Assignment-1

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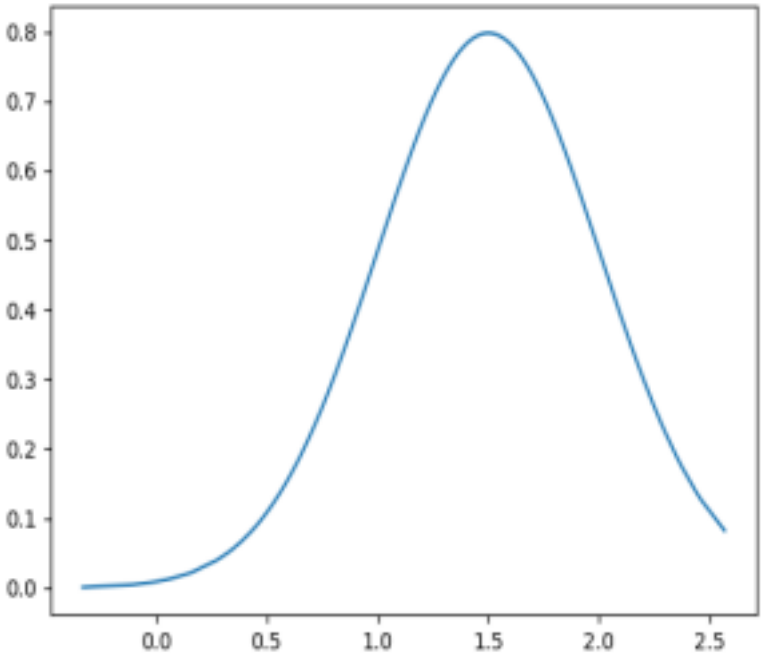
1. **Mean:** 1.496299831095231
   Variance: 0.23667896091958386
   Skewness: -0.03726723105767653
   Kurtosis: 0.16706622450062967
   Sigma: 0.4697602295142368
   Standard Deviation: 0.4667420387898001

   Source code:

```
import numpy as np
import matplotlib.pyplot as plt
from scipy import stats

n=1000
dt = stats.norm(1.5,0.5)

r = dt.rvs(n)
x = np.zeros(n)
for i in range(n):
    x[i] = r[i]
    x.sort()

P = dt.pdf(1)
y = np.zeros(n)

for i in range(n):
    y[i] = dt.pdf(x[i])

print(np.mean(x))
print(np.var(x))
print(stats.skew(x))
print(stats.kurtosis(x))

q25,q50,q75 = np.percentile(x,[25,50,75])

print(q25,q50,q75)

sim = (q75 - q25)*0.7413

print(sim)
print("standard deviation :",1.482*stats.median_abs_deviation(x))
plt.figure(1)
plt.plot(x,y)
plt.show()
```

   Plot:

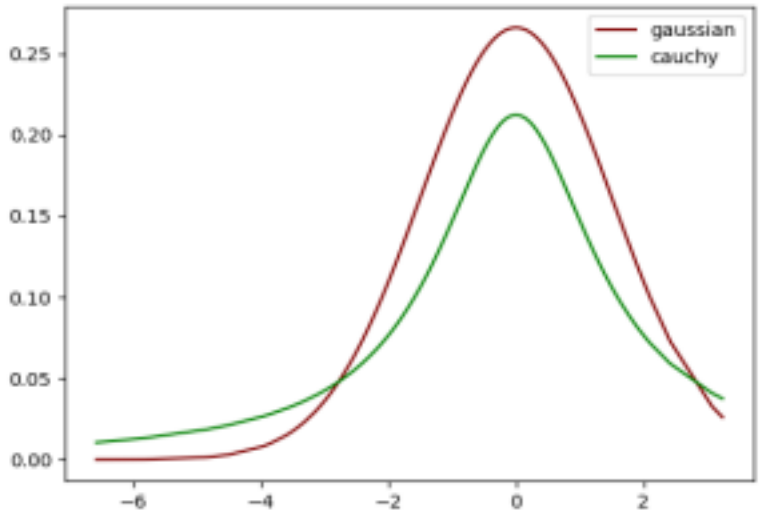


2.

Source code:

```
import numpy as np
import matplotlib.pyplot as plt
from scipy import stats
n=1000

dt = stats.norm(0,1.5)
r = dt.rvs(n)
x = np.zeros(n)

for i in range(n):
    x[i] = r[i]
    x.sort()

y = np.zeros(n)

for i in range(n):
    y[i] = dt.pdf(x[i])
    dt2 = stats.cauchy(0,1.5)

z = np.zeros(n)
for i in range(n):
    z[i] = dt2.pdf(x[i])

plt.figure(1)
plt.plot(x,y,label = "gaussian" ,color = "maroon")
plt.plot(x,z, label = "cauchy" , color = "green")
plt.legend()
plt.show()
```

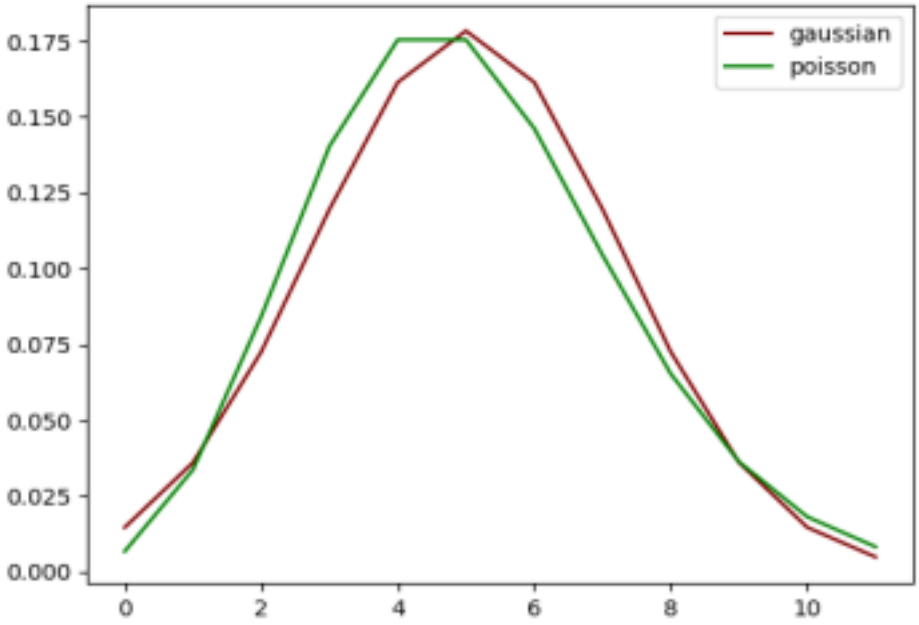
Plot:



3. Source Code:

```
import numpy as np
import matplotlib.pyplot as plt
from scipy import stats

n=1000

dt = stats.norm(5,np.sqrt(5))

dt2 = stats.poisson(5)

r = dt2.rvs(n)

x = np.zeros(n)

for i in range(n):
    x[i] = r[i]
    x.sort()

y = np.zeros(n)

for i in range(n):
    y[i] = dt.pdf(x[i])
    z = np.zeros(n)

for i in range(n):
    z[i] = dt2.pmf(x[i])

plt.figure(1)

plt.plot(x,y,label = "gaussian" , color = "maroon")

plt.plot(x,z, label = "poisson" , color = "green")
plt.legend()
plt.show()
```

Plot:



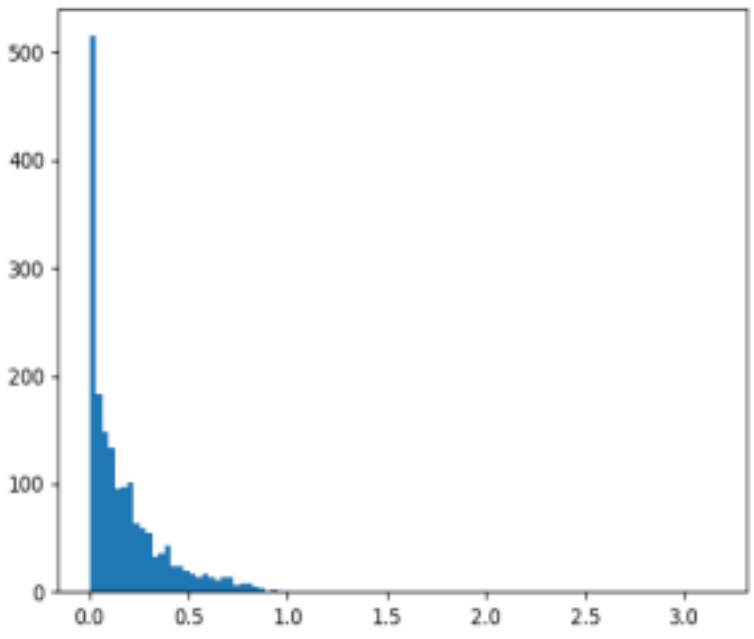
4. **mean :** 0.908885145574897
   error in mean : 4.128510743662294e-08
   Source Code:

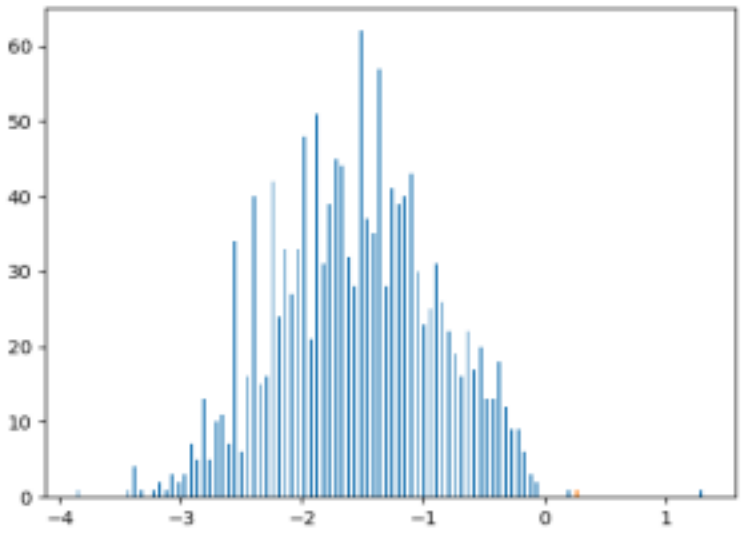
```
import numpy as np
import matplotlib.pyplot as plt

x = np.array([0.892, 0.881, 0.8913, 0.9837,0.8958])
y = np.array([0.00044,0.009, 0.00032,0.00048,0.00045])

k=0

for i in range(5):
    k = k + 1/((y[i])**2)

mean=0
for i in range(5):
    mean = mean + x[i]/((y[i])**2)

mean = mean/k

meanerr = 1/k

print("mean :",mean)
print("error in mean :",meanerr)
```

5. Source Code:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from scipy import stats

x = pd.read_csv("exoplanet.eu_catalog.csv")

print(x)

k = x["eccentricity"]
k = k.dropna()
k = k.tolist()

plt.figure(1)

plt.hist(k,100)

z = np.array(k)

z=z[z !=0]

y = stats.boxcox(z)

plt.figure(2)
plt.hist(y,100)
plt.show()
```

Plots:




60
50
40
30
20
10
0
−4
−3
−2
−1
0
1