Assignment: Module 13 Name: Hoyoung kim

Disclaimer: This is my work, not that of others

Total Score: 20

1. 10
2. 10

1. (10 pt) Evaluate $\iint e_{x2y2R} dxdy$ where the region of integration, R, is the unit circle in the x-y plane. Use 1,000,000 points inside the unit circle to estimate the integral. Use the function average technique or type 1 Monte Carlo simulation.
Notes:
a. Generate pairs of random number (x,y) only keep the pairs that satisfy $x2+y2 \leq 1$. You may need more than 1,000,000 pairs to get the required set.

b. The area of the unit circle is $\iint dxdy = \pi_R$.

Using sets of 2 random number, and doing a natural log evaluation. This was done with python and then adding up all the average, I was able to find that the integral of area of the circle is 3.280147633754156… and continued

2. (10 pt) Find the volume of the 3-d region bounded by the following equations using dart throwing, type 2 Monte Carlo simulation, with 1,000,000 points.

$0<x<1, 0<y<1, 0<z<1$
x^2+sin^2$y \leq z$,
$x - z + e$^$y \leq 1$

With python I was able to generate 3 lists of 1000000 random numbers , then using the halton algorithm, I was able to find the volume of the 3-d region in dart throwing. This was done by using monte carlo simulation of the region and the answer that the code returned was 0.136527 when using counter on
x**2 + math.sin(y)**2 <= z and x - z + math.exp(y) <= 1