MATH 111-01, Assignment 4, due Wednesday March 22

Part I. Do the following problems from the book, chapter 5: 3, 4, 5, 6, 7, 14, 22, 27 (the *z-score* is what you get when you subtract μ and divide by σ), 29, 30, 38. You do not have to turn in solutions.

Part II: Do the following problems. Turn in solutions to me on Wednesday March 22 (in class, office, or mailbox, before midnight).

For these problems, do not use the calculator. Do calculations by hand for the uniform distribution and by standardization and the table for the normal distribution. Show your calculations in the solutions you turn in.

1. Let $x \sim$unif[0,1]. What is the distribution of **(a)** $2x$ **(b)** $3x+5$ **(c)** $1-x$?

2. You bid on an object at a silent auction. You estimate that the maximum bid from others is a random variable x that is uniform between 70 and 130 dollars, $x \sim$unif[70,130] (for convenience, assume that it is a continuous random variable, in reailty it is not).
(a) If you bid \$90, what is the probability that you win the bidding?
(b) How much do you need to bid to have a 95% chance to win the bidding?

3. The continuous random variable x has pdf given by $f(x) = x/2$ for x between 0 and a.
(a) Find the value of a (draw the graph of $f(x)$ and consider the area under the graph between 0 and a).
(b) Find $P(x \leq 1)$.
(c) The expected value of x is not equal to the midpoint $a/2$. Is it smaller or larger? Why? You do not have to compute it since this would require integration but give an intuitive explanation.

4. Let $x \sim \mathrm{N}(200, 100)$ ($\sigma^2 = 100$). Find **(a)** $P(x \leq 220)$ **(b)** $P(x \leq 190)$ **(c)** $P(x > 185)$ **(d)** $P(x > 205)$ **(e)** $P(190 \leq x \leq 210)$ **(f)** $P(180 \leq x \leq 210)$

5. In the previous problem, find the value of t which is such that
(a) $P(x \leq t) = 0.99$ **(b)** $P(x > t) = 0.95$ **(c)** $P(x \leq t) = 0.8$