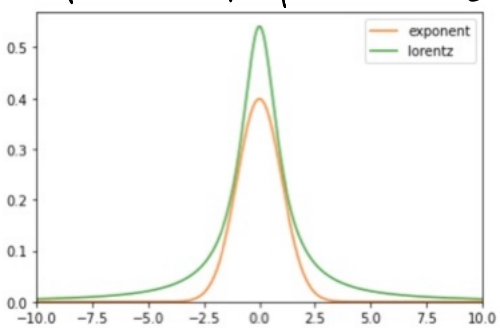
Problem 2

I will use Lorentzians for the bounding distribution.
If I used Gaussian, this wouldn't work because in the asymptotic limit, the exponential is always bigger than the gaussian. So this does not work.
Lorentzian does!

See code for generators.

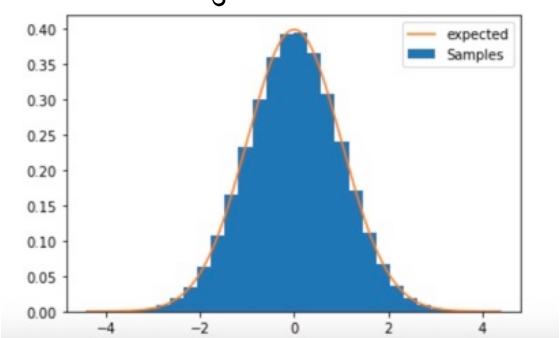
Graph 1: PDFs of exponential & lorentzian



We wanted $g(x) > f(x)$ $\forall x$.
($g(x)$: Lorentz PDF; $f(x)$: exp PDF)

Graph 1 shows that the lorentzian PDF is greater than the exponential PDF $\forall x$. We also want it to be as close as possible to maximize efficiency.
Thus, through trial & error, $H = 1.7$

Graph 2: Histogram of deviates



In graph 2, we see that the histogram of deviates matches very well with the expected exponential curve.

In this method, the efficiency was 58.8121 %.

This was an ~8% increase from my original $M = 2$.