NORMAL DISTRIBUTION

CODE FOR CONSTANT MEAN AND VARYING VARIANCE

```
import numpy as np
import matplotlib.pyplot as plt

mean = 0; variance =1
x = np.arange(-5,5,.01)

mean=0
for i in range(4):

    f = np.exp(-np.square(x-mean)/2*variance)/(np.sqrt(2*np.pi*variance))


    plt.plot(x,f,label='mui=0 var= {}'.format(variance))
    variance=variance+1
plt.ylabel('gaussian distribution')
plt.legend()
```

CODE FOR CONSTANT VARIANCE AND VARYING MEAN

```
import numpy as np
import matplotlib.pyplot as plt

mean = 0; std = 1; variance = np.square(std)
x = np.arange(-5,5,.01)
mui=[0,0.5,1,1.5]

mean=0
for i in range(4):

    f = np.exp(-np.square(x-mean)/2*variance)/(np.sqrt(2*np.pi*variance))


    plt.plot(x,f,label='mean={} var=1'.format(mean))
    mean=mean+0.5
plt.ylabel('gaussian distribution')
plt.legend()
```

CENTRAL LIMIT THEOREM VERIFICATION

```
mui=0
var=1
n=40
ns=10

for i in range(4):

    samplemean=[]
    for j in range(ns):
        sum=0
        x = np.random.normal(0,1,n)
        for k in x:
            sum=sum+k
        samplemean.append(sum/n)
    fig, ax = plt.subplots(figsize =(10, 7))
    ax.hist(samplemean, bins ='auto')

    plt.title("NUMBER OF SAMPLES ={}".format(ns))
    plt.show()
    ns=ns*10
```