1. What happens to the histogram when we increase the sample size?
   Generate histograms of samples of size: 100, 1000, 10,000 from a normal distribution with mean 0 and standard deviation 1. What happens to the histogram as you increase the sample size? What curve does the histogram approximate better and better when we increase sample size?

2. Let X have an exponential distribution with mean 2
   (a) Find the probability that X is larger than 3.
   (b) Find the 20th percentile of X.

3. Let X have a binomial distribution with 20 trials and probability of success 0.7 on each trial.
   (a) Find the probability that X is greater than 5 and less than or equal to 12.
   (b) Find the 65th percentile of X.
   (c) Find 50th percentile of X.

4. Undergraduate students only. I want to generate one observation from a $\chi^2$ distribution with 10 degrees of freedom. using a random number generator I generated an observation from the uniform distribution on the interval (0,1). The observation I generated is 0.977. Using the FTSS I computed the value of the corresponding observation from $\chi^2_{10}$ distribution. What was that value?

5. Graduate Students only. I want to generate one observation from a Pareto distribution with shape parameter $\alpha$ which has the following pdf:

   \[ f(x) = \begin{cases} \frac{\alpha}{x^{\alpha+1}} & \text{if } x \geq 1; \\ 0 & \text{otherwise.} \end{cases} \]

   Using a random number generator I generated an observation from the uniform distribution on the interval (0,1). The observation I generated is 0.5. Using the FTSS I computed the value of the corresponding observation from Pareto distribution with $\alpha = 2$. What was that value?