Lab 3 Report

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1)

PDF: $f(x) = 20x(1-x)^3$
$g(x) = 1$
$c = 135/64$

(a)

Average iterations needed to generate a sample will be equal to 2.1053, which is equal to c. This is because the expectation of rejection rate is equal to c, i.e., the acceptance rate is 1/c.

(b)

Mean of samples generated = 0.335459325709939
Expectation of PDF = 1/3(0.333333)

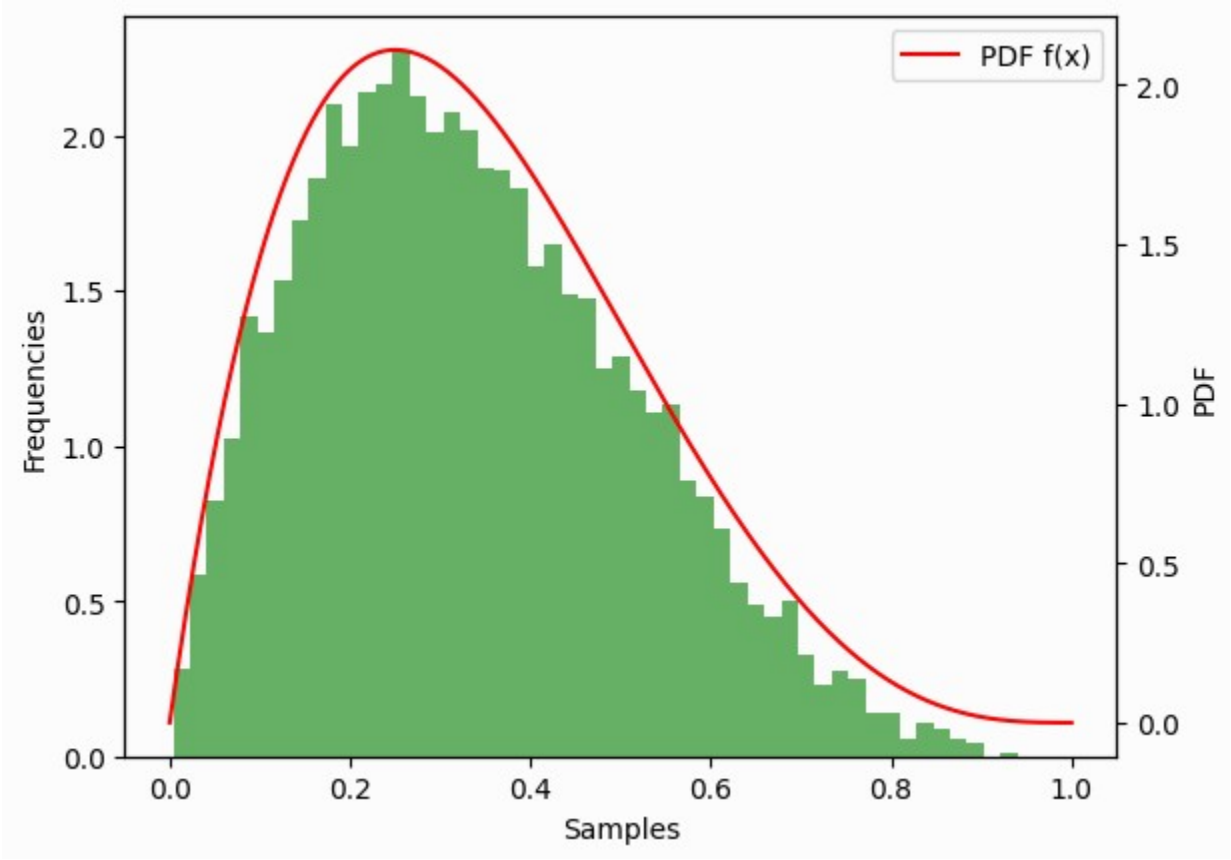
(c)

Approximate value of $P(0.25 \leq X \leq 0.75) = 0.6226$
Exact value found using $\int_{0.25}^{1} f(x)dx - \int_{0.75}^{1} f(x)dx = 0.6171875$

(d)

Average number of iterations needed = 2.1053 which is same as the value obtained in (a).

(e)



(f)

C	Sample Mean	Iterations Required
135/64	0.335459325709939	2.1053
10	0.335896600659936	10.0441
30	0.333035164980590	30.3009

The mean of the samples generated are similar but the average number of iterations required to generate each sample will be equal to the c the taken in each case.

2)

α = 2
PDF: f(x) = e/2(e-1) * x * e^(-x)
g(x) = 1
c = 1/2(e-1) (0.20988)

Sample mean obtained = 0.6067682395808399