BL.SC.U4AIE24116
LAB-2

Q1

```python
import numpy as np
X = np.array([
    [20, 6, 2],
    [16, 3, 6],
    [27, 6, 2],
    [19, 1, 2],
    [24, 4, 2],
    [22, 1, 5],
    [15, 4, 2],
    [18, 4, 2],
    [21, 1, 4],
    [16, 2, 4]
])

cost= np.array([386, 289, 393, 110, 280, 167, 271, 274, 148, 198])

dimensionality = X.shape[1]
num_vectors = X.shape[0]

print("Dimensionality of vector space:", dimensionality)
print("Number of vectors:", num_vectors)



rank_X = np.linalg.matrix_rank(X)
print("Rank of feature matrix:", rank_X)



X_pseudo_inverse = np.linalg.pinv(X)
cost = X_pseudo_inverse @ cost


print("Cost of Candies (Rs per unit):", round(cost[0], 2))
print("Cost of Mangoes (Rs per Kg):", round(cost[1], 2))
print("Cost of Milk Packets (Rs per unit):", round(cost[2], 2))
```

```
--------------------------------------------------
Dimensionality of vector space: 3
Number of vectors: 10
Rank of feature matrix: 3

Cost of each product:
Cost of Candies (Rs per unit): 1.0
Cost of Mangoes (Rs per Kg): 55.0
Cost of Milk Packets (Rs per unit): 18.0
```

```
import pandas as pd

data = pd.read_excel("Lab Session Data.xlsx", sheet_name="Purchase Data")

data["Category"] = data["Payment (Rs)"].apply(
    lambda x: "RICH" if x > 200 else "POOR"
)

print(data)
```

	Customer	Payment (Rs)	Category
0	C_1	386	RICH
1	C_2	289	RICH
2	C_3	393	RICH
3	C_4	110	POOR
4	C_5	280	RICH
5	C_6	167	POOR
6	C_7	271	RICH
7	C_8	274	RICH
8	C_9	148	POOR
9	C_10	198	POOR