

Math 342 — Monte Carlo Integration

Problem 1. Describe how to use the Monte Carlo Integration method to approximate each of the following integrals. You should (1) give the distribution from which you'll sample, and (2) give the sample mean that will be computed. Once you've done this, implement your algorithm in R and check your work with the built-in integrator.

a. $\int_0^1 \sin(x)e^{-x^2} dx$

b. $\int_0^\infty \sin(x)e^{-x^2} dx$

c. $\int_0^3 x^x dx$

d. $\int_2^4 x^x dx$

e. $\int_{-\infty}^\infty \cos(x+1)e^{-x^2} dx$