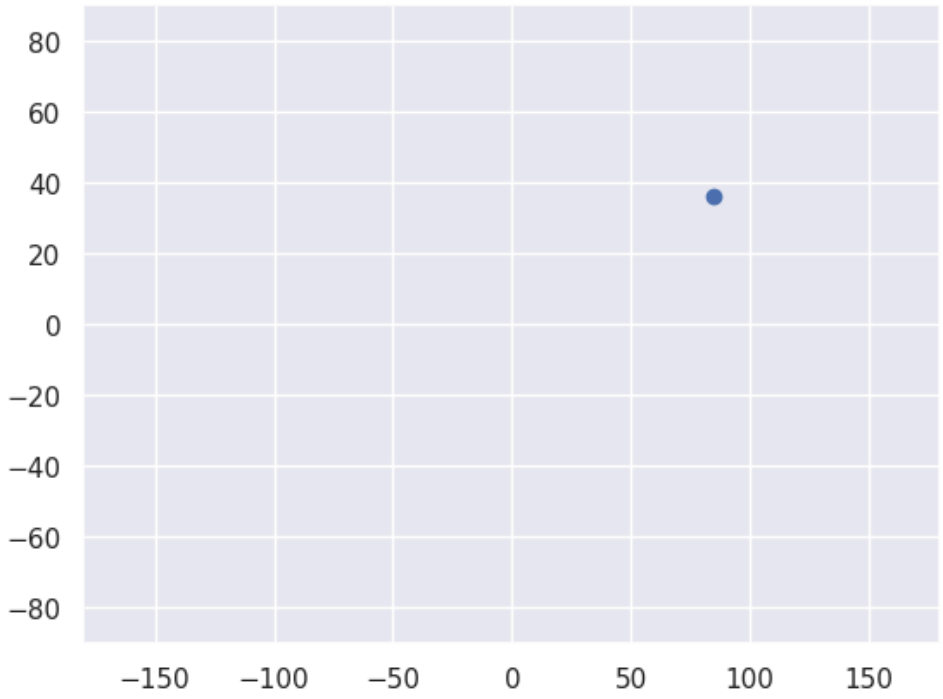
```
1 import numpy as np
2 import pandas as pd
3 import statsmodels.api as sm
4 import matplotlib.pyplot as plt
5 import seaborn as sns
6 sns.set()
7 from sklearn.cluster import KMeans
```

```
1 data = pd.read_csv('/content/Wholesale customers data.csv')
2 data.head()
```

	Channel	Region	Fresh	Milk	Grocery	Frozen	Detergents_Paper	Delicassen
0	2	3	12669	9656	7561	214	2674	1338
1	2	3	7057	9810	9568	1762	3293	1776
2	2	3	6353	8808	7684	2405	3516	7844
3	1	3	13265	1196	4221	6404	507	1788
4	2	3	22615	5410	7198	3915	1777	5185

Next steps: View recommended plots

```
1 plt.scatter(data['Fresh'],data['Frozen'])
2 plt.xlim(-180,180)
3 plt.ylim(-90,90)
4 plt.show()
```




```
1 x = data.iloc[:,1:3] # 1t for rows and second for columns
2 x
```

	Region	Fresh
0	3	12669
1	3	7057
2	3	6353
3	3	13265
4	3	22615
...	...	...
435	3	29703
436	3	39228
437	3	14531
438	3	10290
439	3	2787

440 rows × 2 columns

Next steps: View recommended plots

```
1 kmeans = KMeans(3)
2 kmeans.fit(x)
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: The defa
  warnings.warn(
```

```
KMeans(n_clusters=3)
```

```
1 identified_clusters = kmeans.fit_predict(x)
2 identified_clusters
```

```
r/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWarning: The default
arnings.warn(
ay([1, 1, 1, 0, 0, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1,
    0, 0, 0, 0, 1, 0, 1, 2, 0, 1, 0, 0, 1, 1, 0, 0, 1, 2, 0, 0, 1, 1,
    1, 1, 1, 2, 1, 1, 1, 1, 2, 1, 0, 1, 1, 1, 0, 1, 1, 2, 1, 1, 1, 1,
    1, 0, 1, 1, 0, 0, 1, 0, 1, 0, 1, 1, 1, 1, 1, 1, 1, 0, 1, 0, 0, 2,
    1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 0, 0, 1, 1, 1, 1,
    1, 1, 0, 0, 0, 1, 1, 1, 0, 1, 0, 1, 1, 1, 2, 2, 0, 0, 1, 2, 1, 1,
    0, 1, 1, 1, 1, 1, 0, 1, 0, 0, 2, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 1,
    1, 1, 1, 0, 1, 1, 1, 1, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
    2, 1, 1, 1, 1, 2, 1, 2, 1, 1, 1, 1, 1, 1, 0, 0, 1, 1, 1, 0, 0, 1,
    1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 1, 1,
    0, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 0, 1, 0, 1, 1, 0, 1, 2, 0, 0,
    0, 1, 1, 1, 1, 0, 0, 1, 1, 1, 1, 0, 1, 0, 1, 1, 2, 2, 1, 1, 0, 1,
    1, 1, 1, 0, 1, 0, 1, 1, 1, 2, 1, 1, 0, 1, 1, 0, 1, 1, 2, 0, 2, 2,
    1, 0, 0, 2, 1, 1, 1, 1, 0, 1, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0,
    1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 1, 1, 0, 1,
    1, 1, 0, 1, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1,
    1, 1, 0, 1, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 0, 1, 2, 0, 1, 0,
    1, 1, 1, 2, 1, 1, 0, 0, 0, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 0, 1, 1,
    1, 1, 1, 1, 1, 0, 0, 0, 0, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
```

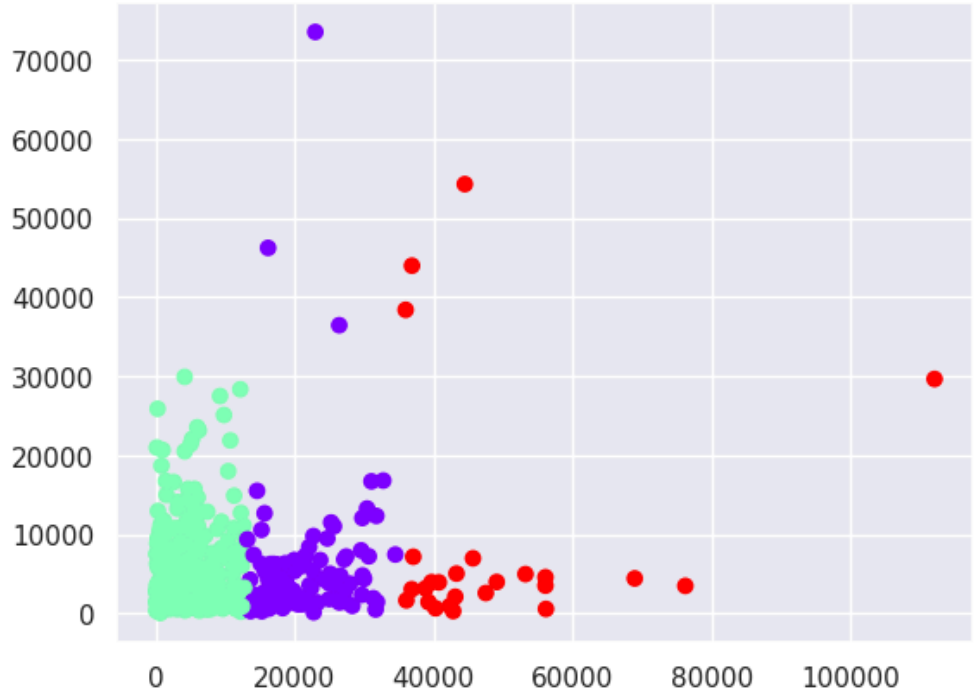
```
       1, 1, 1, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1, 1, 0, 1, 0, 0, 2, 0, 1, 1],
      dtype=int32)
```

```
1
2 from numpy import array
3
4 array([1, 1, 0, 0, 0, 2])
```

```
array([1, 1, 0, 0, 0, 2])
```

```
1  data_with_clusters = data.copy()
2  data_with_clusters['Clusters'] = identified_clusters
3  plt.scatter(data_with_clusters['Fresh'],data_with_clusters['Milk'],c=data_with_clusters['Cluste
```

```
<matplotlib.collections.PathCollection at 0x7dbb727b7a90>
```




```
1  number_clusters = range(1, 7)  # e.g., clusters from 1 to 6
2  wcss = []  # List to store the within-cluster sum of squares
3
4  for i in number_clusters:
5      kmeans = KMeans(n_clusters=i)
6      kmeans.fit(x)
7      wcss.append(kmeans.inertia_)  # inertia_ gives the within-cluster sum of squares
8
9  # Now, number_clusters and wcss should have the same length
10 plt.plot(number_clusters, wcss)
11 plt.title('The Elbow Method')
12 plt.xlabel('Number of Clusters')
13 plt.ylabel('WCSS')  # Within-cluster sum of squares
14 plt.show()
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/cluster/_kmeans.py:870: FutureWa
  warnings.warn(
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  warnings.warn(
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