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[ ]:
```
import numpy as np
import matplotlib.pyplot as plt
```

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```
#sample data
X=np.array([1,2,3,4,5,6])
Y=np.array([2.2,2.8,4.5,3.7,5.8,-20])
X_final=np.c_[np.ones(X.shape[0]),X] #adding a new dimension as 1 to the array
X_final
```

[ ]:
```
array([[1., 1.],
       [1., 2.],
       [1., 3.],
       [1., 4.],
       [1., 5.],
       [1., 6.]])
```

[ ]:
```
#formula- (X.T*X)*X.T*y->gives optimal weights ->Normal Equation
weight_optimal=np.linalg.inv(X_final.T @ X_final) @ X_final.T @ Y #Done as (X.
↪T*X)*X.T*y --@ as matrix multiplication
```

[ ]:
```
weight_optimal
```

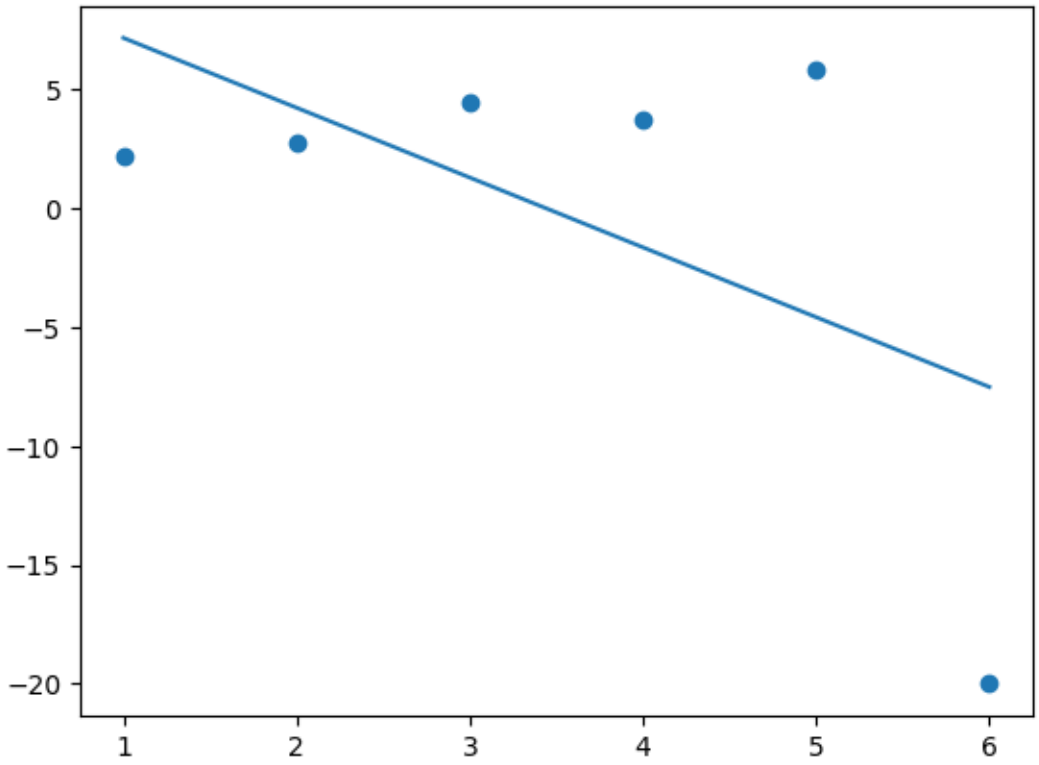
[ ]:
```
array([10.11333333, -2.93714286])
```

[ ]:
```
pred= X_final @ weight_optimal
```

[ ]:
```
pred
```

[ ]:
```
array([ 7.17619048,  4.23904762,  1.30190476, -1.6352381 , -4.57238095,
       -7.50952381])
```

[ ]:
```
plt.scatter(X,Y)
plt.plot(X,pred)
plt.show()
```


5
0
−5
−10
−15
−20
1
2
3
4
5
6

[ ]: