```
import numpy as np
import matplotlib.pyplot as plt
from sklearn.datasets import load_diabetes
```

Textbook Problem (Q3)

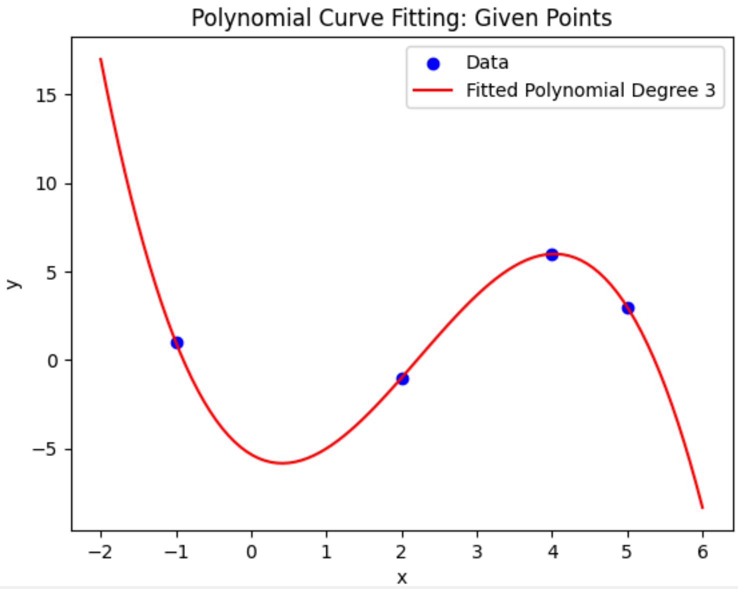
```
# Define the points
x_points = np.array([2, 5, 4, -1])
y_points = np.array([-1, 3, 6, 1])

# Fit a polynomial of degree 3
degree = 3
coefficients = np.polyfit(x_points, y_points, degree)

# Create the polynomial model using the coefficients
polynomial = np.poly1d(coefficients)

# Generate the values of the fitted polynomial
x_fit = np.linspace(min(x_points) - 1, max(x_points) + 1, 100)
y_fit = polynomial(x_fit)

# Plotting the original data and the fitted polynomial curve
plt.scatter(x_points, y_points, color='blue', label='Data')
plt.plot(x_fit, y_fit, color='red', label=f'Fitted Polynomial Degree {degree}')
plt.legend()
plt.xlabel('x')
plt.ylabel('y')
plt.title('Polynomial Curve Fitting: Given Points')
plt.show()
```



Based on diabetes dataset

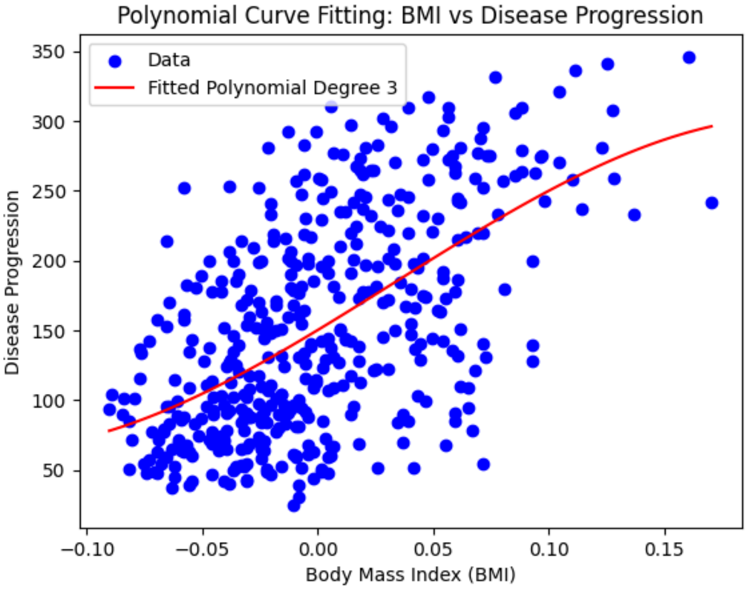
```
# Load the Diabetes dataset
diabetes = load_diabetes()
X = diabetes.data[:, 2]  # Body Mass Index (bmi)
y = diabetes.target      # Disease progression (y)

# Fit a polynomial of degree 3
degree = 3
coefficients = np.polyfit(X, y, degree)

# Create the polynomial model using the coefficients
polynomial = np.poly1d(coefficients)

# Generate the values of the fitted polynomial
X_fit = np.linspace(X.min(), X.max(), 100)
y_fit = polynomial(X_fit)

# Plotting the original data and the fitted polynomial curve
plt.scatter(X, y, color='blue', label='Data')
plt.plot(X_fit, y_fit, color='red', label=f'Fitted Polynomial Degree {degree}')
plt.legend()
plt.xlabel('Body Mass Index (BMI)')
plt.ylabel('Disease Progression')
plt.title('Polynomial Curve Fitting: BMI vs Disease Progression')
plt.show()
```


Polynomial Curve Fitting: BMI vs Disease Progression
Data
Fitted Polynomial Degree 3
Disease Progression
350
300
250
200
150
100
50
−0.10
−0.05
0.00
0.05
0.10
0.15
Body Mass Index (BMI)