Math 3339   Name:

HW #7

To find the numerical solutions, you can use the statistical tables or the commands `pnorm` and `qnorm` in R.

(1)[4 Pts] Let $\overline{X}$ be the mean of a random sample of size $n = 48$ from the uniform distribution in the interval $(0, 2)$. Approximate the probability $P(0.9 < \overline{X} < 1.1)$ using the Central Limit Theorem.

(2)[4 Pts] Let $\overline{X}$ be the mean of a random sample of size $n = 48$ from a distribution with mean 4 and variance 16. Approximate the probability $P(3.1 < \overline{X} < 4.6)$ using the Central Limit Theorem.

(3)[4 Pts] The profits from investments in individual stocks follow a normal distribution with mean 1 and standard deviation 5.

(a) If are buying a single random selected stock, what is the probability that your profit is greater than zero?

(b) If are buying a portfolio of 25 randomly selected stocks, what is the probability that your average profit is greater than zero?

(4)[4 Pts] The mean and standard deviation measured from a randomly selected sample of $n = 42$ mathematics SAT test scores are $\overline{x} = 680$ and $s = 35$. Find an approximate 99 percent confidence interval for the population mean μ.

(5)[4 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.

(6)[4 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.