**Prob 1:**

When M=1e6, SE= 4.82e-4

SE\_req=1e-4

Ratio=SE/SE\_req=4.82

Multiplication factor= 4.82^2

**New M=1e6\*4.82^2= 2.32e7**

**Prob 2:**

For p=0.5, P(100) is also close to 0.5

But for p=0.49, P(100) decreases drastically to 0.118

M is set to 1e5 and K is set to 50 for above.

**Prob 3:**

A good guess for P(obtuse) is 0.75

No, M=1e5 gives a good enough estimate which doesn’t change a lot with increasing M further. The only advantage is the decrease in standard error. But that can be deduced by sqrt(M) relationship with standard error without even trying.

**Prob 4:**

Now if x is uniformly distributed, will be distributed as per the pdf p(x). This is shown below:



* If M=1000, N=1000, a=1, and nbins=10, the test is passed ~950 times.
* P values for all M:



* P values resembles a uniform distribution from 0 to 1. This is because every time the same number of samples are being selected in one particular bin, and since they are uniformly distributed, there is no preference of P-values.