

## Data Analysis and Interpretation

### **Assignment Solution 1**

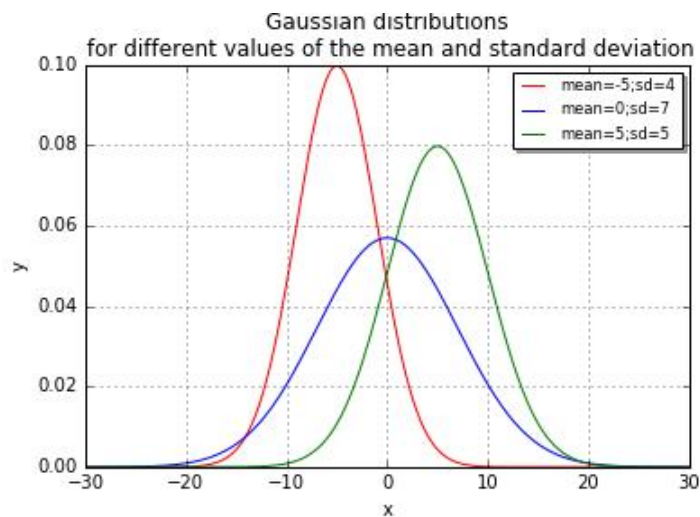
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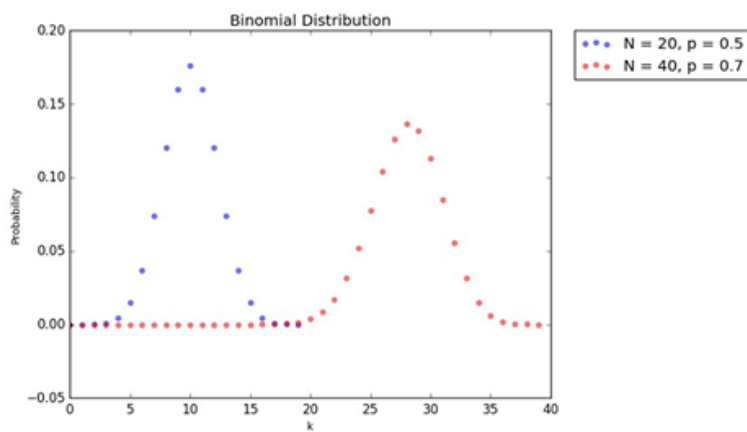
## 1. Question 1

To plot a Gaussian distribution, Poisson distribution, Binomial distribution and to see what happens as the parameters are varied.

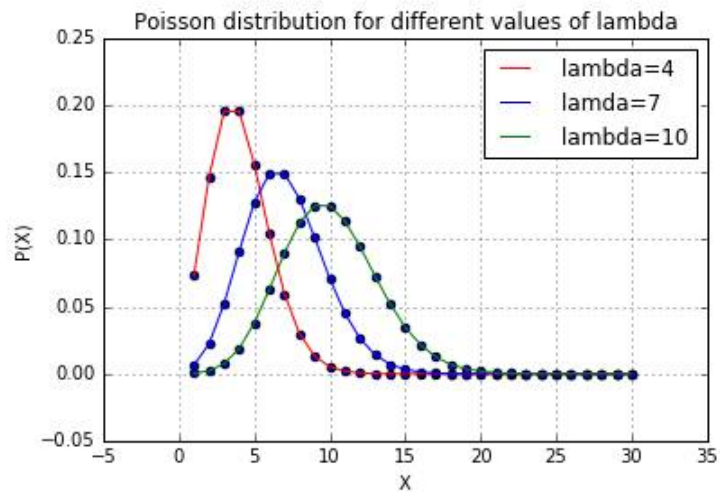
### 1.1 Plots of Gaussian Distribution Function



### 1.2 Plots of Binomial Distribution



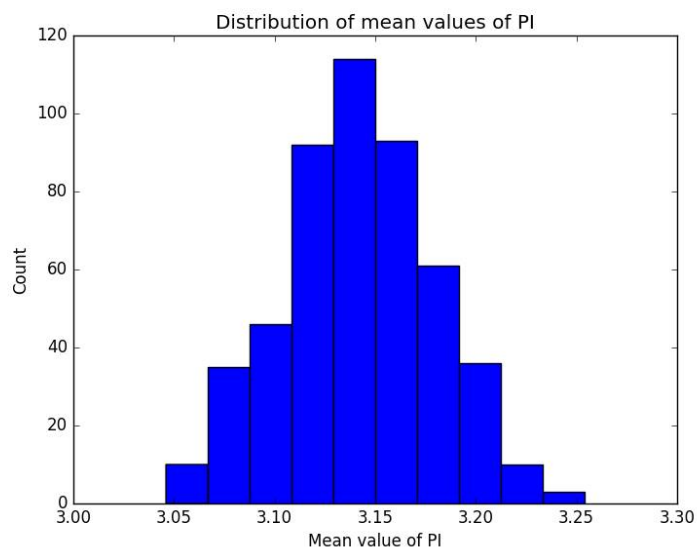
### 1.3 Plots of Poisson Distribution



## 2. Question 2

1. To write a program that can generate 2000 randomly distributed random numbers in a square and by seeing how many of these lie inside a circle.
2. To use this to estimate the value of  $\pi$  and find the error on the estimate.
3. To repeat the above experiment 500 times and plot the distribution of mean values of  $\pi$  obtained.

### 2.1 Plot of distribution of $\pi$



### 3. Summary

For the week 19.09.16 to 28.09.16, we were assigned the task of familiarising ourselves with the basics of python and  $\text{\LaTeX}$ . For this task we made various plots of the Gaussian, Binomial, and Poisson distributions.

The second part of the assignment was an introduction to Monte-Carlo methods, where we attempted to estimate value of  $\pi$  through computer simulations.