QUIZORK 5

1. The purpose of creating a bootstrap distribution is to:
   a) Estimate the mean of the unknown sampling distribution.
   b) Estimate the spread of the unknown sampling distribution.
   c) Both A and B.
   d) None of the above.

2. Indicate whether **each statement** is true or false. (0.5 points each)
   a) The resample and original sample MUST be the same size.
   b) The resample and original sample BOTH are taken from the population.
   c) The resample can ONLY use values that were in the original sample.
   d) The resample uses ALL values that were in the original sample.

3. 10 words were picked at random from a story (our population) and the length of each is recorded below.

   4, 1, 7, 1, 5, 4, 2, 7, 5, 5

   a. Does this represent a sample or a resample of word lengths? Explain.

   b. Regardless of your answer to (a), use the numbers given and for each of the following, identify whether the word lengths represent a possible resample. For each that is not a possible resample, explain why. (1 point each)
      a) 1, 1, 1, 2, 3, 4, 5, 7, 7, 7

      b) 1, 1, 2, 2, 2, 2, 4, 5, 7, 7

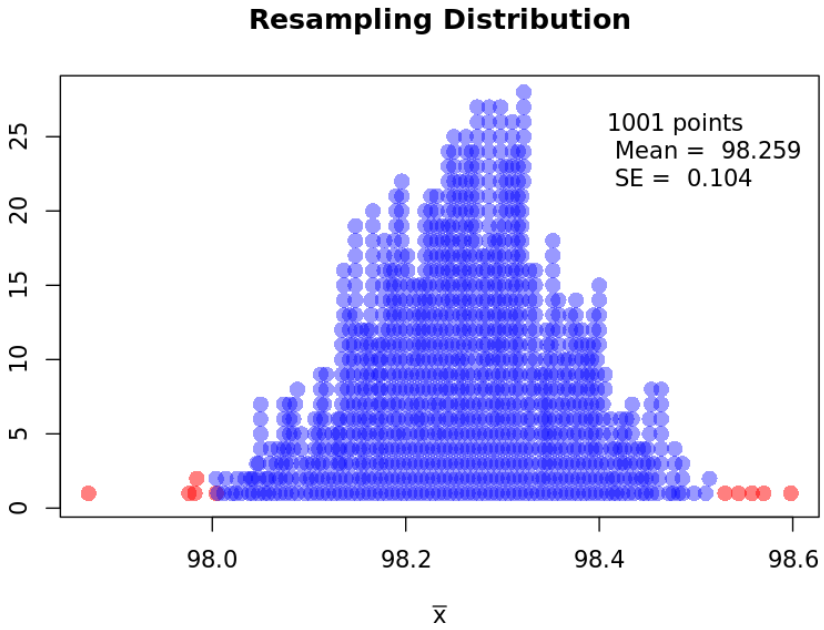
      c) 1, 1, 4, 4, 5, 5, 7, 7, 7, 7, 7

      d) 5, 5, 5, 5, 5, 5, 5, 5, 5, 5

4. Normal human body temperature is said to be 98.6 degrees Fahrenheit. A researcher studying body temperatures took a random sample of 50 people and recorded the body temperatures for each. The average body temperature of the 50 people was 98.26. Using these data, estimate the true average body temperature of people.
   a) What is the parameter of interest? Use proper notation to denote it.

   b) What type of inference should be done to answer the research question?
      a) Confidence Interval
      b) Hypothesis Test
      c) No inference is needed. The true average body temperature is 98.6.
      d) No inference is needed. The true average body temperature is 98.26.

   c) The bootstrap distribution with 1001 bootstrap resamples is pictured on the next page.



i) What does one dot on the plot represent in the context of this problem?

ii) Explain how you could use cards to create 1 bootstrap resample.

iii) The percentile method is used in the picture to give a confidence interval of (98.081, 98.512). What level of confidence is used for this interval?

d) How many bootstrap resamples would be cut-off in the left-tail of the distribution to create a 95% confidence interval?
   a) 50
   b) 25
   c) 5
   d) 10

e) Use the plot and t* = 1.677 to create a 90% confidence interval using the t*SE method. Show your work.

f) Interpret your 90% confidence interval from e.

g) Explain what it means to have 90% confidence in your interval.

h) Based off your interval in e, can we be 90% sure that the true average body temperature is lower than 98.6 degrees Fahrenheit? Explain.