

📦 Import Required Libraries & Transformers

```
import numpy as np
import pandas as pd
import scipy.stats as stats

import matplotlib.pyplot as plt
import seaborn as sns

from sklearn.model_selection import train_test_split
from sklearn.preprocessing import FunctionTransformer
from sklearn.preprocessing import PowerTransformer
from sklearn.compose import ColumnTransformer
```

>Data Loading & Train–Test Split

```
df=pd.read_csv("/content/House_Rent_Dataset.csv",usecols=['BHK','Rent','Size'])
```

```
df.sample(10)
```

| | BHK | Rent | Size | grid icon |
|------|-----|-------|------|-----------|
| 1504 | 1 | 7500 | 400 | info icon |
| 918 | 2 | 90000 | 994 | |
| 4418 | 3 | 46000 | 2235 | |
| 2024 | 2 | 14000 | 1300 | |
| 4224 | 3 | 40000 | 1900 | |
| 401 | 2 | 6000 | 600 | |
| 1396 | 1 | 26000 | 649 | |
| 2473 | 1 | 13000 | 400 | |
| 4027 | 2 | 17000 | 875 | |
| 3176 | 2 | 16000 | 870 | |

```
x=df.drop(columns='Rent')
y=df['Rent']
```

📐 Log Transformation (FunctionTransformer) – Before vs After

```
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=0)
```

```
trf=FunctionTransformer(func=np.log1p)
```

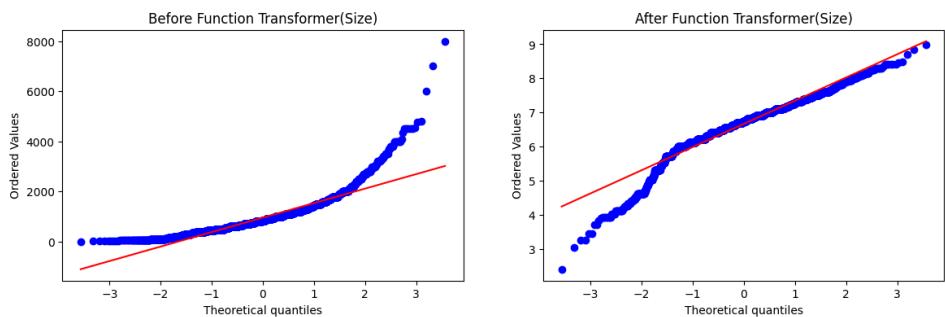
```
x_train_log=trf.fit_transform(x_train)
x_test_log=trf.transform(x_test)
```

```

plt.figure(figsize=(14,4))
plt.subplot(121)
stats.probplot(x_train['Size'],dist='norm',plot=plt)
plt.title('Before Function Transformer(Size)')

plt.subplot(122)
stats.probplot(x_train_log['Size'],dist='norm',plot=plt)
plt.title("After Function Transformer(Size)")
plt.show()

```

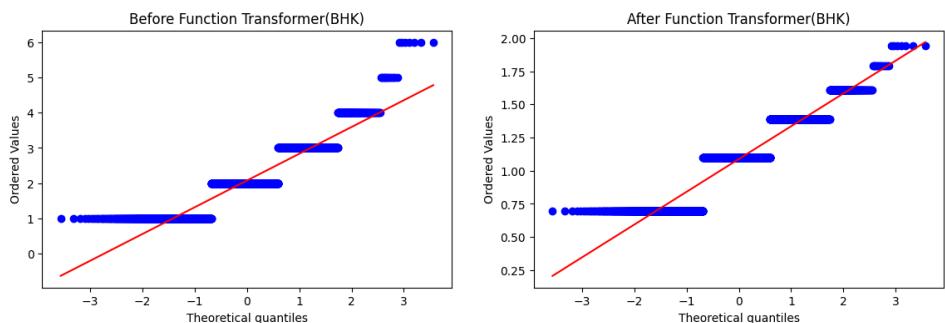


```

plt.figure(figsize=(14,4))
plt.subplot(121)
stats.probplot(x_train['BHK'],dist='norm',plot=plt)
plt.title('Before Function Transformer(BHK)')

plt.subplot(122)
stats.probplot(x_train_log['BHK'],dist='norm',plot=plt)
plt.title("After Function Transformer(BHK)")
plt.show()

```



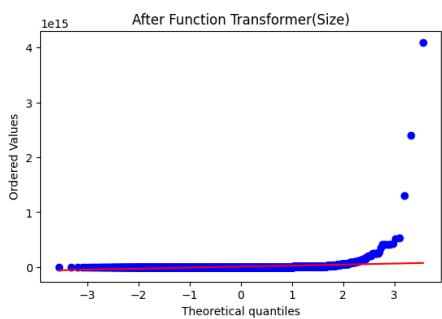
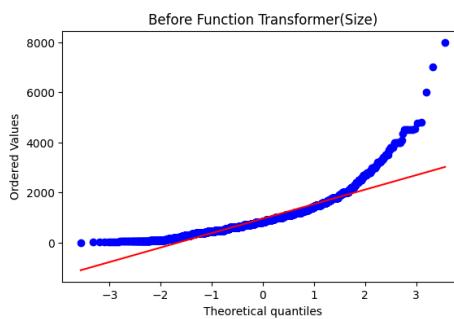
Power Transformation (FunctionTransformer: x⁴) – Before vs After

```
trf2=FunctionTransformer(func=lambda x:x**4)
```

```
x_train_trf2=trf2.fit_transform(x_train)
x_test_trf2=trf2.transform(x_test)
```

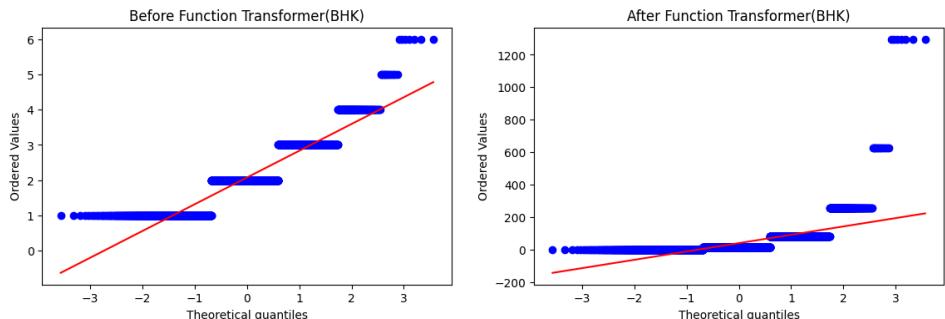
```
plt.figure(figsize=(14,4))
plt.subplot(121)
stats.probplot(x_train['Size'],dist='norm',plot=plt)
plt.title('Before Function Transformer(Size)')

plt.subplot(122)
stats.probplot(x_train_trf2['Size'],dist='norm',plot=plt)
plt.title("After Function Transformer(Size)")
plt.show()
```



```
plt.figure(figsize=(14,4))
plt.subplot(121)
stats.probplot(x_train['BHK'],dist='norm',plot=plt)
plt.title('Before Function Transformer(BHK)')
```

```
plt.subplot(122)
stats.probplot(x_train_trf2['BHK'],dist='norm',plot=plt)
plt.title("After Function Transformer(BHK)")
plt.show()
```



▼ Power Transformation (box-cox) – Before vs After

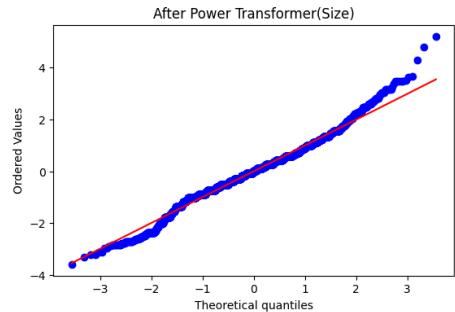
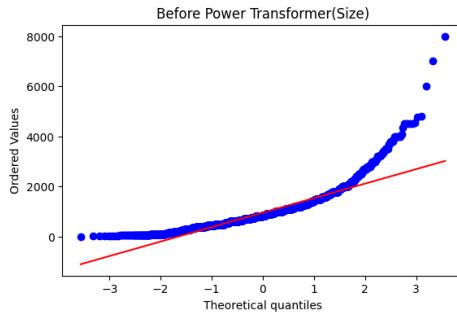
```
pt1=PowerTransformer(method='box-cox')
```

```
x_train_pt1=pt1.fit_transform(x_train)
x_test_pt1=pt1.fit_transform(x_test)
```

```
x_train_pt1=pd.DataFrame(x_train_pt1,columns=x_train.columns)
x_test_pt1=pd.DataFrame(x_test_pt1,columns=x_test.columns)
```

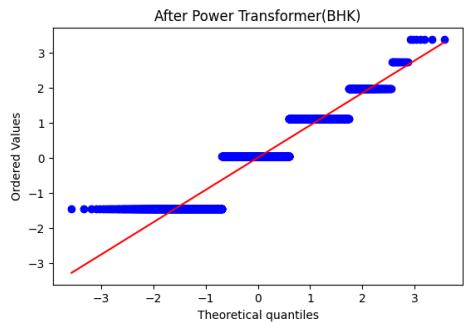
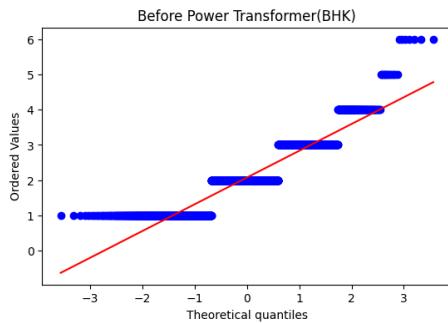
```
plt.figure(figsize=(14,4))
plt.subplot(121)
stats.probplot(x_train['Size'],dist='norm',plot=plt)
plt.title('Before Power Transformer(Size)')

plt.subplot(122)
stats.probplot(x_train_pt1['Size'],dist='norm',plot=plt)
plt.title("After Power Transformer(Size)")
plt.show()
```



```
plt.figure(figsize=(14,4))
plt.subplot(121)
stats.probplot(x_train['BHK'],dist='norm',plot=plt)
plt.title('Before Power Transformer(BHK)')

plt.subplot(122)
stats.probplot(x_train_pt1['BHK'],dist='norm',plot=plt)
plt.title("After Power Transformer(BHK)")
plt.show()
```



▼ Power Transformation (Yeo-Johnson) – Before vs After

```
pt2=PowerTransformer(method="yeo-johnson")
```

```
x_train_pt2=pt2.fit_transform(x_train)
x_test_pt2=pt2.transform(x_test)
```

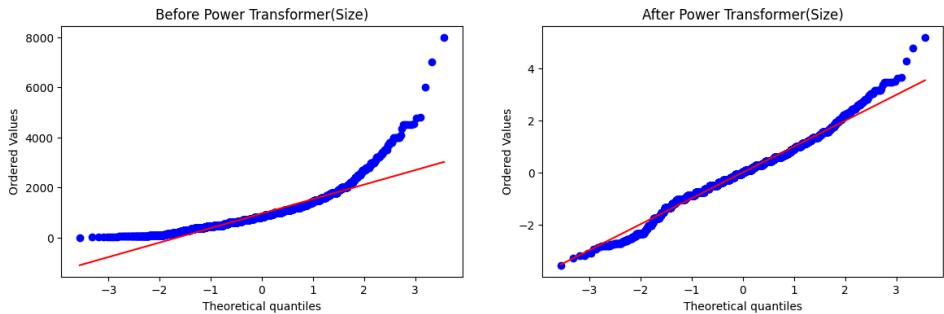
```

x_train_pt2=pd.DataFrame(x_train_pt2.columns=x_train.columns)

plt.figure(figsize=(14,4))
plt.subplot(121)
stats.probplot(x_train['Size'],dist='norm',plot=plt)
plt.title('Before Power Transformer(Size)')

plt.subplot(122)
stats.probplot(x_train_pt2['Size'],dist='norm',plot=plt)
plt.title("After Power Transformer(Size)")
plt.show()

```



```

plt.figure(figsize=(14,4))
plt.subplot(121)
stats.probplot(x_train['BHK'],dist='norm',plot=plt)
plt.title('Before Power Transformer(BHK)')

plt.subplot(122)
stats.probplot(x_train_pt2['BHK'],dist='norm',plot=plt)
plt.title("After Power Transformer(BHK)")
plt.show()

```

