In [2]:

```python
import numpy as np
from sklearn.preprocessing import PolynomialFeatures
from sklearn.linear_model import LinearRegression
```

In [48]:

```python
np.random.seed(10)
x = np.sort(5*np.random.rand(100,1),axis = 0)
y = x**4 - 4.5*x**3 + 1.5*x**2 - 2*x + 10 + 2*np.random.normal(0,3,(100,1))
```

In [49]:

```python
from sklearn.model_selection import train_test_split as split
```

In [50]:

```python
x_train,x_test,y_train,y_test = split(x,y,test_size=0.3,random_state = 0)
```

In [51]:

```python
degree = 3
poly = PolynomialFeatures(degree)
x_train_poly = poly.fit_transform(x_train)

Lr = LinearRegression()
lr = Lr.fit(x_train_poly,y_train)
```

In [52]:

```python
x_test_poly = poly.fit_transform(x_test)
y_pred = lr.predict(x_test_poly)
```

In [53]:

```python
from sklearn.metrics import mean_squared_error,r2_score
r2_score = r2_score(y_test,y_pred)
mse = mean_squared_error(y_test,y_pred)
```
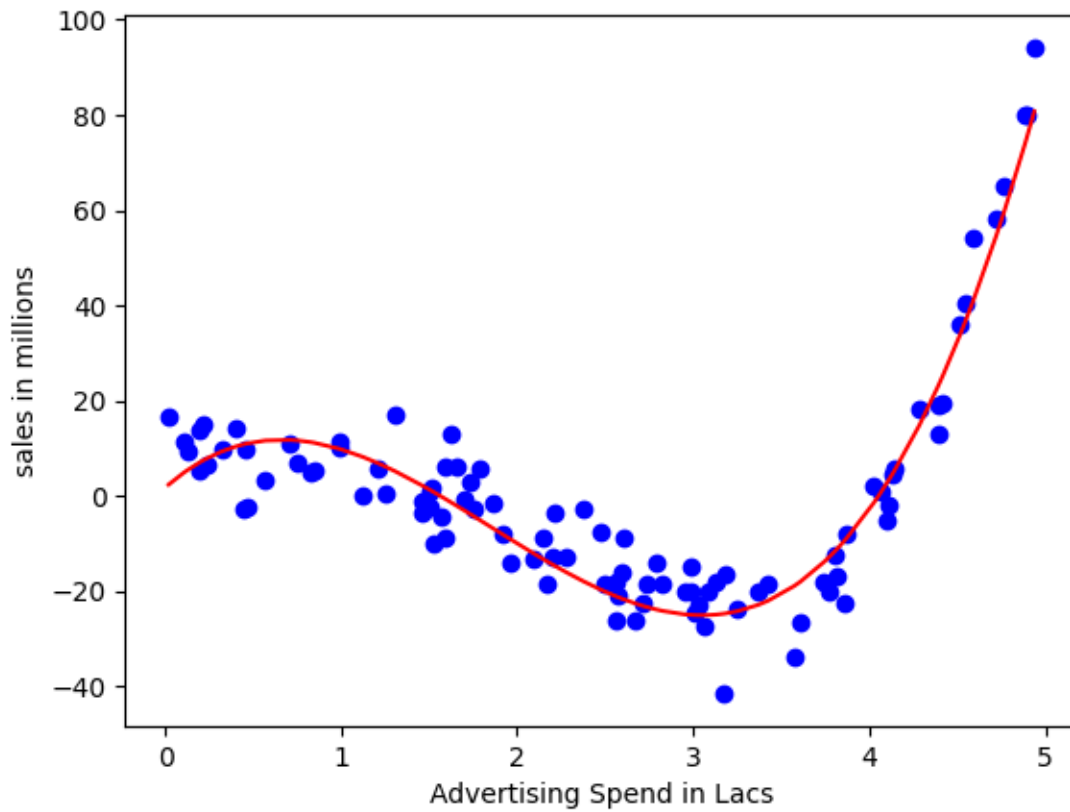
In [54]:

```python
import matplotlib.pyplot as plt
```

In [60]:

```python
plt.scatter(x,y,color="blue")
Y_Predict = lr.predict(poly.transform(x))
plt.plot(x,Y_Predict,color="red")
plt.xlabel("Advertising Spend in Lacs")
plt.ylabel("sales in millions" )
```

Out[60]:

```
Text(0, 0.5, 'sales in millions')
```



In [61]:

```
lr.coef_
```

Out[61]:

```
array([[  0.        ,  32.80243577, -30.1649506 ,   5.41971317]])
```

In [ ]: