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] A research conducted at the University of Houston wants to estimate the average SAT test scores in mathematics. Assuming that the population of test scores is normally distributed with standard deviation $\sigma = 35$, find the sample size n ensuring that the estimated value of the sample mean is within ± 10 points from the true mean. Use confidence level $\alpha = 0.05$.