In [1]:

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:

```
df = pd.read_csv('data.csv')
```

In [3]:

```
df.head()
```

Out[3]:

	feature1	feature2	feature3	target
0	-0.570563	1.420342	0.495580	-9.763182
1	-0.990563	0.556965	1.045064	-24.029355
2	-0.674728	0.150617	1.774645	45.616421
3	0.388250	-0.387127	-0.110229	34.135737
4	1.167882	-0.024104	0.145063	86.663647

In [4]:

```
X = df.iloc[:,0:3].values
y = df.iloc[:,-1].values
```

In [5]:

```
from sklearn.model_selection import train_test_split
X_train,X_test,y_train,y_test = train_test_split(X,y,test_size=0.3,random_state=1)
```

In [6]:

```
from sklearn.linear_model import LinearRegression
model = LinearRegression()

model.fit(X_train,y_train)
```

Out[6]:

```
LinearRegression()
```

In [7]:

```
# Residual
y_pred = model.predict(X_test)
residual = y_test - y_pred
```

1. Linear Relationship

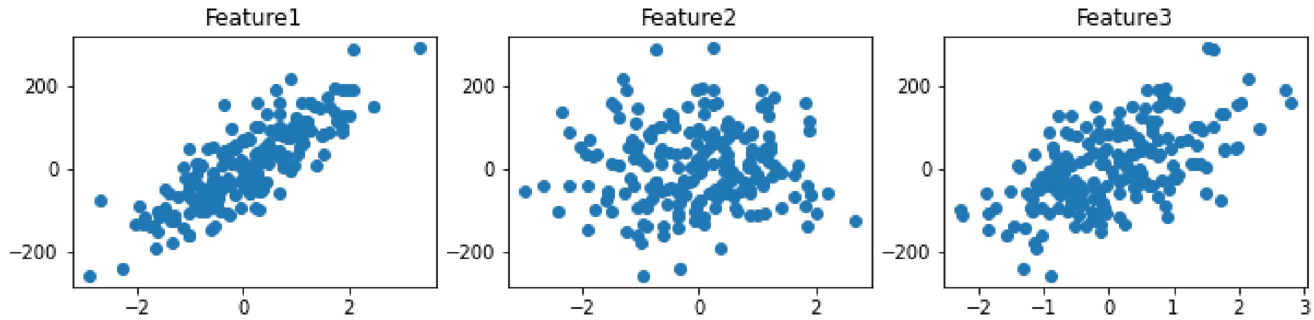
In [8]:

```
fig, (ax1, ax2, ax3) = plt.subplots(ncols=3, figsize=(12, 2.5))

ax1.scatter(df['feature1'], df['target'])
ax1.set_title("Feature1")
ax2.scatter(df['feature2'], df['target'])
ax2.set_title("Feature2")
ax3.scatter(df['feature3'], df['target'])
```

```
ax3.set_title("Feature3")

plt.show()
```



In [ ]:

```

```

2. Multicollinearity

In [9]:

```
from statsmodels.stats.outliers_influence import variance_inflation_factor

vif = []

for i in range(X_train.shape[1]):
    vif.append(variance_inflation_factor(X_train, i))
```

In [10]:

```
pd.DataFrame({'vif': vif}, index=df.columns[0:3]).T
```

Out[10]:

	feature1	feature2	feature3
vif	1.010326	1.009871	1.01395

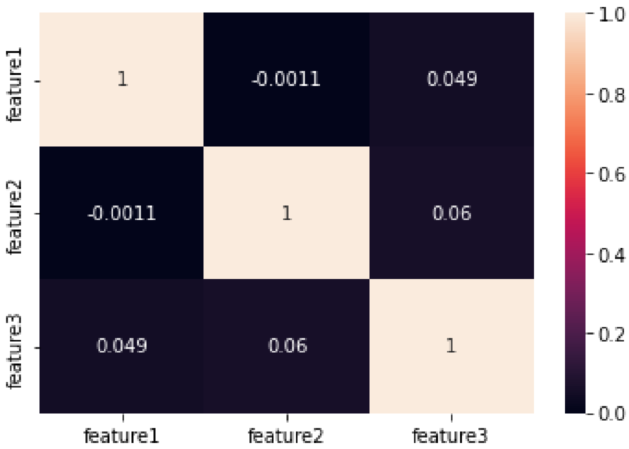
Our result is came for every feature is 1 then we can consider here is not any multicollinearity is present

In [11]:

```
# Another Technique
sns.heatmap(df.iloc[:,0:3].corr(),annot=True)
```

Out[11]:

<AxesSubplot:>



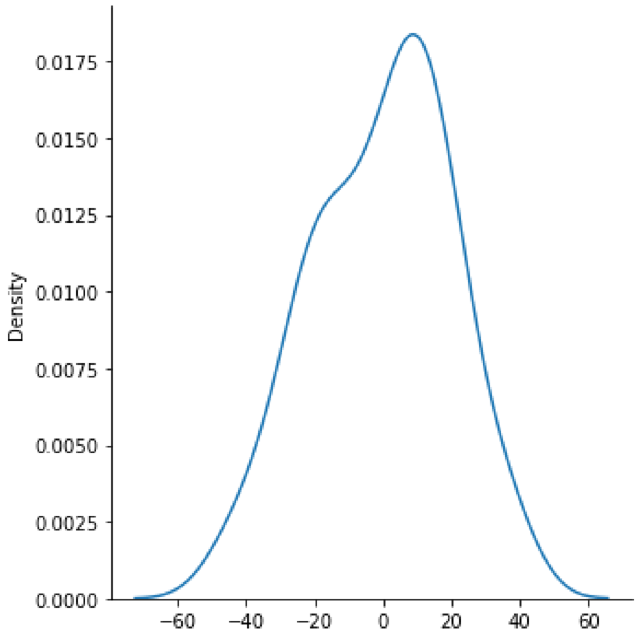
3. Normality of Residual

In [12]:

```
sns.displot(residual,kind='kde')
```

Out[12]:

```
<seaborn.axisgrid.FacetGrid at 0x25cdb9d8fa0>
```



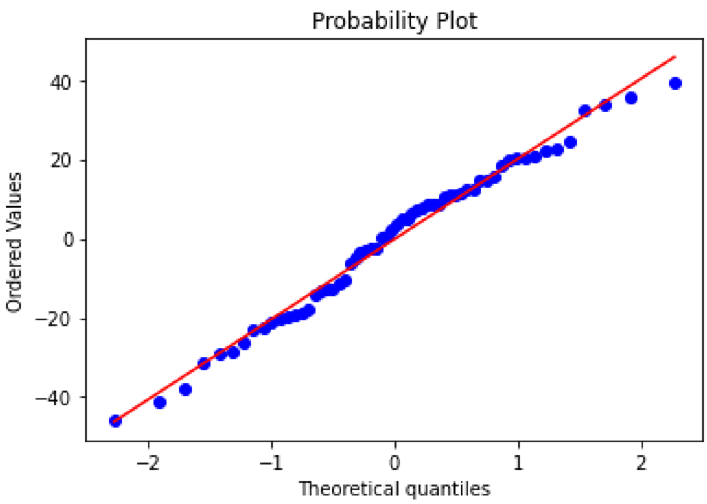
In [13]:

```
# QQ Plot

import scipy as sp

fig, ax = plt.subplots(figsize=(6,4))
sp.stats.probplot(residual, plot=ax, fit=True)

plt.show()
```



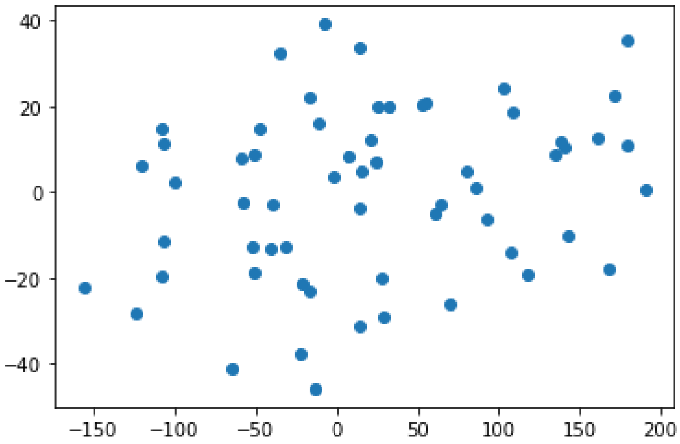
4. Homoscedasticity

In [14]:

```
plt.scatter(y_pred,residual)
```

Out[14]:

```
<matplotlib.collections.PathCollection at 0x25cdc27d250>
```



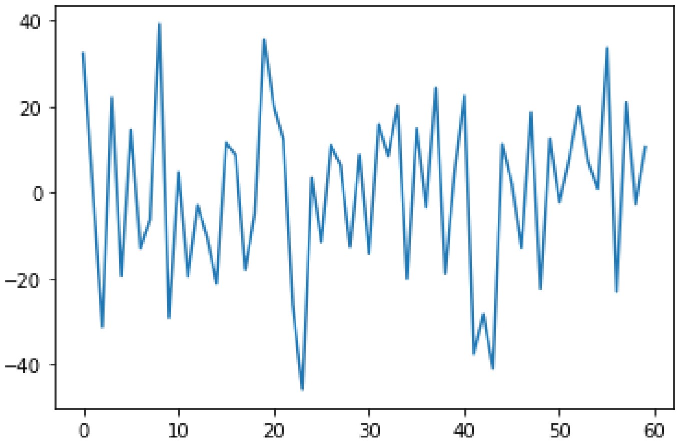
5. Autocorrelation of Residuals

In [15]:

```
plt.plot(residual)
```

Out[15]:

```
[<matplotlib.lines.Line2D at 0x25cdc2d9d90>]
```



In [ ]:

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