Math 3339 Name:

HW #7

To find the numerical solutions, you can use the commands `qnorm`, `qt` in R.

(1)[3 Pts] The mean and standard deviation measured from a randomly selected sample of $n = 96$ mathematics SAT test scores are $\overline{x} = 672$ and $s = 31$. Find a 99 percent confidence interval for the population mean μ.

(2)[3 Pts] The mean and standard deviation measured from a randomly selected sample of $n = 16$ mathematics SAT test scores are $\overline{x} = 672$ and $s = 31$. Assume that the scores are normally distributed. Find a 99 percent confidence interval for the population mean μ.

(3)[3 Pts] Let a population be normally distributed with mean μ and standard deviation $\sigma = 5$. Find the sample size n such that we are 95 percent confident that the estimate of $\overline{x}$ is within ± 1.5 unit of the true mean μ.

(4)[3 Pts] The EPA considers indoor radon levels above 4 picocuries per liter (pCi/L) of air to be high enough to warrant amelioration efforts. Tests in a sample of 200 homes in a certain county found 127 (63.5%) of these sampled households to have indoor radon levels above 4 pCi/L. Compute the 95% confidence interval of the proportion of all the households in the county that don't meet the EPA guidelines.

(5)[3 Pts] The EPA considers indoor radon levels above 4 picocuries per liter (pCi/L) of air to be high enough to warrant amelioration efforts. We want to compute the 95% confidence interval of the proportion of all the households in the county that don't meet the EPA guidelines and we want to make sure that our margin of error is within 5 percentage points. How many households do we need to test to guarantee such margin of error?