```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
df = pd.read_csv('/content/Housing (1).csv')
print("Dataset Shape:", df.shape)
```

```
Dataset Shape: (545, 13)
```

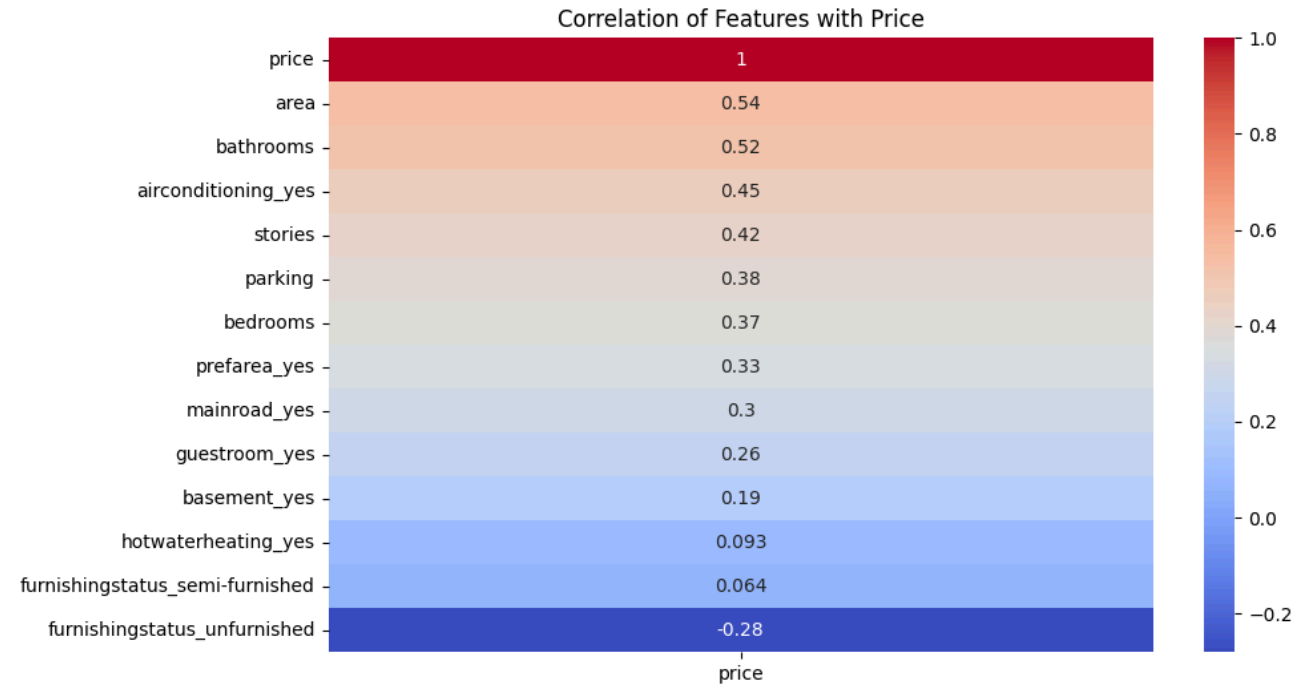
```
print("\nFirst 5 rows:\n", df.head())
print("\nDataset Info:")
print(df.info())
print("\nMissing Values:\n", df.isnull().sum())
num_cols = df.select_dtypes(include=[np.number]).columns
cat_cols = df.select_dtypes(include=["object"]).columns
```

```
First 5 rows:
       price  area  bedrooms  bathrooms  stories mainroad guestroom basement  \
0  13300000  7420         4          2        3      yes        no       no
1  12250000  8960         4          4        4      yes        no       no
2  12250000  9960         3          2        2      yes        no      yes
3  12215000  7500         4          2        2      yes        no      yes
4  11410000  7420         4          1        2      yes       yes      yes

  hotwaterheating airconditioning  parking prefarea furnishingstatus
0              no             yes        2      yes        furnished
1              no             yes        3       no        furnished
2              no              no        2      yes   semi-furnished
3              no             yes        3      yes        furnished
4              no             yes        2       no        furnished

Dataset Info:
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 545 entries, 0 to 544
Data columns (total 13 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   price             545 non-null    int64
 1   area              545 non-null    int64
 2   bedrooms          545 non-null    int64
 3   bathrooms         545 non-null    int64
 4   stories           545 non-null    int64
 5   mainroad          545 non-null    object
 6   guestroom         545 non-null    object
 7   basement          545 non-null    object
 8   hotwaterheating   545 non-null    object
 9   airconditioning   545 non-null    object
 10  parking           545 non-null    int64
 11  prefarea          545 non-null    object
 12  furnishingstatus  545 non-null    object
dtypes: int64(6), object(7)
memory usage: 55.5+ KB
None

Missing Values:
 price               0
area                0
bedrooms            0
bathrooms           0
stories             0
mainroad            0
guestroom           0
basement            0
hotwaterheating     0
airconditioning     0
parking             0
prefarea            0
furnishingstatus    0
dtype: int64
```

```
df[num_cols] = df[num_cols].fillna(df[num_cols].median())
df[cat_cols] = df[cat_cols].fillna(df[cat_cols].mode().iloc[0])
```

```
df_encoded = pd.get_dummies(df, drop_first=True)
X = df_encoded.drop("price", axis=1)
y = df_encoded["price"]
plt.figure(figsize=(10,6))
sns.heatmap(df_encoded.corr()[["price"]].sort_values(by="price", ascending=False), annot=True, cmap="coolwarm")
plt.title("Correlation of Features with Price")
plt.show()
```

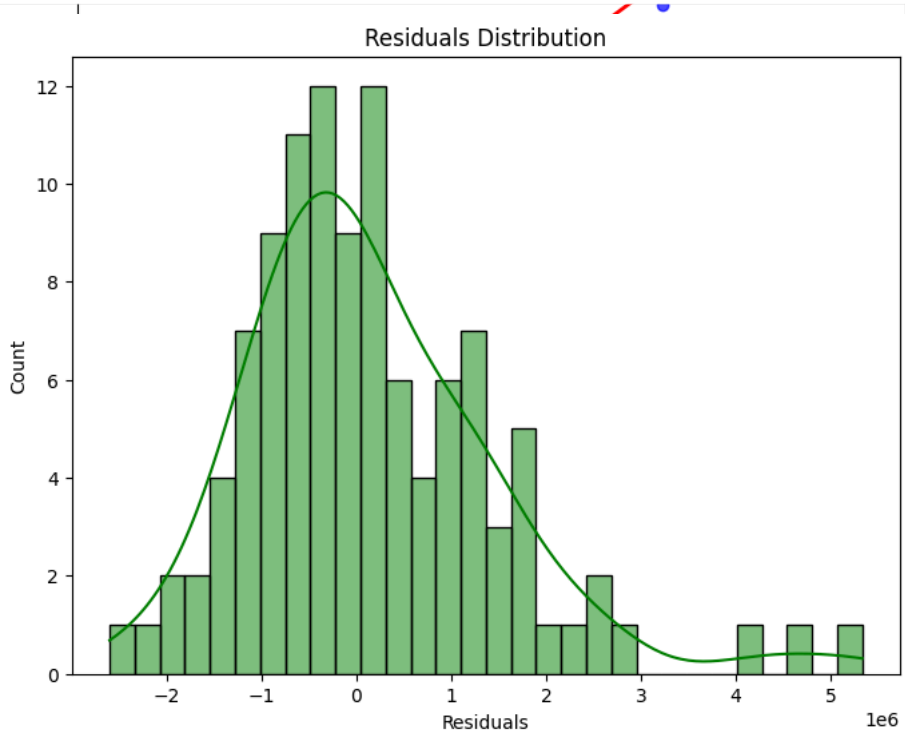
```
X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.2, random_state=42
)
lr = LinearRegression()
lr.fit(X_train, y_train)
y_pred = lr.predict(X_test)
mse = mean_squared_error(y_test, y_pred)
rmse = np.sqrt(mse)
r2 = r2_score(y_test, y_pred)
print("\n===== Model Evaluation =====")
print(f"Mean Squared Error (MSE): {mse:.2f}")
print(f"Root Mean Squared Error (RMSE): {rmse:.2f}")
print(f"R-Squared (R²): {r2:.2f}")
```




```
===== Model Evaluation =====
Mean Squared Error (MSE): 1754318687330.66
Root Mean Squared Error (RMSE): 1324506.96
R-Squared (R²): 0.65
```

```
plt.figure(figsize=(8,6))
plt.scatter(y_test, y_pred, alpha=0.7, color="blue")
plt.plot([y_test.min(), y_test.max()], [y_test.min(), y_test.max()], color="red", linewidth=2)
plt.xlabel("Actual Prices")
plt.ylabel("Predicted Prices")
plt.title("Actual vs Predicted House Prices")
plt.show()
```


```
residuals = y_test - y_pred
plt.figure(figsize=(8,6))
sns.histplot(residuals, bins=30, kde=True, color="green")
plt.xlabel("Residuals")
plt.title("Residuals Distribution")
plt.show()
```




```
numeric_df = df.select_dtypes(include=['float64', 'int64'])
corr_matrix = numeric_df.corr()
plt.figure(figsize=(10,6))
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm', fmt=".2f")
plt.title("Correlation Heatmap of Numeric Features", fontsize=14)
plt.show()
```