POISSON DISTRIBUTION

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CODE FOR VARYING LAMDA

```
import numpy as np
import matplotlib.pyplot as plt
from matplotlib import pyplot
def factorial(k):
    if k==0:
        return 1
    return k*factorial(k-1)


x = []
for i in range(1,25):
    x.append(i)
lamda=1
for i in range(3):
    y=[]
    for j in range(len(x)):
        num=(lamda**x[j])*(np.exp(-lamda))/factorial(x[j])
        y.append(num)

    pyplot.bar(x,y,label='lamda={}'.format(lamda))

    lamda=lamda+4

pyplot.legend()
```

CODE FOR MEAN for n=10

```
import numpy as np
import matplotlib.pyplot as plt
lamda=np.arange(1,10,1)
n=10
mean=lamda
```

```
plt.plot(lamda,mean,label='mean n=10')
plt.legend()
```

CODE FOR VARIANCE for n=10

```
import numpy as np
import matplotlib.pyplot as plt
lamda=np.arange(1,10,1)
n=10
var=lamda

plt.plot(lamda,var,label='variance n=10')
plt.legend()
```

CENTRAL LIMIT THEOREM VERIFICATION

```
  lamda=1
n=100
ns=10
for i in range(4):

    samplemean=[]
    for j in range(ns):
        sum=0

        x = np.random.poisson(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
```