analysis-of-superstore

May 4, 2023

[5]:

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sb
import numpy as np
df=pd.read_csv('supermarket_sales - Sheet1.csv')
```

[6]:

```
df.head(10)
```

[6]:

```
    Invoice ID Branch       City Customer type  Gender  \
0  750-67-8428      A     Yangon        Member  Female
1  226-31-3081      C  Naypyitaw        Normal  Female
2  631-41-3108      A     Yangon        Normal    Male
3  123-19-1176      A     Yangon        Member    Male
4  373-73-7910      A     Yangon        Normal    Male
5  699-14-3026      C  Naypyitaw        Normal    Male
6  355-53-5943      A     Yangon        Member  Female
7  315-22-5665      C  Naypyitaw        Normal  Female
8  665-32-9167      A     Yangon        Member  Female
9  692-92-5582      B   Mandalay        Member  Female

             Product line  Unit price  Quantity   Tax 5%     Total       Date  \
0       Health and beauty       74.69         7  26.1415  548.9715   1/5/2019
1  Electronic accessories       15.28         5   3.8200   80.2200   3/8/2019
2      Home and lifestyle       46.33         7  16.2155  340.5255   3/3/2019
3       Health and beauty       58.22         8  23.2880  489.0480  1/27/2019
4       Sports and travel       86.31         7  30.2085  634.3785   2/8/2019
5  Electronic accessories       85.39         7  29.8865  627.6165  3/25/2019
6  Electronic accessories       68.84         6  20.6520  433.6920  2/25/2019
7      Home and lifestyle       73.56        10  36.7800  772.3800  2/24/2019
8       Health and beauty       36.26         2   3.6260   76.1460  1/10/2019
9      Food and beverages       54.84         3   8.2260  172.7460  2/20/2019

    Time      Payment    cogs  gross margin percentage  gross income  Rating
0  13:08      Ewallet  522.83                 4.761905       26.1415     9.1
1  10:29         Cash   76.40                 4.761905        3.8200     9.6
2  13:23  Credit card  324.31                 4.761905       16.2155     7.4
3  20:33      Ewallet  465.76                 4.761905       23.2880     8.4
```

```
4  10:37      Ewallet  604.17                  4.761905       30.2085     5.3
5  18:30      Ewallet  597.73                  4.761905       29.8865     4.1
6  14:36      Ewallet  413.04                  4.761905       20.6520     5.8
7  11:38      Ewallet  735.60                  4.761905       36.7800     8.0
8  17:15  Credit card   72.52                  4.761905        3.6260     7.2
9  13:27  Credit card  164.52                  4.761905        8.2260     5.9
```

[7]:

```
df.rename(columns = {'Total':'Net sales'}, inplace = True)
```

[8]:

```
df.columns
```

[8]:

```
Index(['Invoice ID', 'Branch', 'City', 'Customer type', 'Gender',
       'Product line', 'Unit price', 'Quantity', 'Tax 5%', 'Net sales', 'Date',
       'Time', 'Payment', 'cogs', 'gross margin percentage', 'gross income',
       'Rating'],
      dtype='object')
```

[9]:

```
df.isnull().sum()
```

[9]:

```
Invoice ID                 0
Branch                     0
City                       0
Customer type              0
Gender                     0
Product line               0
Unit price                 0
Quantity                   0
Tax 5%                     0
Net sales                  0
Date                       0
Time                       0
Payment                    0
cogs                       0
gross margin percentage    0
gross income               0
Rating                     0
dtype: int64
```

[18]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1000 entries, 0 to 999
Data columns (total 17 columns):
 #   Column                   Non-Null Count  Dtype
---  ------                   --------------  -----
 0   Invoice ID               1000 non-null   object
 1   Branch                   1000 non-null   object
 2   City                     1000 non-null   object
 3   Customer type            1000 non-null   object
 4   Gender                   1000 non-null   object
 5   Product line             1000 non-null   object
 6   Unit price               1000 non-null   float64
 7   Quantity                 1000 non-null   int64
 8   Tax 5%                   1000 non-null   float64
 9   Total                    1000 non-null   float64
 10  Date                     1000 non-null   object
 11  Time                     1000 non-null   object
 12  Payment                  1000 non-null   object
 13  cogs                     1000 non-null   float64
 14  gross margin percentage  1000 non-null   float64
 15  gross income             1000 non-null   float64
 16  Rating                   1000 non-null   float64
dtypes: float64(7), int64(1), object(9)
memory usage: 132.9+ KB
```

[19]:
```
df.max()
```

[19]:
```
Invoice ID                        898-04-2717
Branch                                      C
City                                   Yangon
Customer type                          Normal
Gender                                   Male
Product line               Sports and travel
Unit price                              99.96
Quantity                                   10
Tax 5%                                  49.65
Total                                 1042.65
Date                                 3/9/2019
Time                                    20:59
Payment                               Ewallet
cogs                                    993.0
gross margin percentage              4.761905
gross income                            49.65
Rating                                   10.0
dtype: object
```

[25]:
```
df['Branch'].value_counts()
```

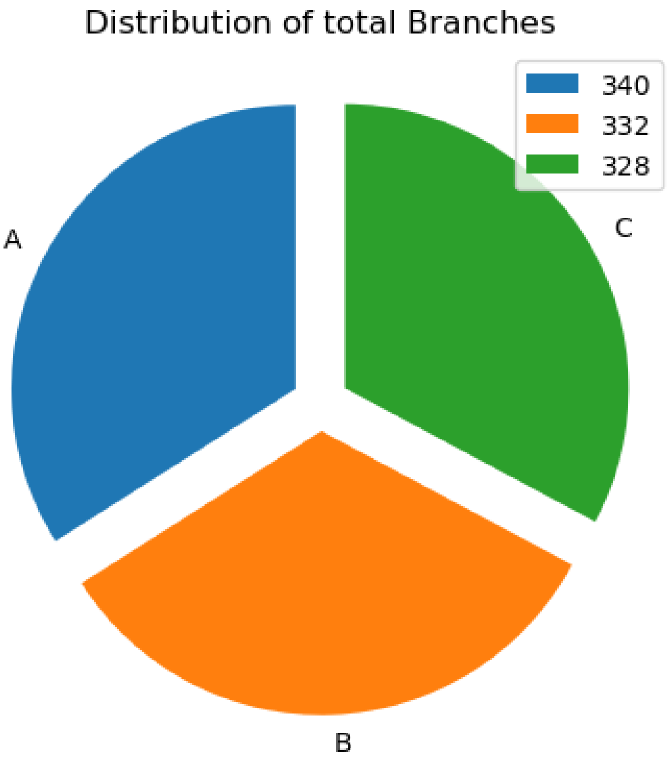
[25]:
```
A    340
B    332
C    328
Name: Branch, dtype: int64
```

[36]:

```
x=df['Branch'].value_counts()
plt.pie(x,labels=['A','B','C'],startangle=90,explode=[0.1,0.1,0.1])
plt.title('Distribution of total Branches')
plt.legend(x)
```

[36]:

```
<matplotlib.legend.Legend at 0x25d7d62a970>
```



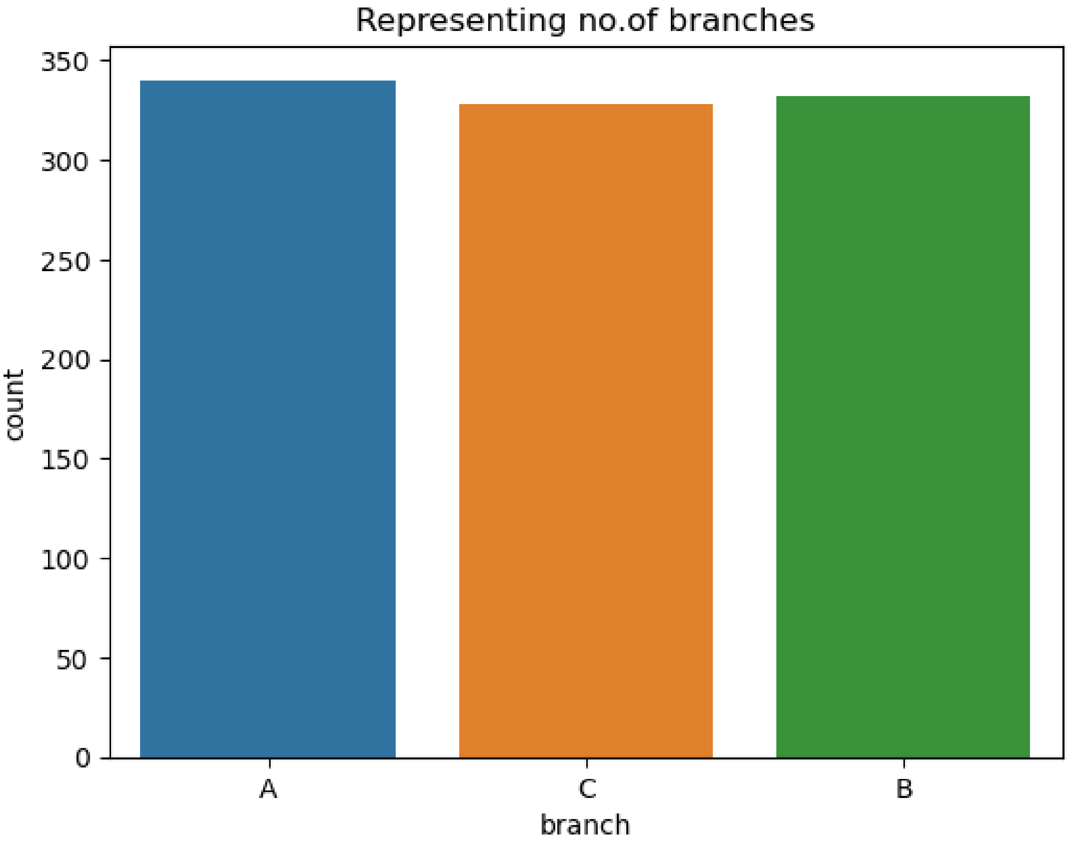
[40]:

```
x=df['Branch']
sb.countplot(x)
plt.xlabel('branch')
plt.title('Representing no.of branches')
```

```
C:\Users\Mokshogna Teja\anaconda3\lib\site-packages\seaborn\_decorators.py:36:
FutureWarning: Pass the following variable as a keyword arg: x. From version
0.12, the only valid positional argument will be `data`, and passing other
arguments without an explicit keyword will result in an error or
misinterpretation.
  warnings.warn(
```

[40]:

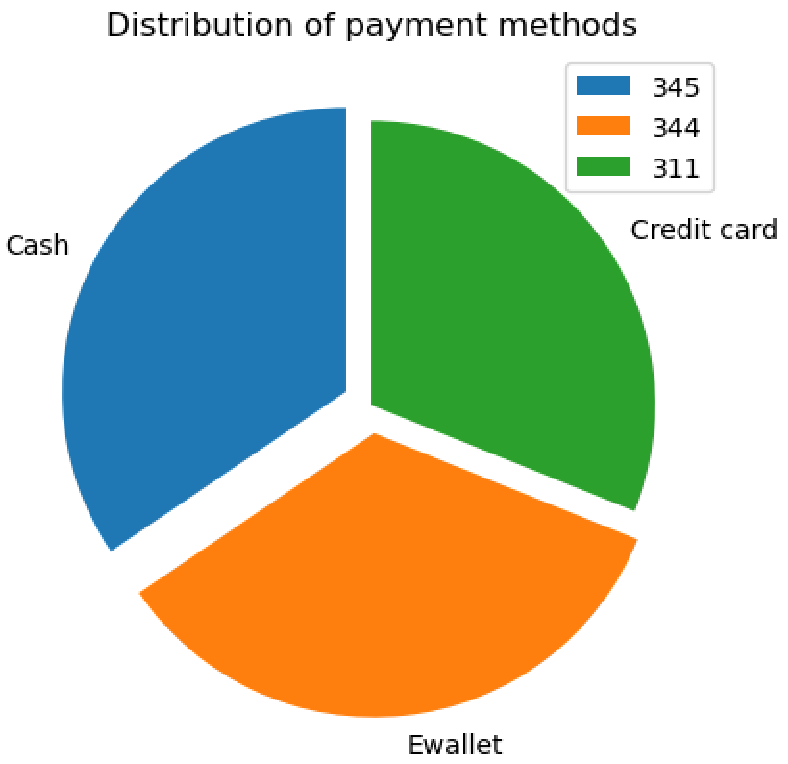
```
Text(0.5, 1.0, 'Representing no.of branches')
```



[70]:
```
x=df['Payment'].value_counts()
```

[47]:
```
x=df['Payment'].value_counts()
plt.pie(x,labels=['Cash','Ewallet','Credit card'],startangle=90,explode=[0.1,0.
  ↪1,0])
plt.title('Distribution of payment methods')
plt.legend(x)
```

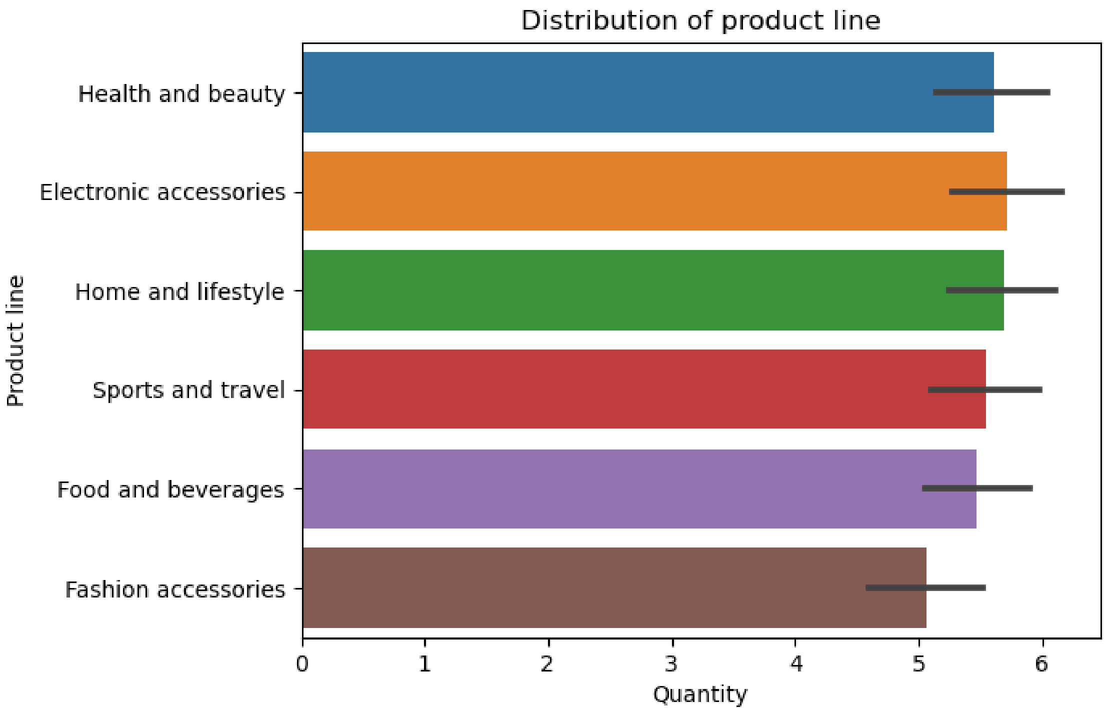
[47]:
```
<matplotlib.legend.Legend at 0x25d7f17d340>
```



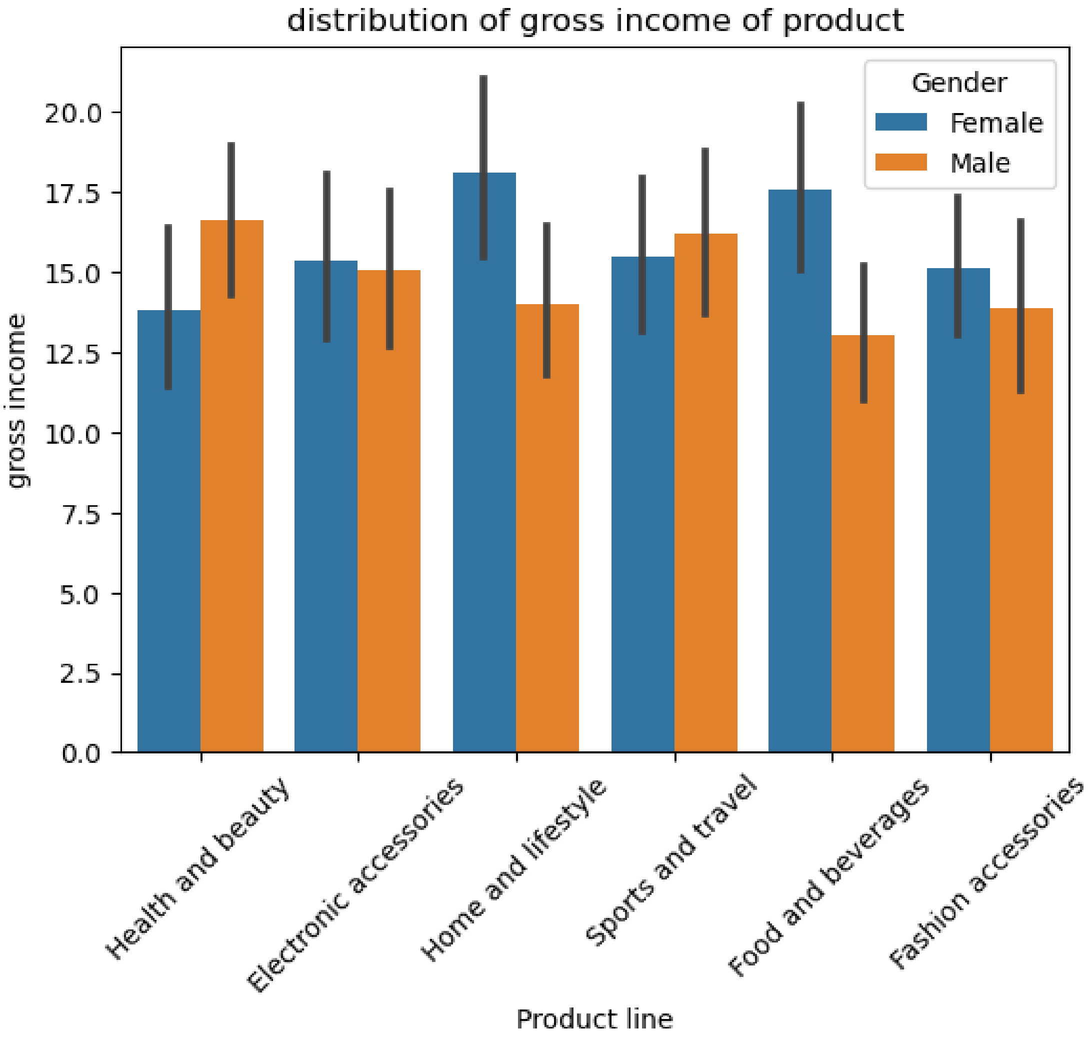
[40]:
```
y=df['Product line']
x=df['Quantity']
sb.barplot(x,y)
plt.xlabel('Quantity')
plt.ylabel('Product line')
plt.title('Distribution of product line')
```

```
C:\Users\Mokshogna Teja\anaconda3\lib\site-packages\seaborn\_decorators.py:36:
FutureWarning: Pass the following variables as keyword args: x, y. From version
0.12, the only valid positional argument will be `data`, and passing other
arguments without an explicit keyword will result in an error or
misinterpretation.
  warnings.warn(
```

[40]:
```
Text(0.5, 1.0, 'Distribution of product line')
```

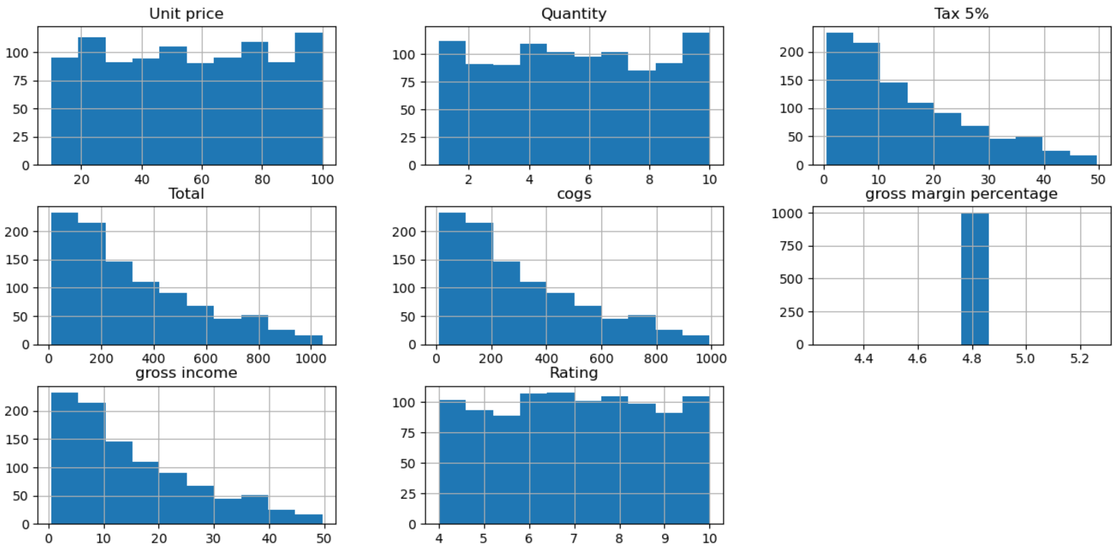


[93]:
```
sb.barplot(data = df, x = "Product line", y = "gross income", hue = "Gender")
plt.xticks(rotation = 45)
plt.title('distribution of gross income of product')
plt.show()
```



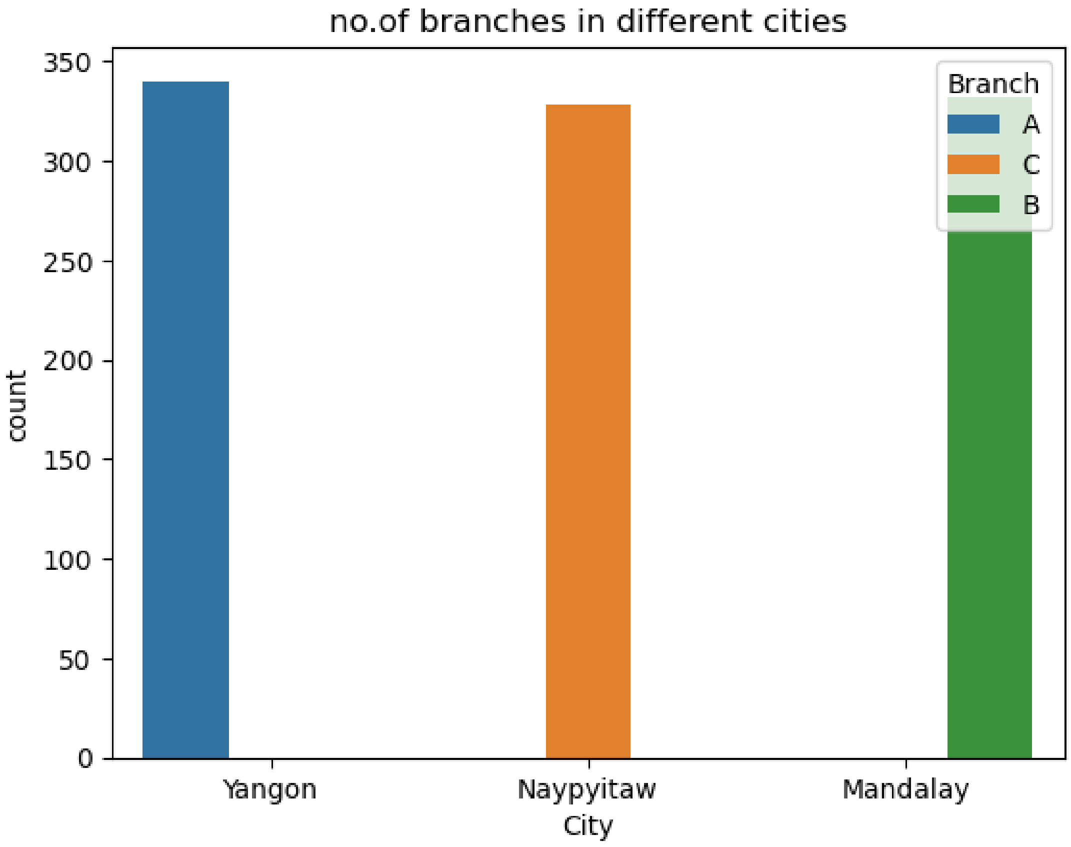
```
[94]: df.hist(figsize = (15, 7))
```

```
[94]: array([[<AxesSubplot:title={'center':'Unit price'}>,
              <AxesSubplot:title={'center':'Quantity'}>,
              <AxesSubplot:title={'center':'Tax 5%'}>],
             [<AxesSubplot:title={'center':'Total'}>,
              <AxesSubplot:title={'center':'cogs'}>,
              <AxesSubplot:title={'center':'gross margin percentage'}>],
             [<AxesSubplot:title={'center':'gross income'}>,
              <AxesSubplot:title={'center':'Rating'}>, <AxesSubplot:>]],
            dtype=object)
```



```
[102]: sb.countplot(data= df, x='City', hue= 'Branch')
       plt.title('no.of branches in different cities')
```

```
[102]: Text(0.5, 1.0, 'no.of branches in different cities')
```

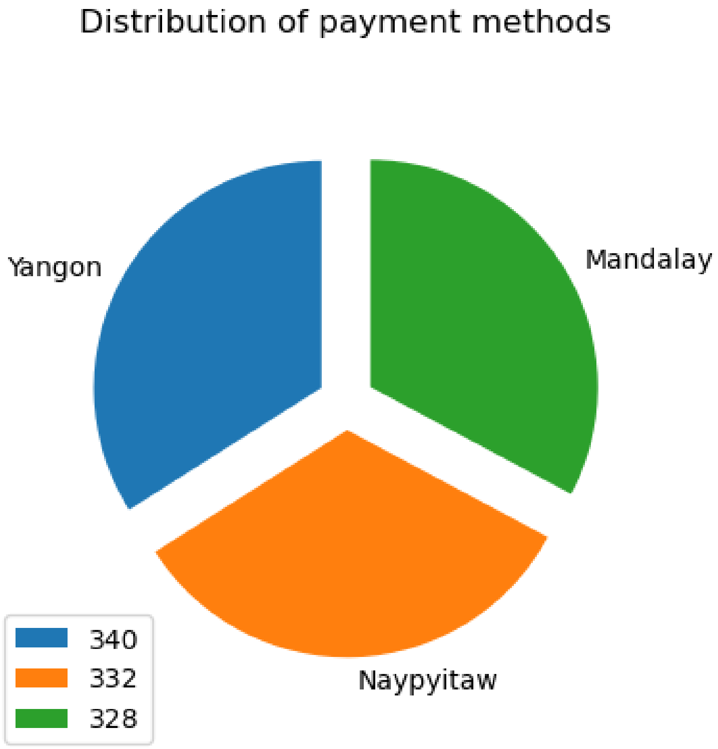


[114]:

```
x=df['City'].value_counts()
plt.pie(x,labels=['Yangon','Naypyitaw','Mandalay'],startangle=90,explode=[0.1,0.1,0.1],radius=0.8)
plt.title('Distribution of payment methods')
plt.legend(x)
```

[114]:

```
<matplotlib.legend.Legend at 0x269d2e0f220>
```

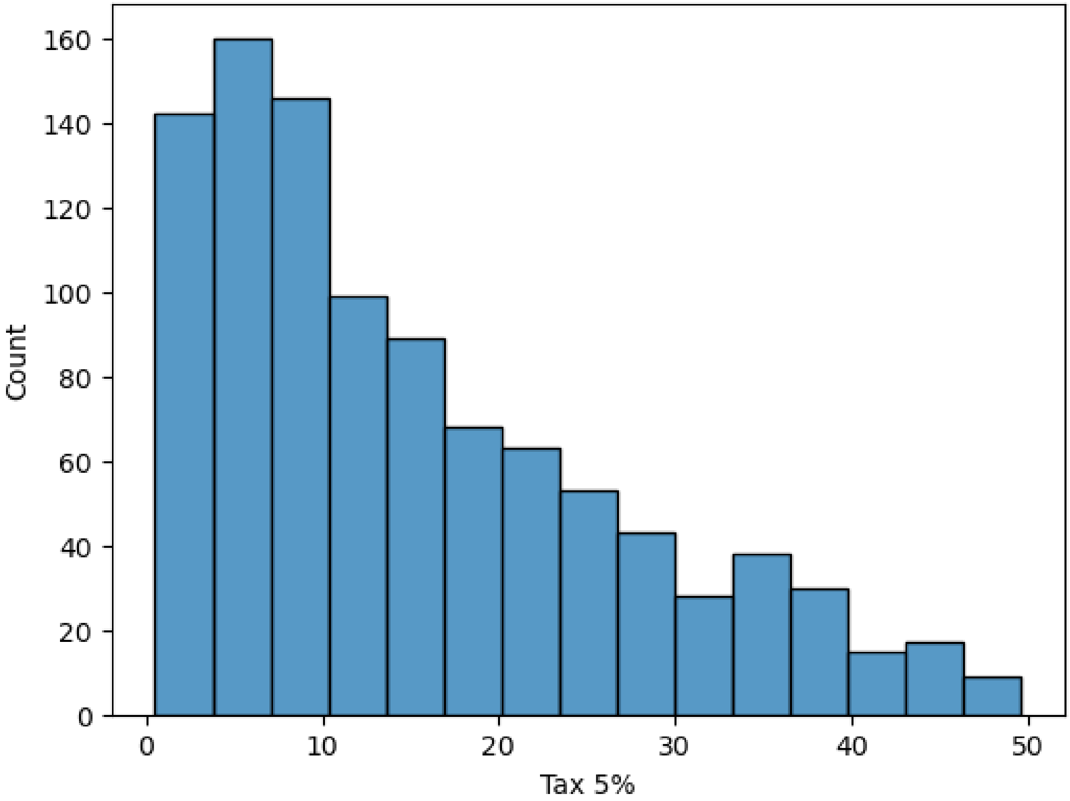


[115]:

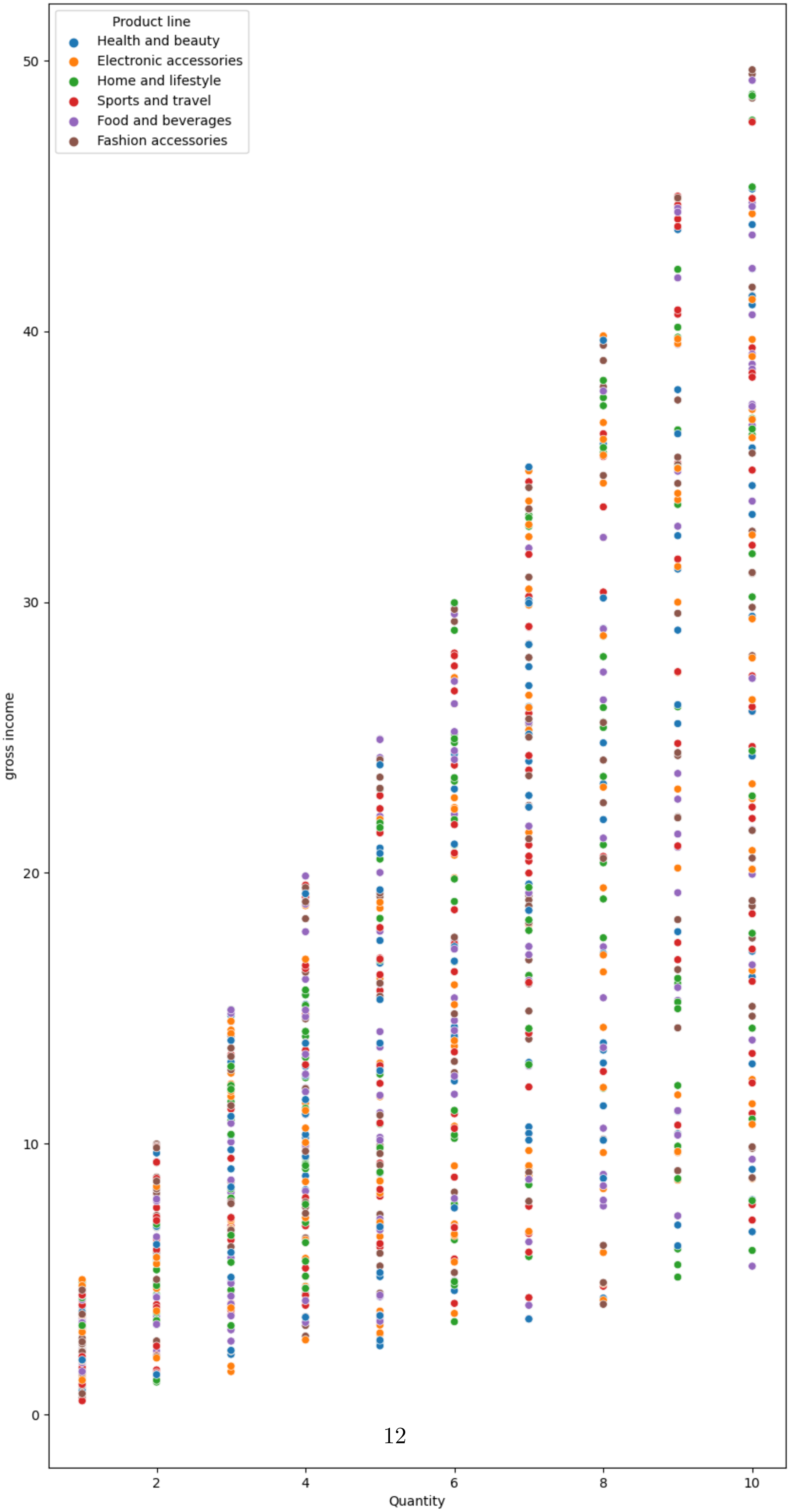
```
y=df['Tax 5%']
sb.histplot(y)
```

[115]:

```
<AxesSubplot:xlabel='Tax 5%', ylabel='Count'>
```

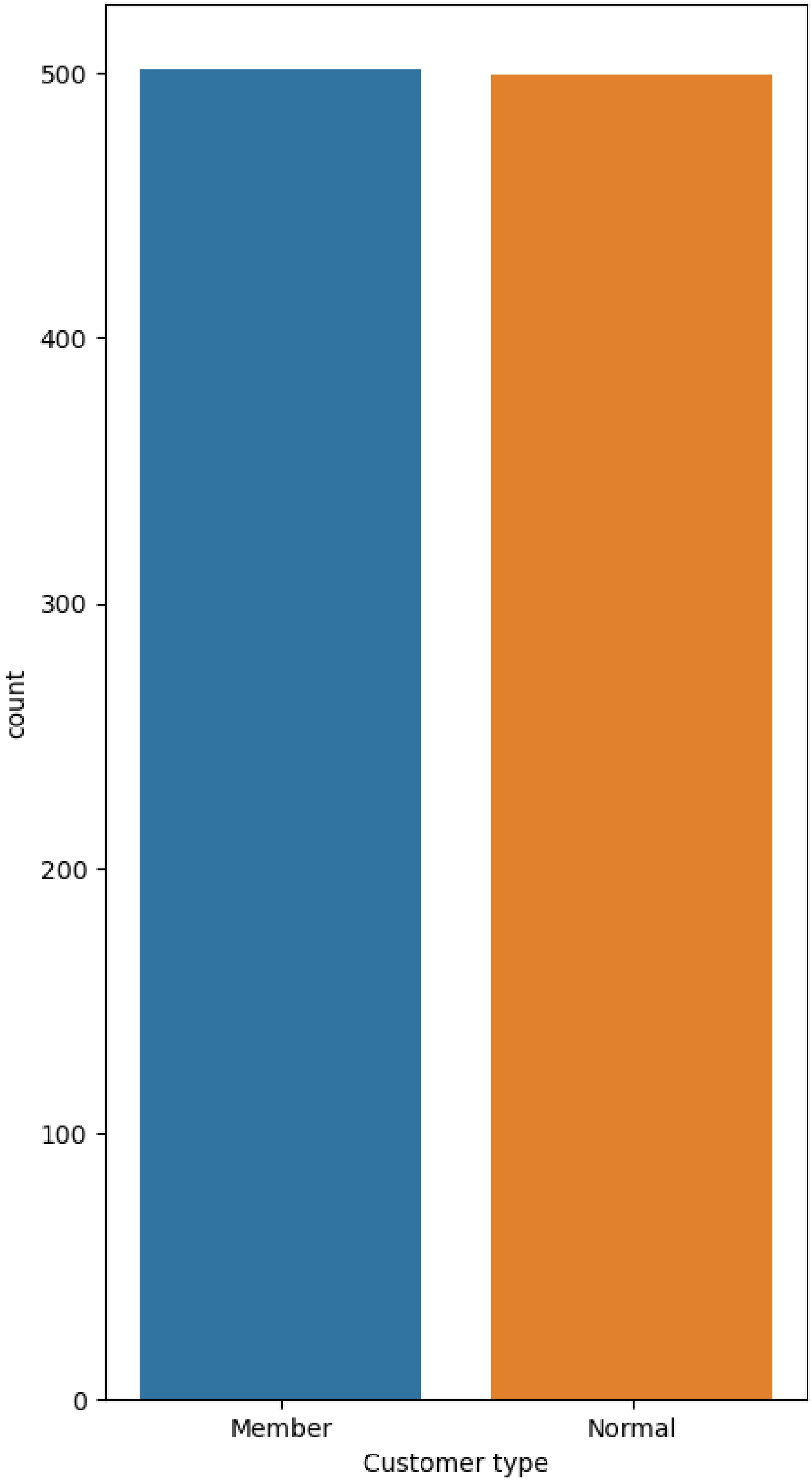


[127]:
```
sb.scatterplot(data=df,x='Quantity',y='gross income',hue='Product line')
plt.rcParams["figure.figsize"]=(5,10)
plt.show()
```

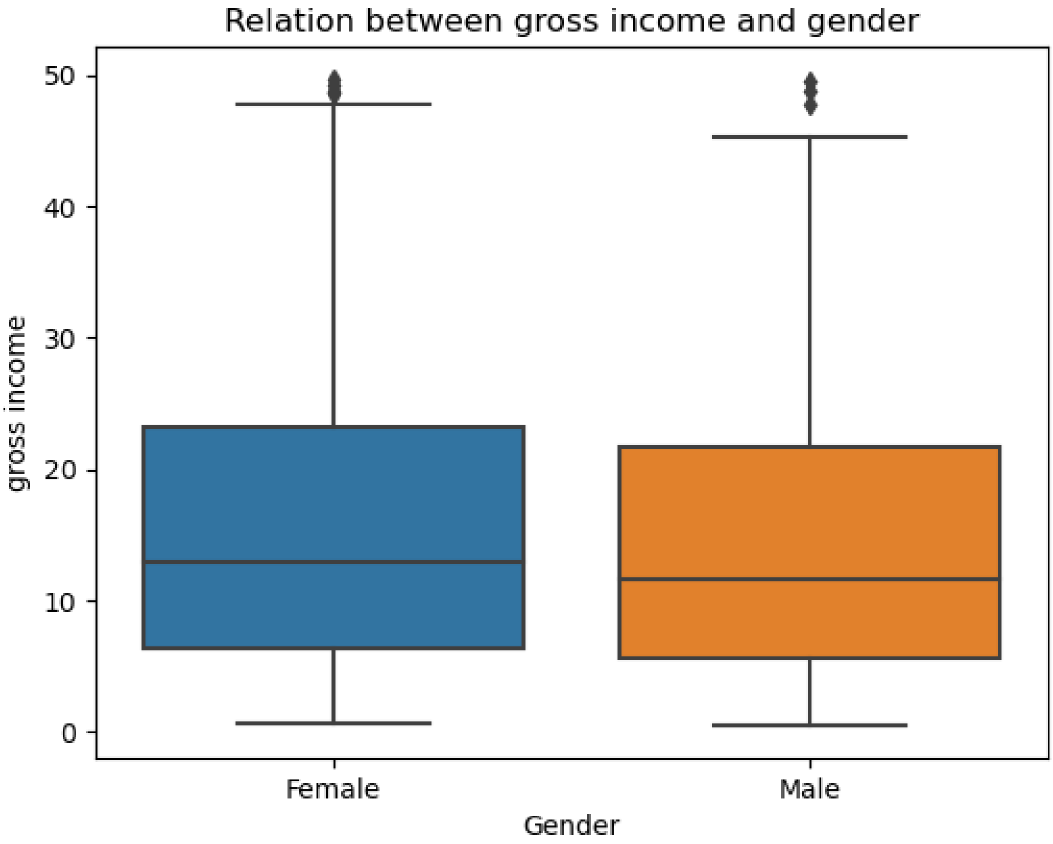

Product line
● Health and beauty
● Electronic accessories
● Home and lifestyle
● Sports and travel
● Food and beverages
● Fashion accessories
gross income
0
10
20
30
40
50
Quantity
2
4
6
8
10

[138]:
```
sb.countplot(data= df, x='Customer type')
```

[138]:
```
<AxesSubplot:xlabel='Customer type', ylabel='count'>
```


500
400
300
200
100
0
count
Member
Normal
Customer type

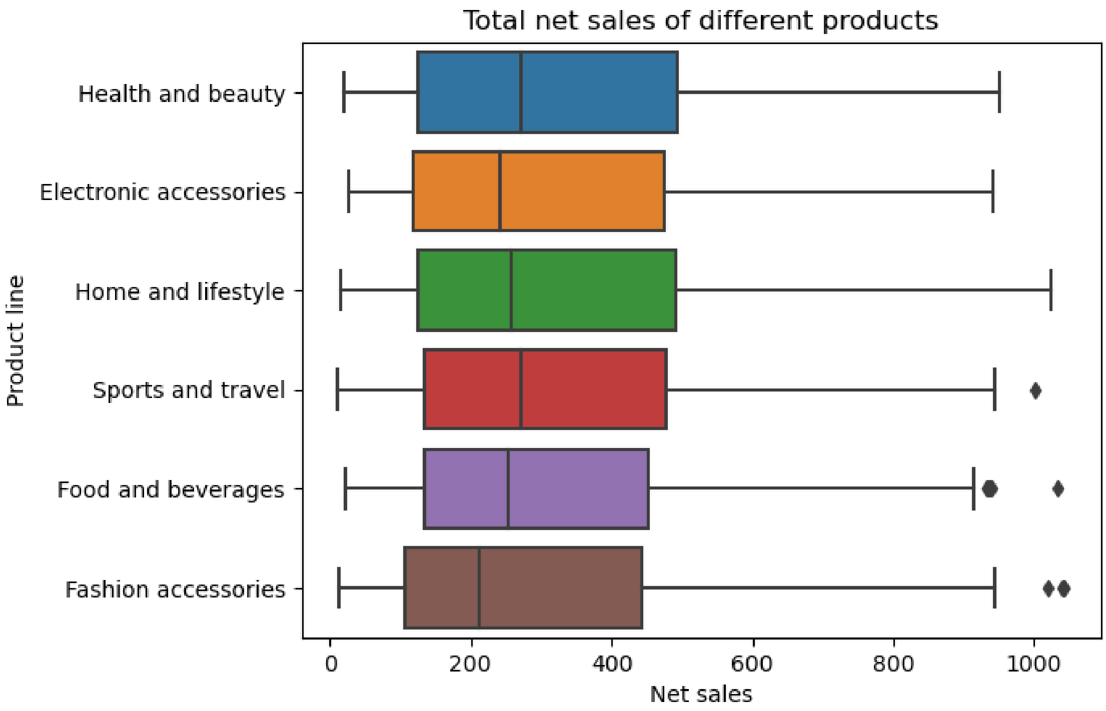
[43]:
```
sb.boxplot(x=df['Gender'],y=df['gross income'])
plt.title('Relation between gross income and gender')
plt.show()
```



[17]:
```
x=df['Net sales']
y=df['Product line']
sb.boxplot(x,y)
plt.title('Total net sales of different products')
```

```
C:\Users\Mokshogna Teja\anaconda3\lib\site-packages\seaborn\_decorators.py:36:
FutureWarning: Pass the following variables as keyword args: x, y. From version
0.12, the only valid positional argument will be `data`, and passing other
arguments without an explicit keyword will result in an error or
misinterpretation.
  warnings.warn(
```

[17]:
```
Text(0.5, 1.0, 'Total net sales of different products')
```



[32]:
```
table1 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'],␣
 ↪columns = 'Gender', aggfunc = np.sum)
table1
```

[32]:
```
                          Net sales
Gender                       Female          Male
Product line
Electronic accessories   27102.0225   27235.5090
Fashion accessories      30437.4000   23868.4950
Food and beverages       33170.9175   22973.9265
Health and beauty        18560.9865   30632.7525
Home and lifestyle       30036.8775   23825.0355
Sports and travel        28574.7210   26548.1055
```

[31]:
```
table2 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'],␣
 ↪columns = 'Gender', aggfunc = np.min)
table2
```

[31]:
```
                        Net sales
Gender                     Female     Male
Product line
Electronic accessories    26.7225  37.6110
Fashion accessories       12.6945  13.4190
Food and beverages        23.7510  22.6590
```

```
Health and beauty         18.6375  26.2500
Home and lifestyle        25.2630  14.6790
Sports and travel         16.1070  10.6785
```

[30]:

```python
table3= pd.pivot_table(df, values = ['Net sales'], index = ['Product line'], columns = 'Gender', aggfunc = np.max)
table3
```

[30]:

```
                          Net sales
Gender                       Female      Male
Product line
Electronic accessories     942.4485   931.035
Fashion accessories       1042.6500  1039.290
Food and beverages        1034.4600   939.540
Health and beauty          794.6505   950.250
Home and lifestyle        1022.4900  1023.750
Sports and travel         1002.1200   944.622
```

[28]:

```python
table4 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'], columns = 'Gender', aggfunc = np.mean)
table4
```

[28]:

```
                           Net sales
Gender                        Female        Male
Product line
Electronic accessories    322.643125  316.691965
Fashion accessories       317.056250  291.079207
Food and beverages        368.565750  273.499125
Health and beauty         290.015414  348.099460
Home and lifestyle        380.213639  294.136241
Sports and travel         324.712739  340.360327
```

[27]:

```python
table5 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'], columns = 'City', aggfunc = np.sum)
table5
```

[27]:

```
                           Net sales
Gender                        Female        Male
Product line
Electronic accessories    322.643125  316.691965
Fashion accessories       317.056250  291.079207
Food and beverages        368.565750  273.499125
Health and beauty         290.015414  348.099460
Home and lifestyle        380.213639  294.136241
Sports and travel         324.712739  340.360327
```

[24]:
```
table6 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'],␣
 ↪columns = 'City', aggfunc = np.min)
table6
```

[24]:
```
                        Net sales
City                     Mandalay Naypyitaw   Yangon
Product line
Electronic accessories    26.7225   31.7520  30.4080
Fashion accessories       35.1960   13.1670  12.6945
Food and beverages        56.4060   22.6590  33.4320
Health and beauty         18.6375   32.2770  19.2465
Home and lifestyle        33.9360   14.6790  19.1940
Sports and travel         34.6290   10.6785  16.1070
```

[25]:
```
table7 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'],␣
 ↪columns = 'City', aggfunc = np.max)
table7
```

[25]:
```
                         Net sales
City                      Mandalay Naypyitaw     Yangon
Product line
Electronic accessories    942.4485    864.57   931.0350
Fashion accessories       874.1250   1042.65  1039.2900
Food and beverages        888.6150   1034.46   932.3370
Health and beauty         922.6350    950.25   752.6400
Home and lifestyle       1022.4900   1023.75   951.8250
Sports and travel         944.6220   1002.12   926.9505
```

[26]:
```
table8 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'],␣
 ↪columns = 'City', aggfunc = np.mean)
table8
```

[26]:
```
                          Net sales
City                       Mandalay   Naypyitaw      Yangon
Product line
Electronic accessories   310.026245  344.890445  305.285225
Fashion accessories      264.730911  331.693385  320.245265
Food and beverages       304.297770  360.103864  295.915526
Health and beauty        376.993585  319.525500  268.037298
Home and lifestyle       350.983290  308.790067  344.879931
Sports and travel        322.390306  350.265067  328.350839
```

[35]:
```
table9 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'],␣
 ↪columns = 'Customer type', aggfunc = np.sum)
table9
```

[35]:
```
                              Net sales
Customer type                    Member      Normal
Product line
Electronic accessories       24498.4950  29839.0365
Fashion accessories          26323.9620  27981.9330
Food and beverages           31357.6200  24787.2240
Health and beauty            25831.0395  23362.6995
Home and lifestyle           27978.0270  25883.8860
Sports and travel            28234.3005  26888.5260
```

[34]:
```
table10 = pd.pivot_table(df, values = ['Net sales'], index = ['Product line'],␣
 ↪columns = 'Customer type', aggfunc = np.mean)
table10
```

[34]:
```
                              Net sales
Customer type                    Member      Normal
Product line
Electronic accessories       314.083269  324.337353
Fashion accessories          306.092581  304.151446
Food and beverages           333.591702  309.840300
Health and beauty            353.849856  295.730373
Home and lifestyle           337.084663  336.154364
Sports and travel            324.532190  340.361089
```

[ ]:
```

```