$. Explain your reasoning.

   (c) What is $\mathcal{B} = \mathcal{P}_\mathcal{S}$, the power set of S? How many elements are in $\mathcal{B}$? (Use R if necessary, and exponential notation).