Math 498
Quiz 2

You should use the inside front cover of the textbook as a cheat sheet. You also should use the tables in the back of the textbook.

Justify all answers with neat and organized work. Clearly indicate your answers. 40 points possible.

1. (10 pts.) Let X represent the self-service time in minutes required by a randomly selected customer at a certain gasoline pump. A random sample of size 5 is taken of X, yielding times of 3.4, 5.2, 4.1, 5.5, and 4.8 minutes.

(a) Compute $\overline{x}$ for this sample. Do you know what μ_X is?

(b) Is $T = \dfrac{X_1^2 + X_5}{2}$ a statistic? What would t be for this sample?

2. (10 pts.) Let X be $N(100, 36)$. Using the same set of axes, sketch the graphs of the probability density functions for each of the following.

Also, give the formula for the p.d.f.

(a) X

(b) $\overline{X}$, the mean of a random sample of size 9 from this distribution

(c) $\overline{X}$, the mean of a random sample of size 36 from this distribution

3. (10 pts.) If the moment-generating function of X is

$$M(t) = e^{500t+5000t^2},$$

then find the probability $P[27,060 \leq (X - 500)^2 \leq 50,240]$.

4. (10 pts.) A traffic study has shown that the delay time measured in seconds at a stop sign is uniformly distributed on the interval $(10, 80)$. If 50 randomly selected automobiles passing through the intersection are timed, what is the probability that the average delay time is between 44 and 45 seconds.