Math-III Homework #3

1. Modify the code to get π from random numbers using the volume of a sphere (R=1) instead of a circle. How many trials are needed approximately to get 4 significant figures? The code to be modified is on Omega in /home/z/zh/zhang/Math3/pi2d.f
2. Take 500 steps random walk with a unit step length in a single trial.
    a) Plot the x-y path for this walk.
    b) Plot sqrt(R) vs. sqrt(N) (N is the N-th step), where R=sqrt(x**2+y**2).
    c) Then average over 100 trial, plot sqrt(R) vs. sqrt(N) again. Discuss.
3. Use Monte Carlo method to calculate $I = \int_0^1 dx_1 \int_0^1 dx_2 ... \int_0^1 dx_{10} (x_1 + x_2 + ... + x_{10})^2$, up to 5 significant figures. The analytic value is 155/6.

If you want longer random number sequence, copy the function from my directory to your current directory by

/home/z/zh/zhang/phys5319/drand48.f

Due: Thurday (June 30, 2016)