Lab - 3

19/03/2025

Linear Regression of data of weeks and product sales. Use matrix approach for finding linear regression.

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

data = pd.read_csv('new_data.csv')
x = data['x']
y = data['y']

x_mean = x.mean()
y_mean = y.mean()

X = np.column_stack((np.ones(len(x)), x))

beta = np.linalg.inv(X.T @ X) @ X.T @ y

b0 = beta[0]
b1 = beta[1]

print("Slope (b1)", b1)
print("Intercept (b0)", b0).

x_new = 5
y_predicted = b0 + (b1 * x_new)

print("Predicted value for x = 5", y_predicted)
```

Output.

Slope (b1) : 2.2
Intercept (b0) : -1.5.
Predicted value for x = 5 : 9.5

02] Find Linear Regression of data of week and product sales.

```
import pands as pd.

data = pd.read_csv ('new_data.csv').
x = data['x']
y = data['y']

x_mean = x.mean()
y_mean = y.mean().

num = ((x - x_mean) * (y - y_mean)).sum()
den = ((x - x_mean) ** 2).sum()
b1 = num/den

b0 = y_mean - (b1 * x_mean)

print ("Slope (b1)", b1)
print ("Intercept (b0)", b0)
```

```
x_new = 5
y_predicted = b0 + (b1 * x_new)

print("predicted value for x=5:", y_predicted)
```

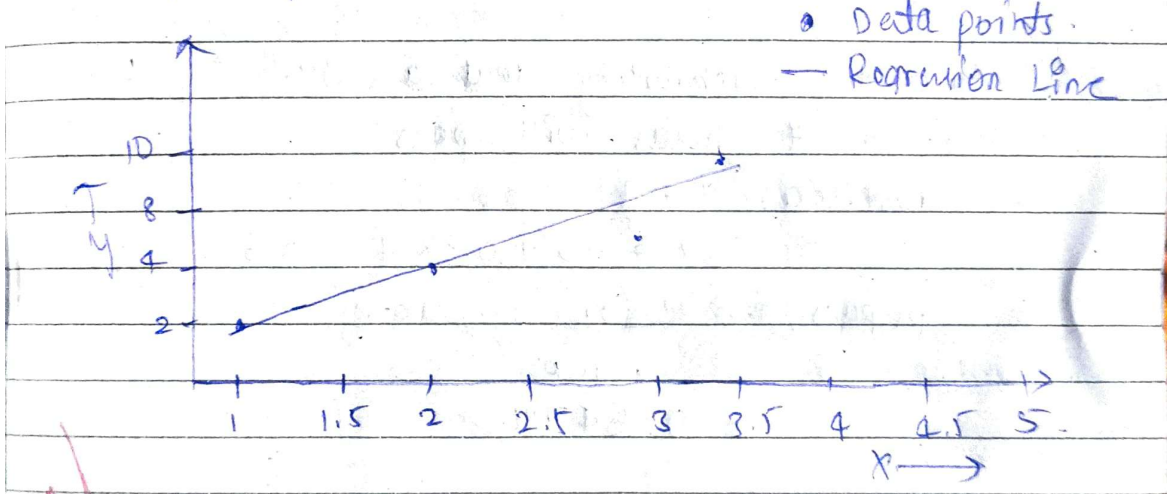
Output:

Slope (b1) : 2.2

Intercept (b0) : -1.5

Predicted value for x = 5 : 9.5

Graph output for matrix method.



Graph output of Linear (Normal) method.