MONT 105Q – Mathematical Journeys
Problem Set 4 – Using the Standard Normal Table
due: March 30, 2016

Use the standard normal table to the following questions.

A) Let Z be a standard normal.

1) Find $P(Z > .57)$.
2) Find $P(Z < -1.3)$.
3) Find $P(.37 < Z < 1.20)$.
4) Find $P(-.55 < Z < 1.30)$.
5) Find c such that $P(Z > c) = .01$. (You'll probably want to "interpolate.")
6) How would your answer to 5) change if it said: Find c such that $P(|Z| > c) = .01$? (Note: $|Z| > c$ says: the absolute value of Z is greater than c. That can happen if either $Z > c$ or $Z < -c$.)

B) Y is normally distributed with mean 10 and SD 3. Find

1) $P(Y < 9)$.
2) $P(Y > 11.3)$.
3) $P(7 < Y \leq 16)$. How does this answer compare with the "rule of thumb" given by Wheelan in the graph on page 26 of *Naked Statistics*?)

C) For this question, you will need to combine what we learned before about the Central Limit Theorem with our new techniques based on the standard normal table. Let X be the maximal oxygen intake of a human on a treadmill where the measurements are made in milliliters of oxygen per minute per kilogram of weight. Assume that for a particular population of patients the population mean of X is $\mu = 54.030$ and the population standard deviation is $\sigma = 5.8$. Let $\overline{X}$ be the sample mean of a random sample of size $n = 50$ from this population.

1) Find $P(52.761 \leq \overline{X} \leq 54.453)$.
2) (Without calculation, and explain): Would the answer to part 1) be larger or smaller if the sample size was $n = 100$?
3) Suppose 10 different random samples of size $n = 50$ are taken from this population. What is the probability that exactly 7 of them will have $52.761 \leq \overline{X} \leq 54.453$?