In [1]:

```
data=[23,24,32,45,12,43,67,45,32,56,32]
```

In [2]:

```
data
```

Out[2]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [3]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings("ignore")
data2=pd.read_csv("iris.csv")
```

In [4]:

```
data
```

Out[4]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [5]:

```
data2
```

Out[5]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
...	...	...	...	...	...	...
145	146	6.7	3.0	5.2	2.3	Iris-virginica
146	147	6.3	2.5	5.0	1.9	Iris-virginica
147	148	6.5	3.0	5.2	2.0	Iris-virginica
148	149	6.2	3.4	5.4	2.3	Iris-virginica
149	150	5.9	3.0	5.1	1.8	Iris-virginica

150 rows × 6 columns

In [6]:

```
data3=pd.read_csv("Titanic.csv")
```

In [7]:

```
data3
```

Out[7]:

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S
...	...	...	...	...	...	...	...	...	...	...	...	...
886	887	0	2	Montvila, Rev. Juozas	male	27.0	0	0	211536	13.0000	NaN	S
887	888	1	1	Graham, Miss. Margaret Edith	female	19.0	0	0	112053	30.0000	B42	S
888	889	0	3	Johnston, Miss. Catherine Helen "Carrie"	female	NaN	1	2	W./C. 6607	23.4500	NaN	S
889	890	1	1	Behr, Mr. Karl Howell	male	26.0	0	0	111369	30.0000	C148	C
890	891	0	3	Dooley, Mr. Patrick	male	32.0	0	0	370376	7.7500	NaN	Q

891 rows × 12 columns

In [8]:

```
data
```

Out[8]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [9]:

```
data_copy=data.copy()
```

In [10]:

```
data_copy.sort()
```

In [11]:

```
data_copy
```

Out[11]:

```
[12, 23, 24, 32, 32, 32, 43, 45, 45, 56, 67]
```

pandas numpy matplotlin and seaborn scipy statsmodel stastisticsmean median mode

In [12]:

```
data
```

Out[12]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [13]:

```
data_copy
```

Out[13]:

```
[12, 23, 24, 32, 32, 32, 43, 45, 45, 56, 67]
```

In [14]:

```
import numpy as np
np.mean(data)
```

Out[14]:

```
37.36363636363637
```

In [15]:

```
np.median(data)
```

Out[15]:

```
32.0
```

In [16]:

```
np.mean(data2['SepalLengthCm'])
```

Out[16]:

```
5.843333333333335
```

import numpy as np np.mode(data)

In [17]:

```
import statistics
```

In [18]:

```
statistics.mode(data)
```

Out[18]:

```
32
```

In [19]:

```
from scipy import stats as st
st.mode(data)
```

Out[19]:

```
ModeResult(mode=array([32]), count=array([3]))
```

In [20]:

```
def mean(data):
    sum = 0
    for i in data:
        sum = sum + i

    mean = sum /len(data)

    return mean
```

In [21]:

```
mean(data)
```

Out[21]:

```
37.36363636363637
```

In [22]:

```
data_copy.append(150)
```

In [23]:

```
data copy
```

Out[23]:

```
[12, 23, 24, 32, 32, 32, 43, 45, 45, 56, 67, 150]
```

In [24]:

```
data_copy2=data.copy()
```

In [25]:

```
data_copy2.append(75)
```

In [26]:

```
np.mean(data_copy2)
```

Out[26]:

```
40.5
```

In [27]:

```
np.mean(data_copy)
```

Out[27]:

```
46.75
```

In [28]:

```
np.median(data)
```

Out[28]:

```
32.0
```

In [29]:

```
data_copy
```

Out[29]:

```
[12, 23, 24, 32, 32, 32, 43, 45, 45, 56, 67, 150]
```

In [30]:

```
np.median(data_copy)
```

Out[30]:

```
37.5
```

In [31]:

```
np.median(data_copy2)
```

Out[31]:

```
37.5
```

In [32]:

```
data
```

Out[32]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [33]:

```
#dispersion
```

In [34]:

In [34]:

```
data
```

Out[34]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [35]:

```
data_copy
```

Out[35]:

```
[12, 23, 24, 32, 32, 32, 43, 45, 45, 56, 67, 150]
```

In [36]:

```
data_copy.pop()
```

Out[36]:

```
150
```

In [37]:

```
data_copy
```

Out[37]:

```
[12, 23, 24, 32, 32, 32, 43, 45, 45, 56, 67]
```

In [38]:

```
np.percentile(data,[25])
```

Out[38]:

```
array([28.])
```

In [39]:

```
np.percentile(data,[50])
```

Out[39]:

```
array([32.])
```

In [40]:

```
np.percentile(data,[25,50,75,100])
```

Out[40]:

```
array([28., 32., 45., 67.])
```

In [41]:

```
q1,q2,q3,q4

IQR=q3-q1

lower_fence=q1-iqr*1.5
upper_fence=q3+iqr*1.5
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Input In [41], in <cell line: 1>()
----> 1 q1,q2,q3,q4
      3 IQR=q3-q1
      5 lower_fence=q1-iqr*1.5

NameError: name 'q1' is not defined
```

In [ ]:

```
data_copy.append(150)
```

In [42]:

```
data_copy
```

Out[42]:

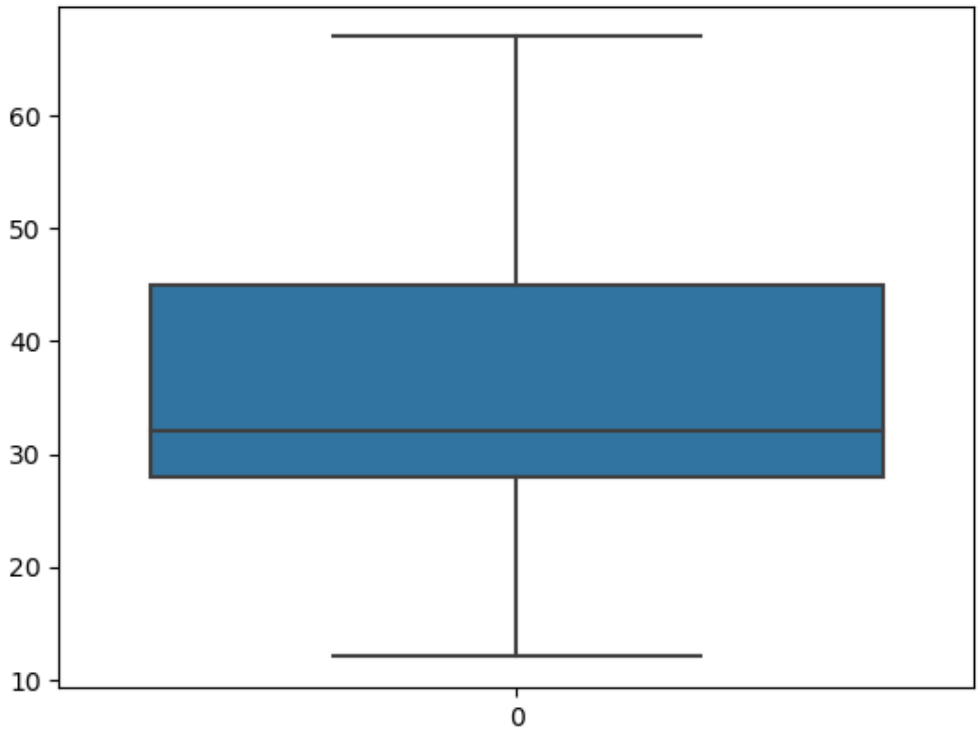
```
[12, 23, 24, 32, 32, 32, 43, 45, 45, 56, 67]
```

In [43]:

```
import seaborn as sns
sns.boxplot(data_copy)
```

Out[43]:

```
<AxesSubplot:>
```



In [44]:

```
data
```

Out[44]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

find out atleast 5 techniques of the sampling and implemnent it wiht the help of python keep it ovver the github post it in linkdinsample/population

In [45]:

```
np.random.choice(data,size=3)
```

Out[45]:

```
array([24, 32, 32])
```

In [46]:

```
data2.sample(n=15)
```

Out[46]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
75	**76**	**6.6**	**3.0**	**4.4**	**1.4**	**Iris-versicolor**

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
107	108	7.3	2.9	6.3	1.8	Iris-virginica
89	90	5.5	2.5	4.0	1.3	Iris-versicolor
1	2	4.9	3.0	1.4	0.2	Iris-setosa
12	13	4.8	3.0	1.4	0.1	Iris-setosa
116	117	6.5	3.0	5.5	1.8	Iris-virginica
95	96	5.7	3.0	4.2	1.2	Iris-versicolor
60	61	5.0	2.0	3.5	1.0	Iris-versicolor
142	143	5.8	2.7	5.1	1.9	Iris-virginica
34	35	4.9	3.1	1.5	0.1	Iris-setosa
112	113	6.8	3.0	5.5	2.1	Iris-virginica
49	50	5.0	3.3	1.4	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
83	84	6.0	2.7	5.1	1.6	Iris-versicolor
126	127	6.2	2.8	4.8	1.8	Iris-virginica

In [47]:

```
data
```

Out[47]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [48]:

```
len(data)
```

Out[48]:

```
11
```

In [49]:

```
len(data)-1
```

Out[49]:

```
10
```

In [50]:

```
n-1
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Input In [50], in <cell line: 1>()
----> 1 n-1

NameError: name 'n' is not defined
```

In [51]:

```
#python code for variance
def variance(data):
    n=len(data)
    ## mean of the data
    mean=sum(data)/n
    ## variance
    deviation=[(x - mean) ** 2 for x in data]
    variance=sum(deviation)/(n-1)
    return variance
```

In [52]:

```
variance(data)
```

```
variance(data)
```

Out[52]:

```
248.8545454545455
```

In [53]:

```
import numpy as np
np.var(data)
```

Out[53]:

```
226.23140495867773
```

In [54]:

```
np.std(data)
```

Out[54]:

```
15.040990823701666
```

In [55]:

```
import statistics
statistics.variance(data)
```

Out[55]:

```
248.85454545454547
```

In [56]:

```
statistics.pvariance(data)
```

Out[56]:

```
226.2314049586777
```

In [57]:

```
import math
math.sqrt(statistics.variance(data))
```

Out[57]:

```
15.775124261144363
```

In [58]:

```
import seaborn as sns
df=sns.load_dataset('tips')
```

In [59]:

```
df.head()
```

Out[59]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

In [60]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 244 entries, 0 to 243
Data columns (total 7 columns):
 #   Column      Non-Null Count  Dtype   
---  ------      --------------  -----   
 0   total_bill  244 non-null    float64 
 1   tip         244 non-null    float64 
 2   sex         244 non-null    category
 3   smoker      244 non-null    category
 4   day         244 non-null    category
 5   time        244 non-null    category
 6   size        244 non-null    int64   
dtypes: category(4), float64(2), int64(1)
memory usage: 7.4 KB
```

In [61]:

```
df.corr()
```

Out[61]:

	total_bill	tip	size
total_bill	1.000000	0.675734	0.598315
tip	0.675734	1.000000	0.489299
size	0.598315	0.489299	1.000000

In [62]:

```
df.isnull().sum()
```

Out[62]:

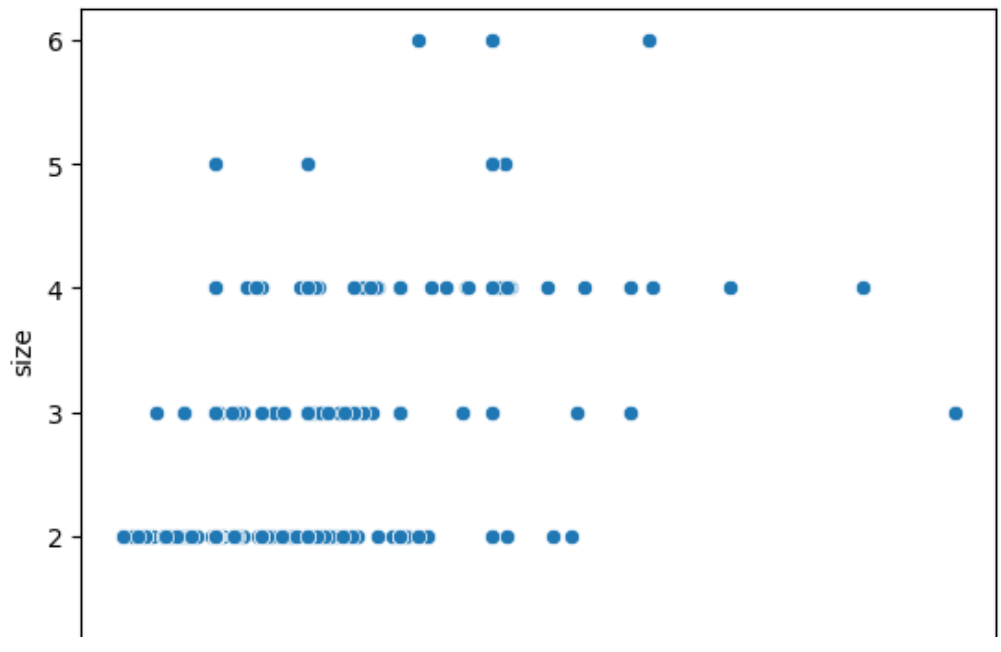
```
total_bill    0
tip           0
sex           0
smoker        0
day           0
time          0
size          0
dtype: int64
```

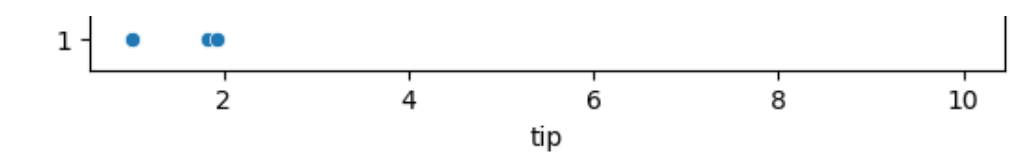
In [63]:

```
sns.scatterplot(x=df['tip'],y=df['size'])
```

Out[63]:

```
<AxesSubplot:xlabel='tip', ylabel='size'>
```



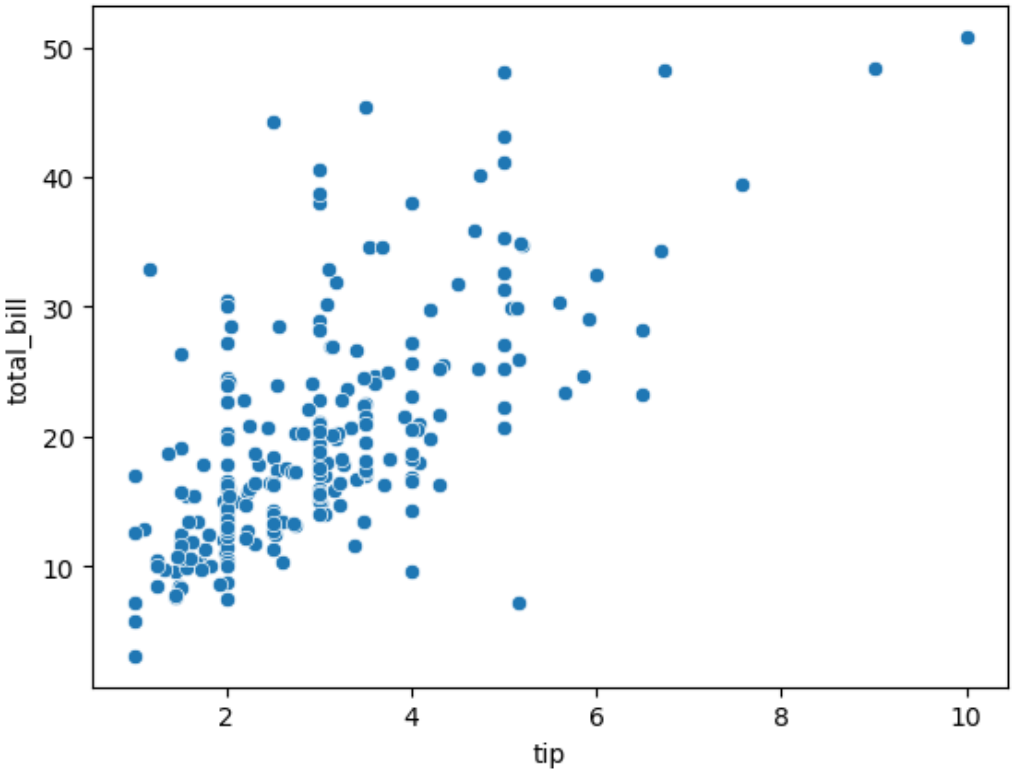


In [64]:

```
sns.scatterplot(x=df['tip'],y=df['total_bill'])
```

Out[64]:

```
<AxesSubplot:xlabel='tip', ylabel='total_bill'>
```



In [65]:

```
df.cov()
```

Out[65]:

	total_bill	tip	size
total_bill	79.252939	8.323502	5.065983
tip	8.323502	1.914455	0.643906
size	5.065983	0.643906	0.904591

corr/covpdf

In [66]:

```
data
```

Out[66]:

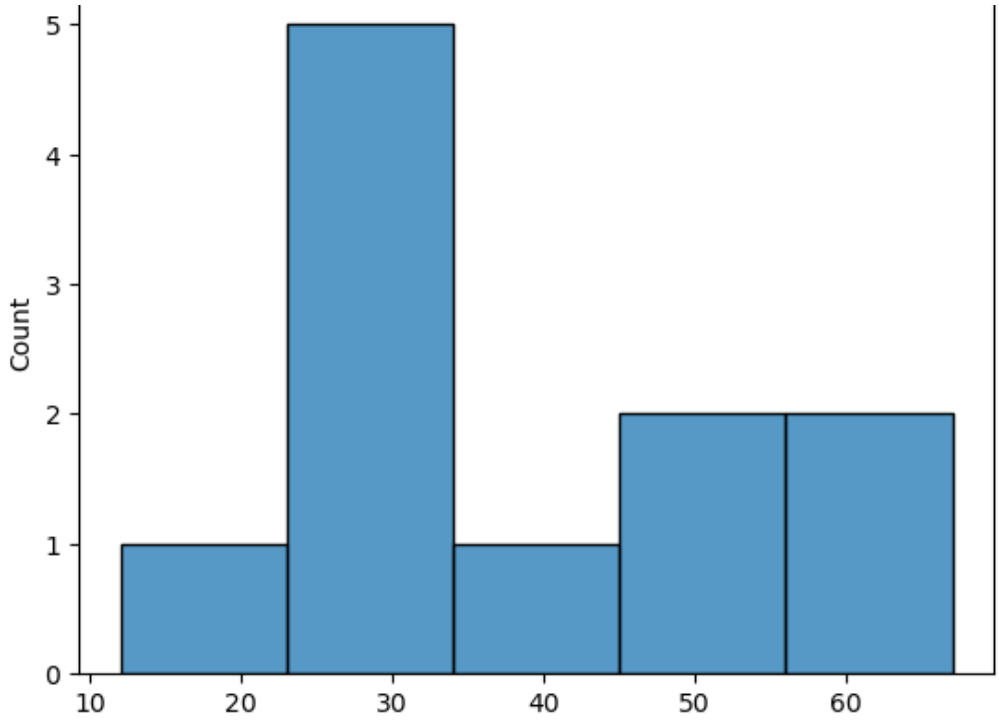
```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [67]:

```
import seaborn as sns
sns.histplot(data)
```

Out[67]:

```
<AxesSubplot:ylabel='Count'>
```



In [68]:

```
data=[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [69]:

```
data
```

Out[69]:

```
[23, 24, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [70]:

```
data_copy2=data.copy()
```

In [71]:

```
data_copy=data.copy()
```

In [72]:

```
data_copy.sort()
```

In [73]:

```
data_copy.append(289)
```

In [74]:

```
data_copy
```

Out[74]:

```
[12, 23, 24, 32, 32, 32, 43, 45, 45, 56, 67, 289]
```

In [75]:

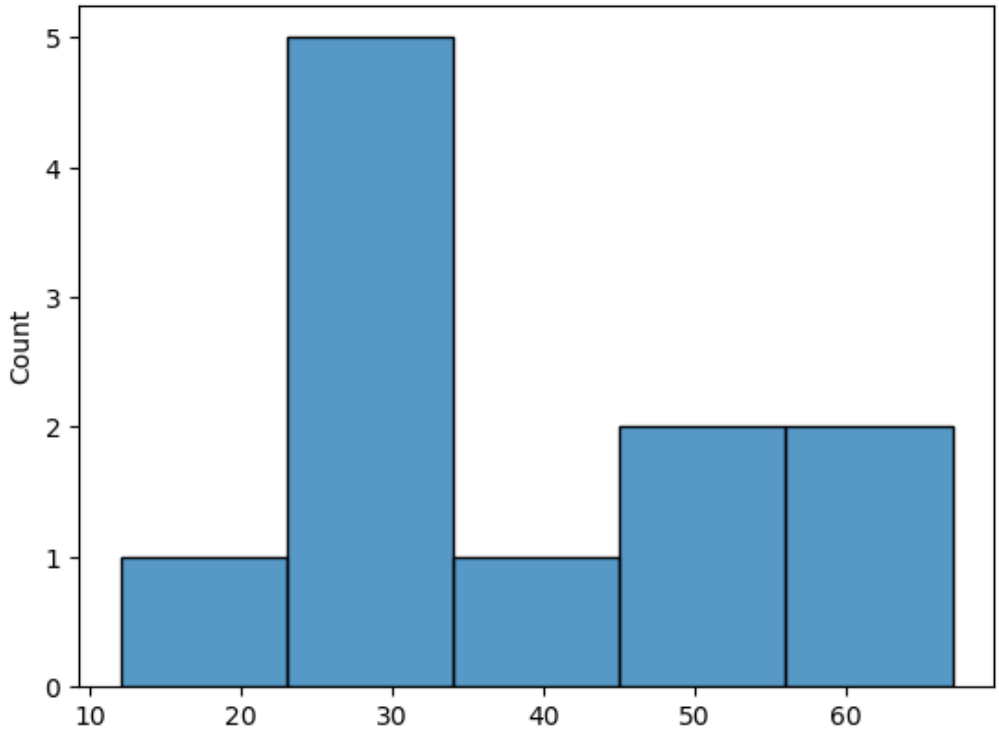
```
import seaborn as sns
```

In [76]:

```
sns.histplot(data)
```

Out[76]:

```
<AxesSubplot:ylabel='Count'>
```

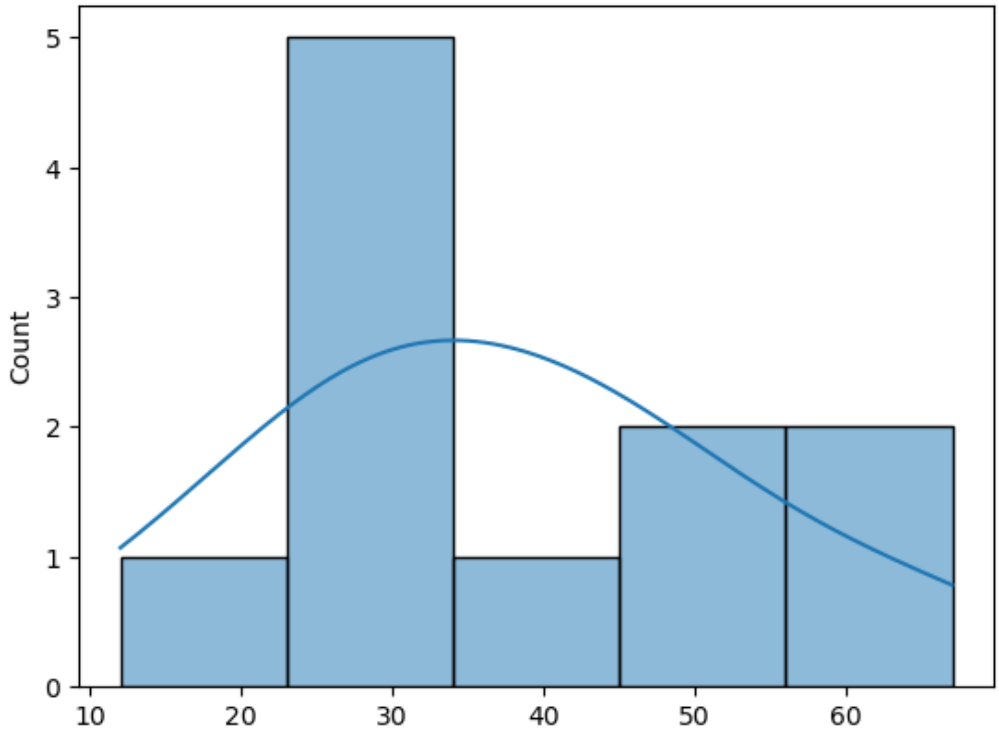


In [77]:

```
sns.histplot(data,kde=True)
```

Out[77]:

```
<AxesSubplot:ylabel='Count'>
```

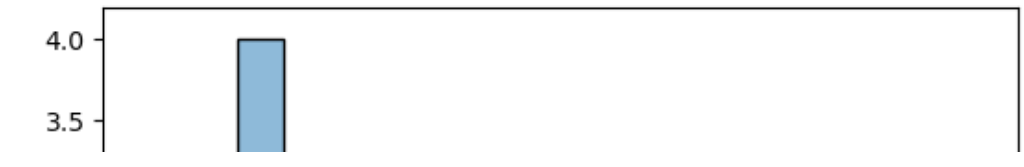


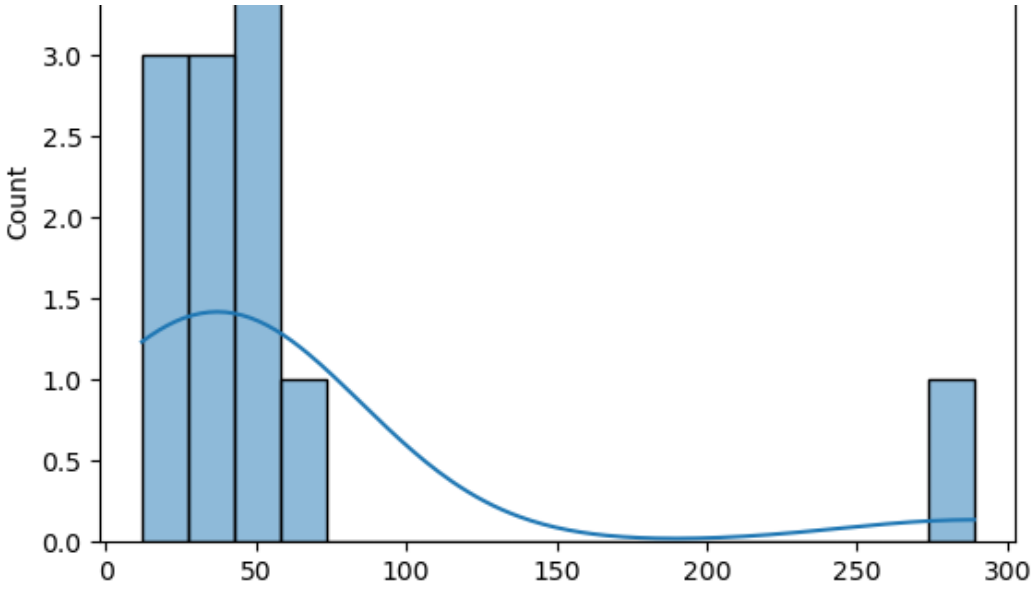
In [78]:

```
sns.histplot(data_copy,kde=True)
```

Out[78]:

```
<AxesSubplot:ylabel='Count'>
```





In [79]:

```
data_copy2[0]=-10
```

In [80]:

```
data_copy2[1]=-75
```

In [81]:

```
data_copy2
```

Out[81]:

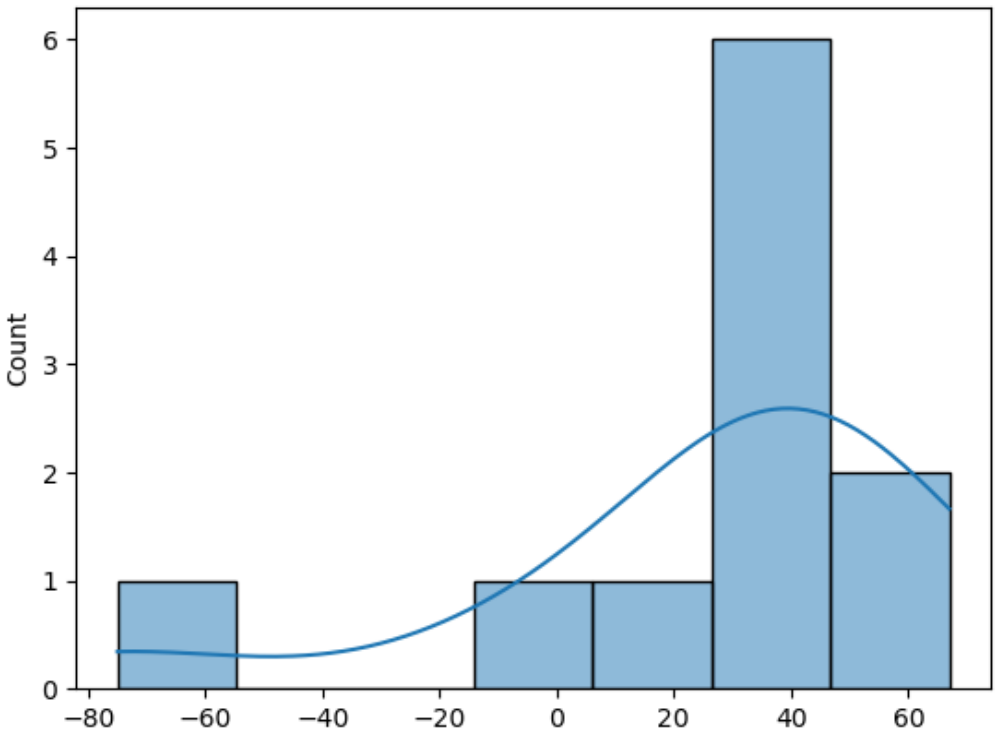
```
[-10, -75, 32, 45, 12, 43, 67, 45, 32, 56, 32]
```

In [82]:

```
sns.histplot(data_copy2,kde=True)
```

Out[82]:

```
<AxesSubplot:ylabel='Count'>
```



In [83]:

```
import pandas as pd
data2=pd.read_csv("iris.csv")
```

In [84]:

```
data2.head()
```

Out[84]:

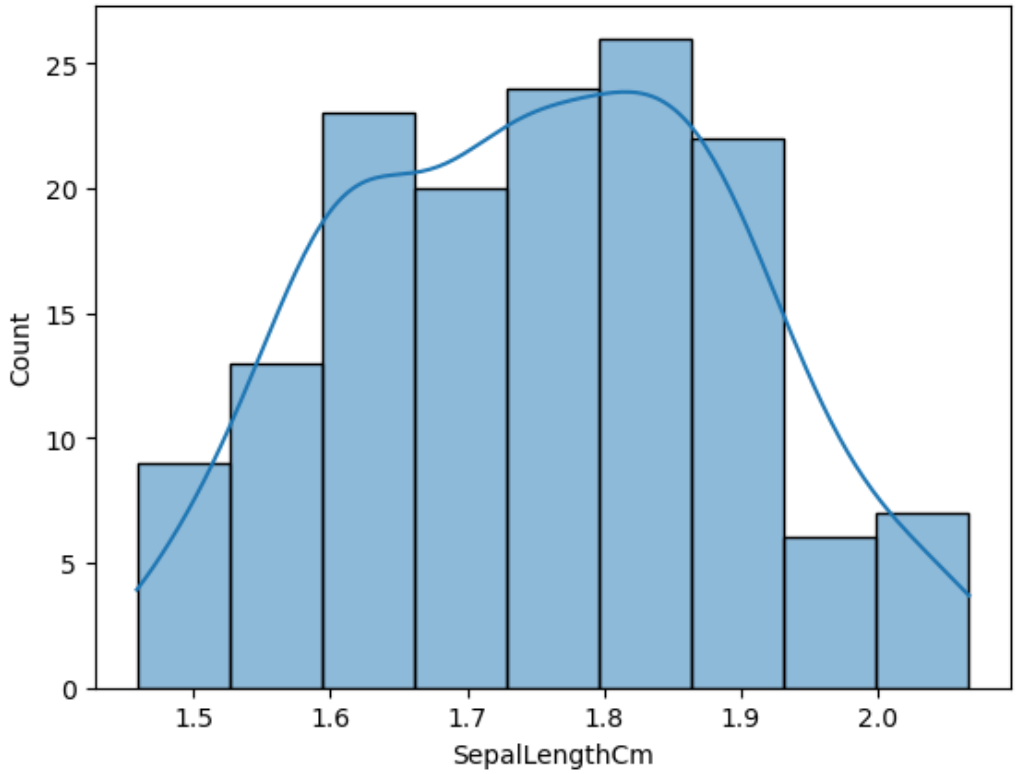
	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa

In [85]:

```
sns.histplot(np.log(data2["SepalLengthCm"]),kde=True)
```

Out[85]:

```
<AxesSubplot:xlabel='SepalLengthCm', ylabel='Count'>
```

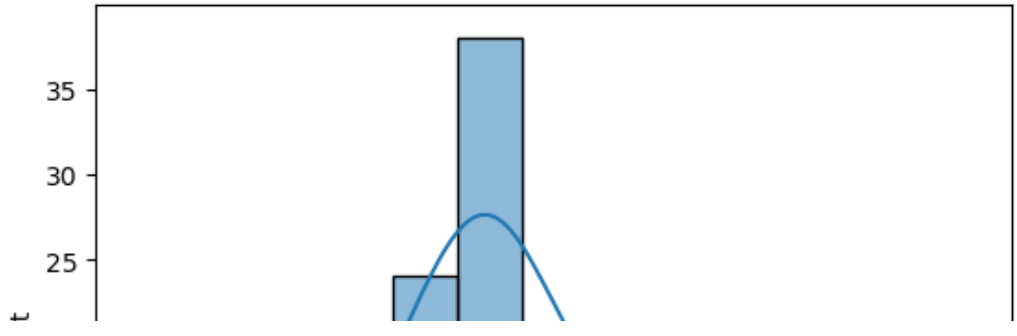


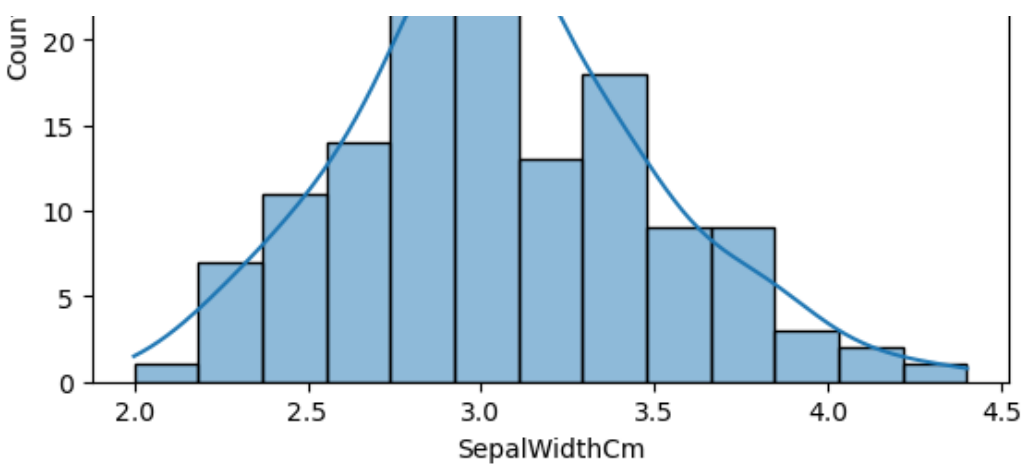
In [86]:

```
sns.histplot(data2["SepalWidthCm"],kde=True)
```

Out[86]:

```
<AxesSubplot:xlabel='SepalWidthCm', ylabel='Count'>
```



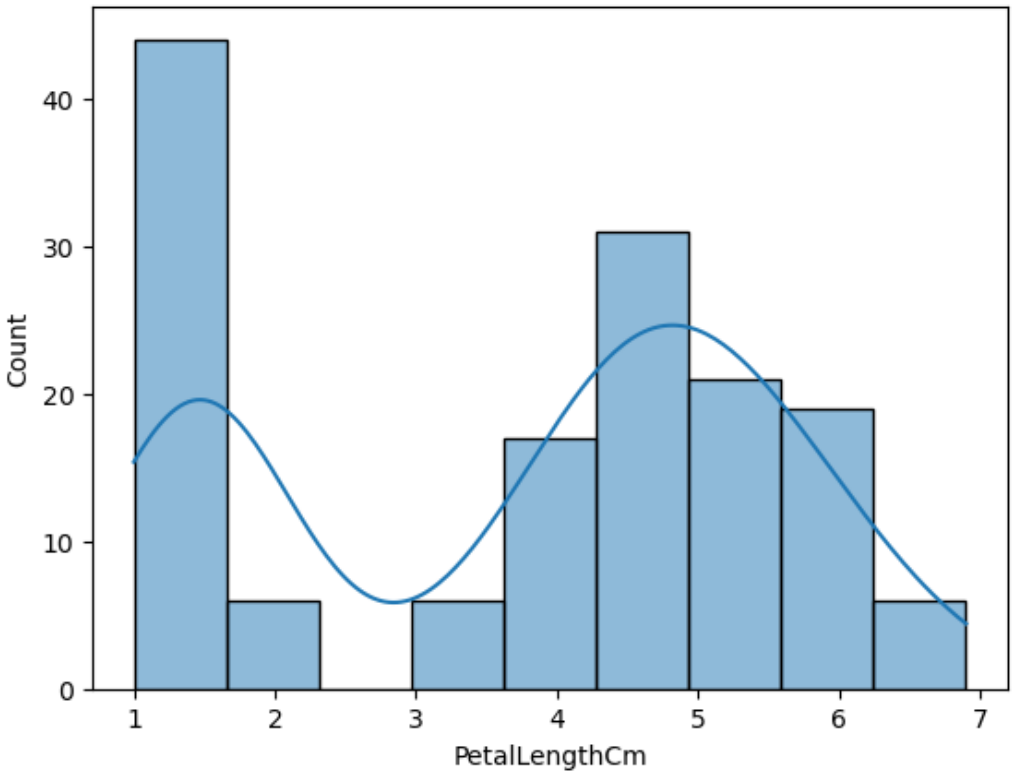


In [87]:

```
sns.histplot(data2["PetalLengthCm"],kde=True)
```

Out[87]:

```
<AxesSubplot:xlabel='PetalLengthCm', ylabel='Count'>
```

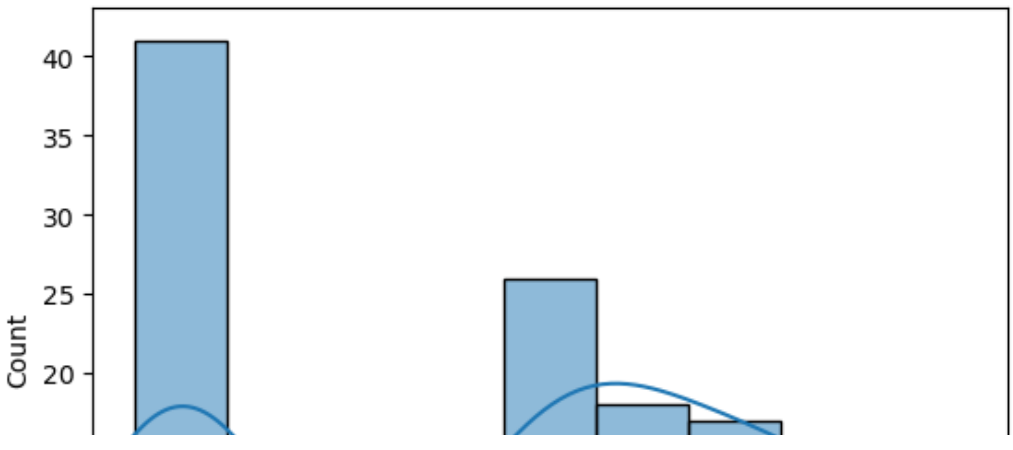


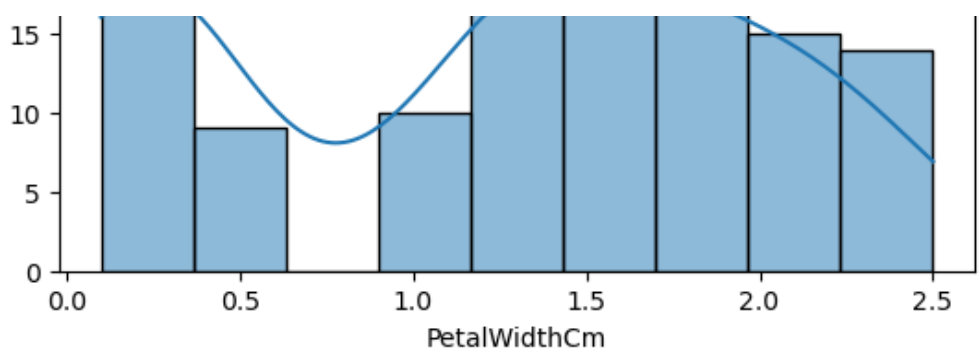
In [88]:

```
sns.histplot(data2["PetalWidthCm"],kde=True)
```

Out[88]:

```
<AxesSubplot:xlabel='PetalWidthCm', ylabel='Count'>
```





In [89]:

```
import numpy as np
s=np.random.normal(0.5,0.2,1000)
```

In [90]:

```
s
```

Out[90]:

```
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```

In [91]:

```
sns.histplot(s,kde=True)
```

Out[91]:

```
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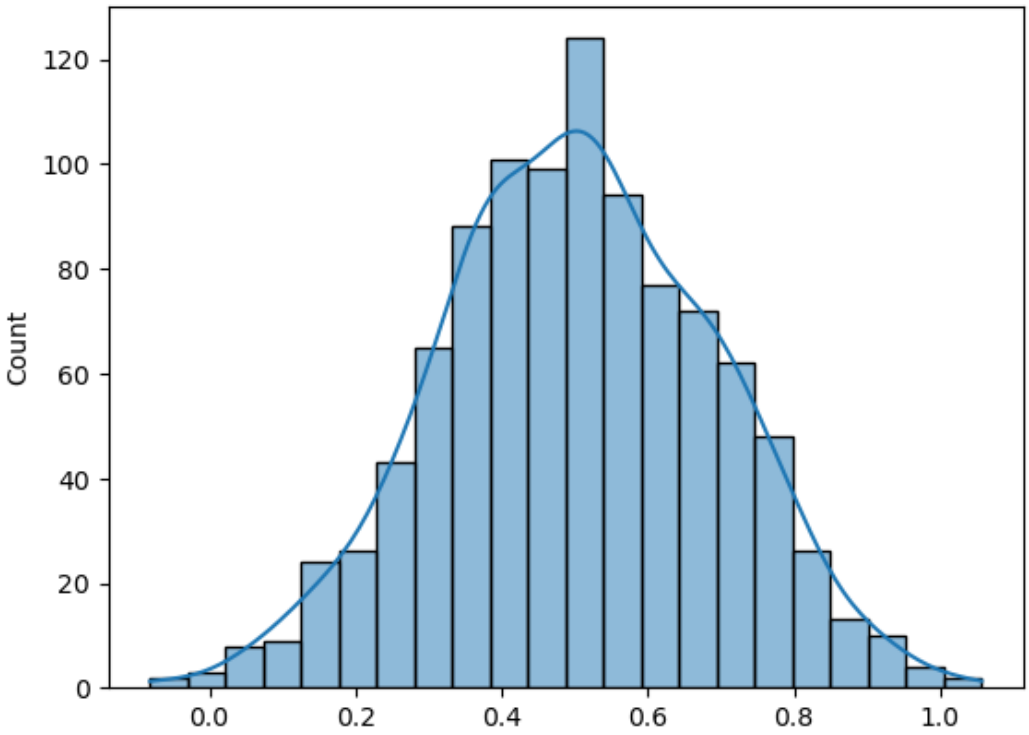

In [92]:

```
mu,sigma=3.0,1.0
p=np.random.lognormal(mu,sigma,1000)
```

In [93]:

```
p
```

Out[93]:

```
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```

In [94]:

```
sns.histplot(p,kde=True)
```

Out[94]:

```
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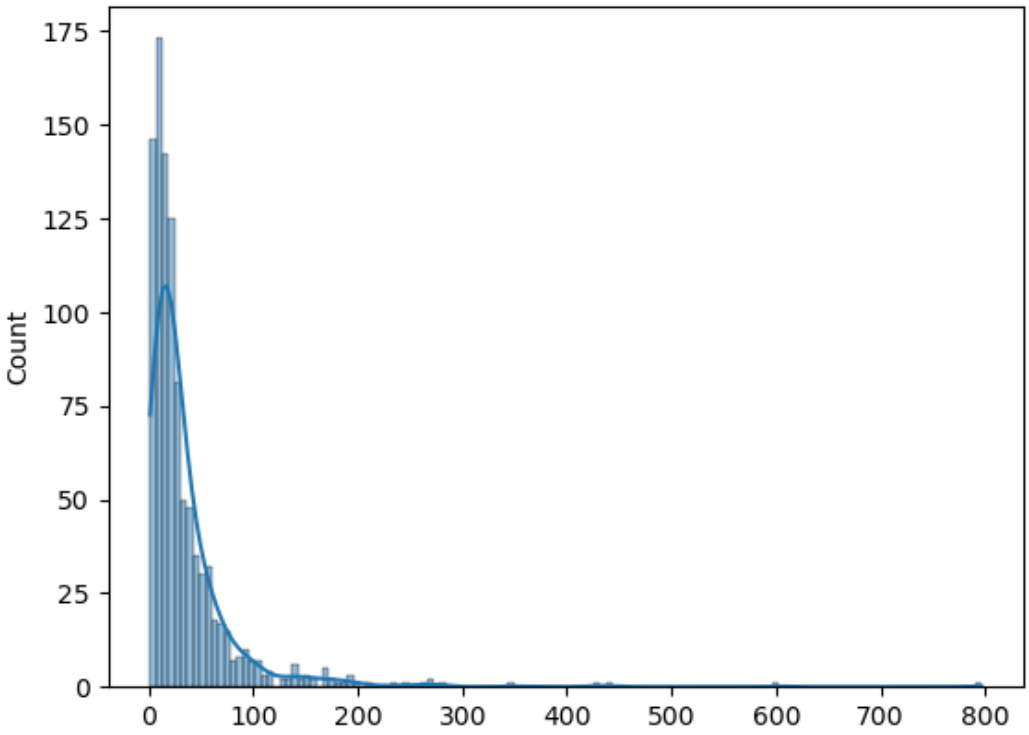

In [95]:

```
sns.histplot(np.log(p),kde=True)
```

Out[95]:

```
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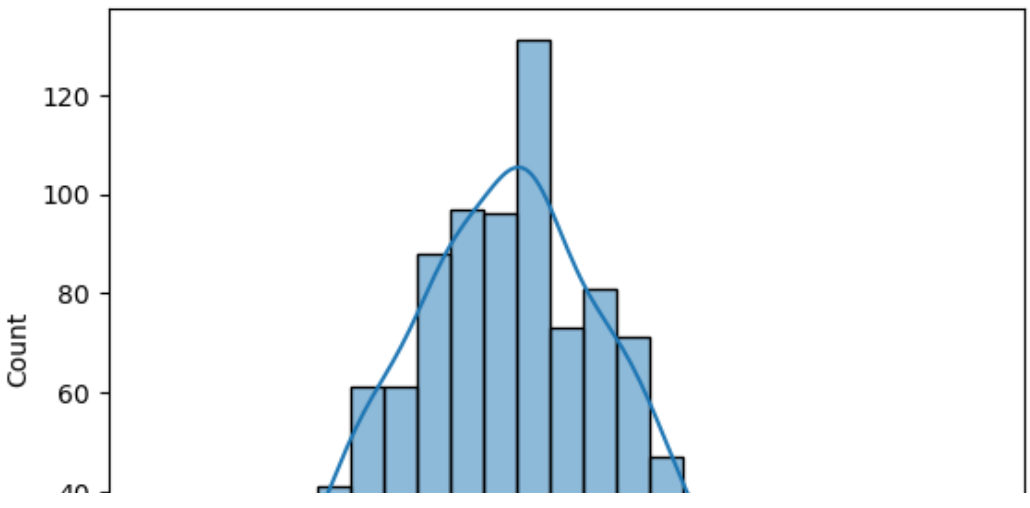

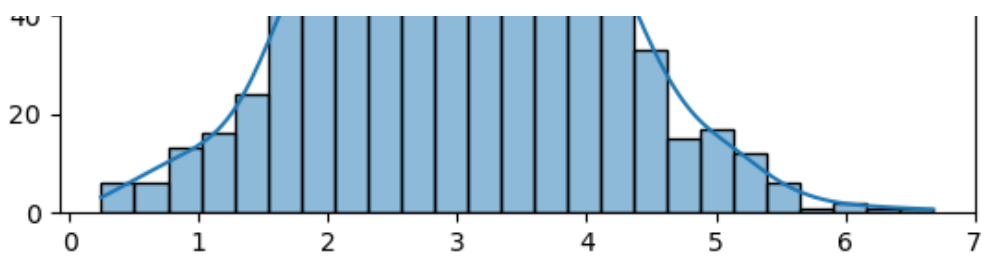

In [96]:

```
data
```

Out[96]:

```
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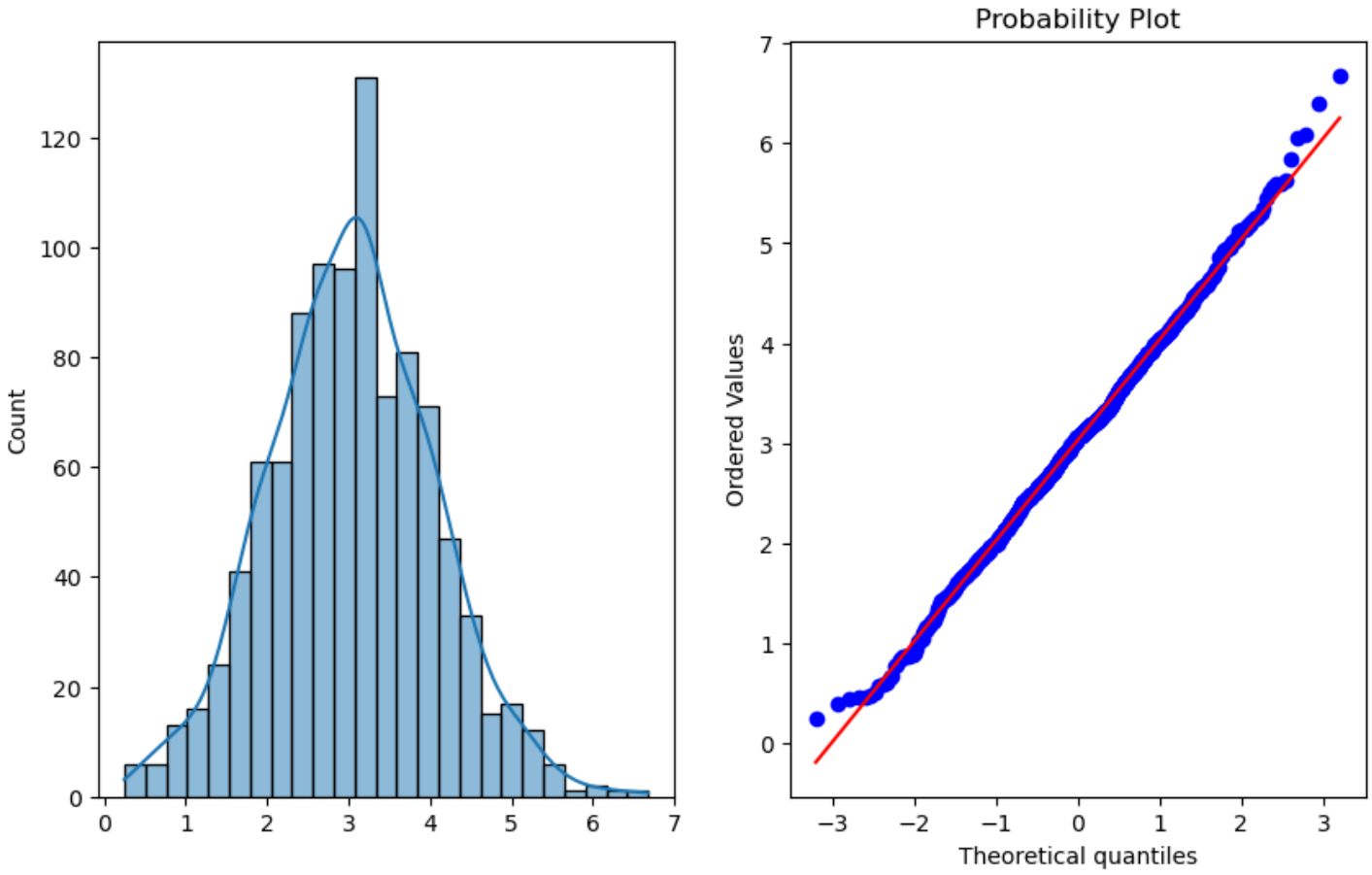
```

In [97]:

```
import matplotlib.pyplot as plt
import scipy.stats as stat
import pylab
def plot_data(sample):
    plt.figure(figsize=(10,6))
    plt.subplot(1,2,1)
    sns.histplot(sample,kde=True)
    plt.subplot(1,2,2)
    stat.probplot(sample,dist='norm',plot=pylab)
    plt.show()
```

In [98]:

```
plot_data(np.log(p))
```



In [ ]:

In [ ]: