Part 2 - Univariate Analysis

A)

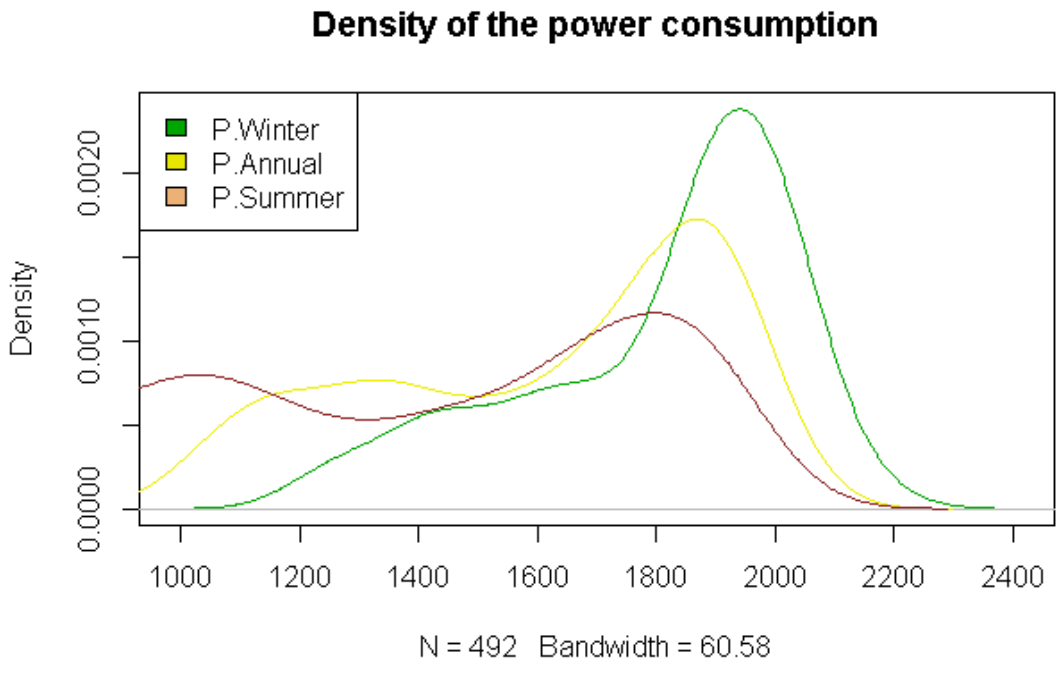
Write R codes that calculate the mean and standard deviation of the annual, winter and summer power consumption. Show the results in your report by using a table.

```
> stat
    Type     Mean       SD
1 Annual 1616.925 293.9710
2 Winter 1806.859 232.5296
3 Summer 1426.992 378.3787
```

B)

Write R codes that plots the density function of the annual, winter and summer power consumption. Use appropriate labels for the plots. Use same scale for the plots. Add the plots to your report.

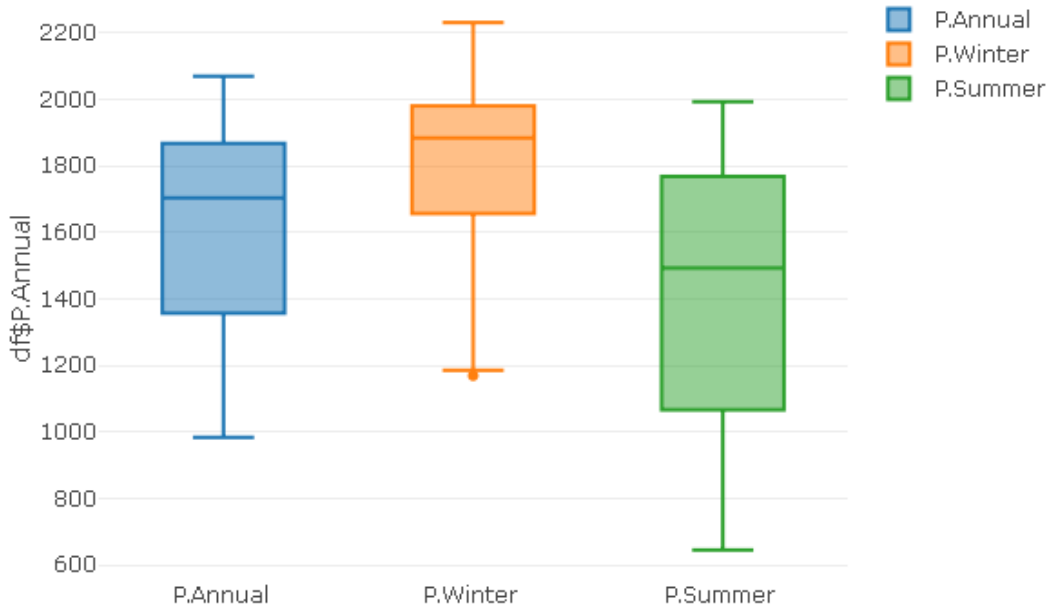
```
> dplot = plot_density(df)
```



C)

Write R codes that creates the boxplots for the annual, winter and summer power consumption. Use appropriate labels for the plots. Use same scale for the plots. Add the plots to your report.

```
> bplot = boxplot(df)
```



E)

Write R codes that repeat tasks A, B, C for the two subsets.

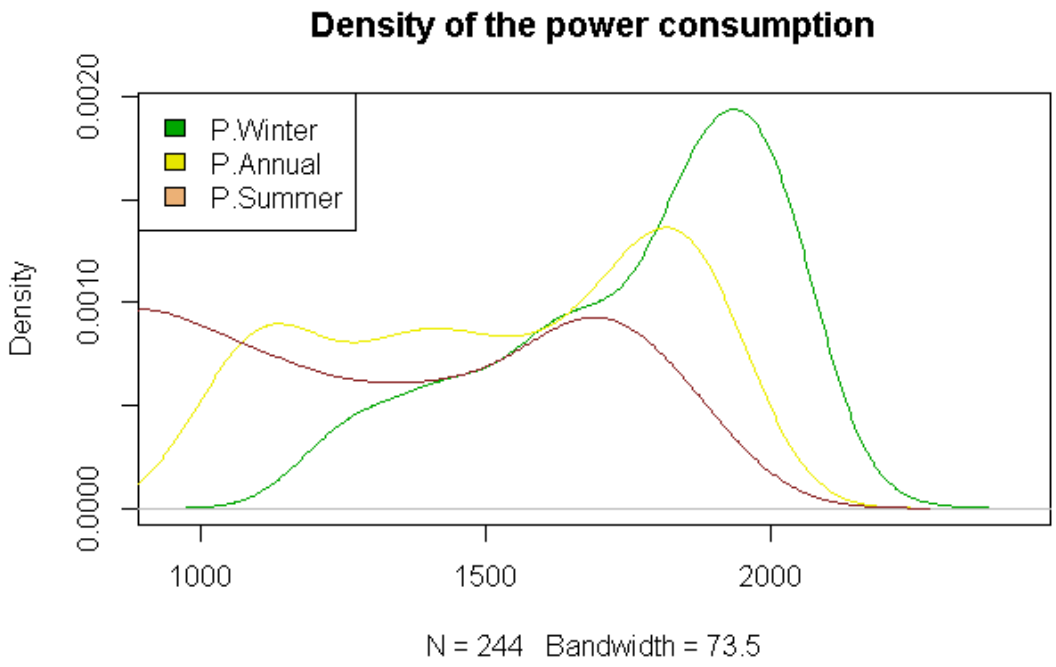
1.subset of df_Auckland

A

```
> stat_Auckland
   Type     Mean      SD
1 Annual 1526.157 297.4891
2 Winter 1764.240 245.2136
3 Summer 1288.075 373.5909
```

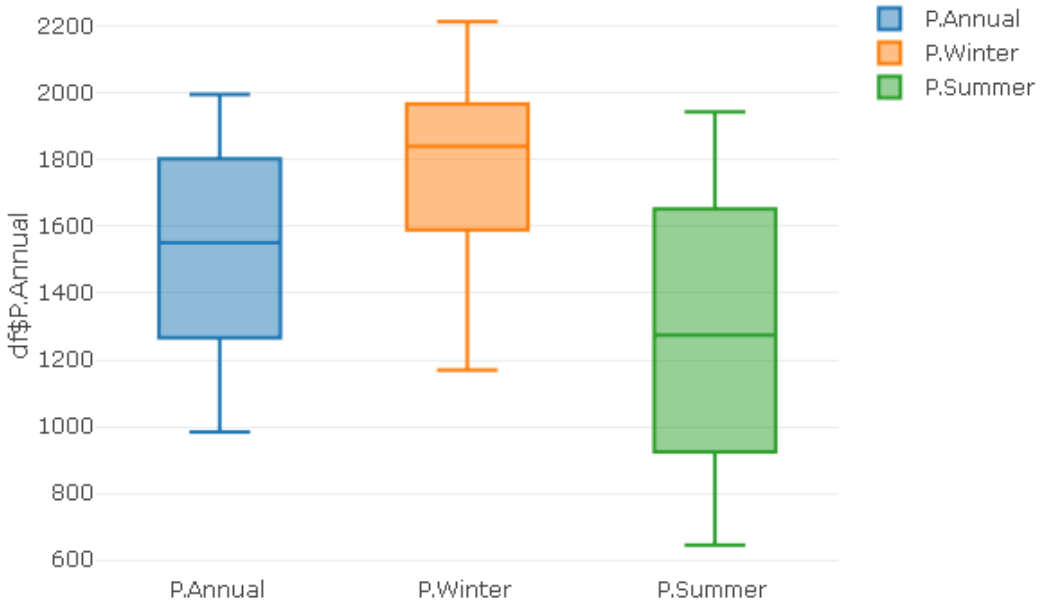
 # B

```
> dplot_Auckland = plot_density(df_Auckland)
```



 # C

```
> bplot_Auckland
```



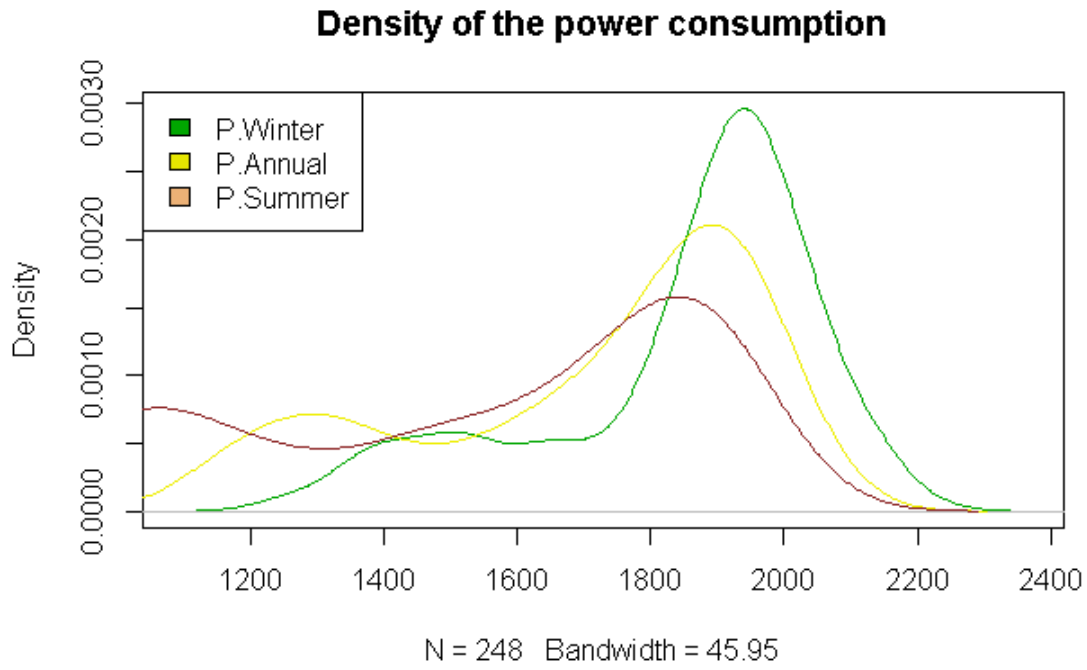
2.subset of Wellington

 # A

```
> stat_Wellington =cal_stat(df_Wellington)
> stat_Wellington
   Type     Mean       SD
1 Annual 1706.229 261.8692
2 Winter 1848.791 211.5836
3 Summer 1563.667 330.8668
```

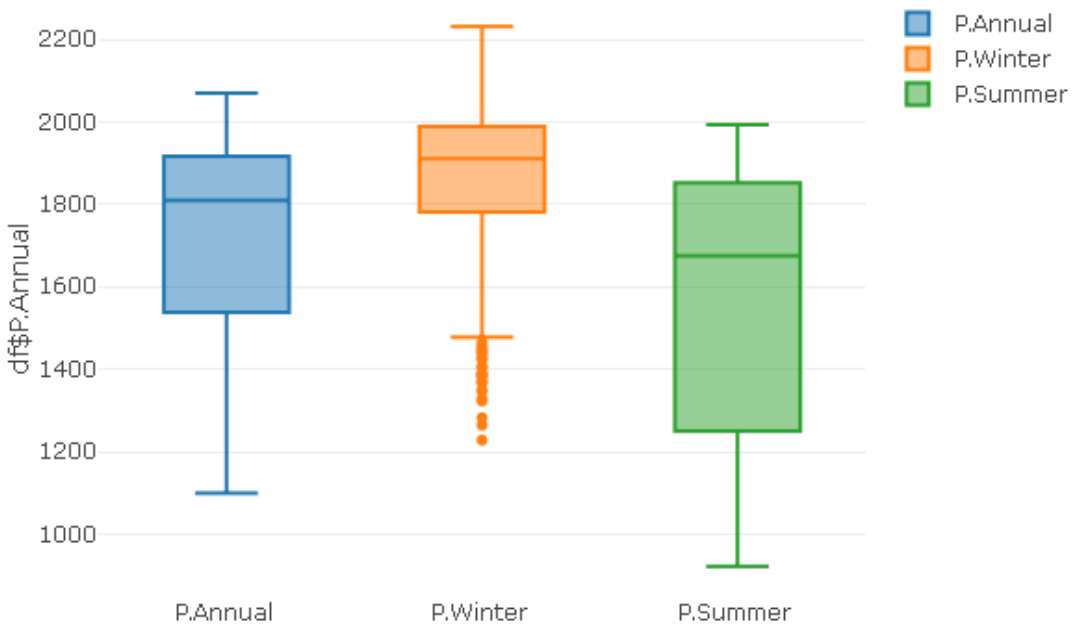
 # B

```
> dplot_Wellington = plot_density(df_Wellington)
```



 # C

```
> bplot_Wellington = boxplot(df_Wellington)
> bplot_Wellington
```



F)

Compare the results obtained from the above tasks and make comments on the power consumptions of Auckland and Wellington residential houses during winter and summer.

A. The average monthly power consumption (mean value) in Auckland is lower than Wellington throughout the year(summar, winter and annually). Moreover, the monthly volatility of power consumption(standard deviation)(PC)in Auckland is also lower than Wellington all the year. Lastly, the monthly volatility of PC in winter is lower than summer in both cities.

B. For the start point, comparing winter, both Auckland and Wellington has a relative high density in summer. Then the density of power consumption(DPC) in winter raised gradually and finally catch up and exceed the DPC in summer. After that, both DPC of summer and winter reached to the peach and then reduced at the high value range. The peak point of DPC in winter is located in higher value range with higher density than in summer in both cities.

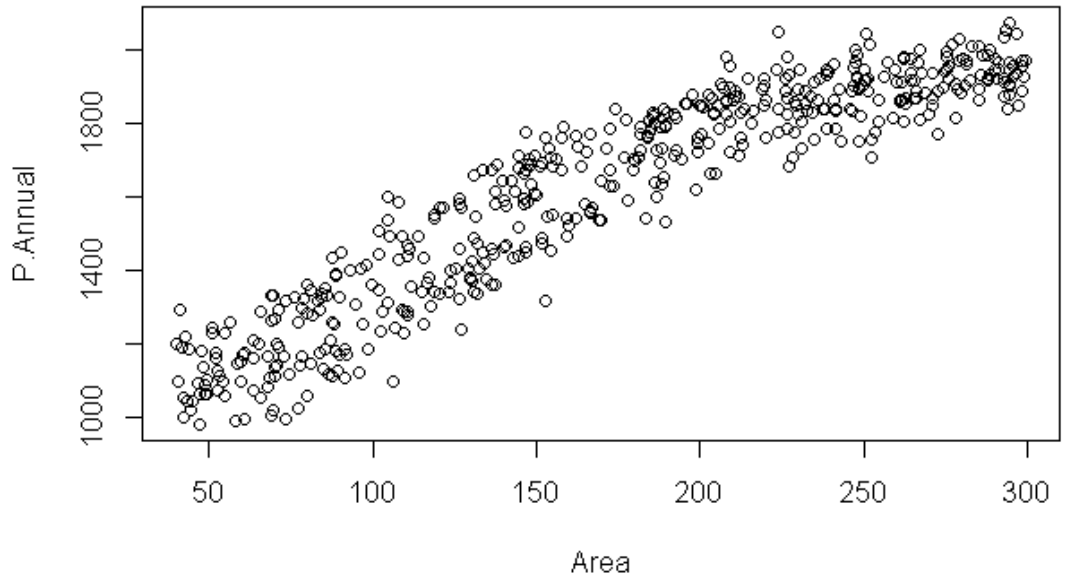
C. All the figures(max,min, 1sd quartile,3rd quartile and median) in winter is higher than summer in both cities. The IQR(Interquartile range) in summer is wider than winter shows the same result of trends as the figure “standard deviation” in part A. One remarkable point is the PC of winter in Wellington has some outlier values as shown in the plot.

Part 3 - Bivariate Analysis

A)

Write R codes that create a scatterplot from "P.Annual" and "Area" variables. Use appropriate labels for the plots. Use same scale for the plots. Add the plots to your report.

```
> splot_annual = scatterplot(df,'P.Annual')
```



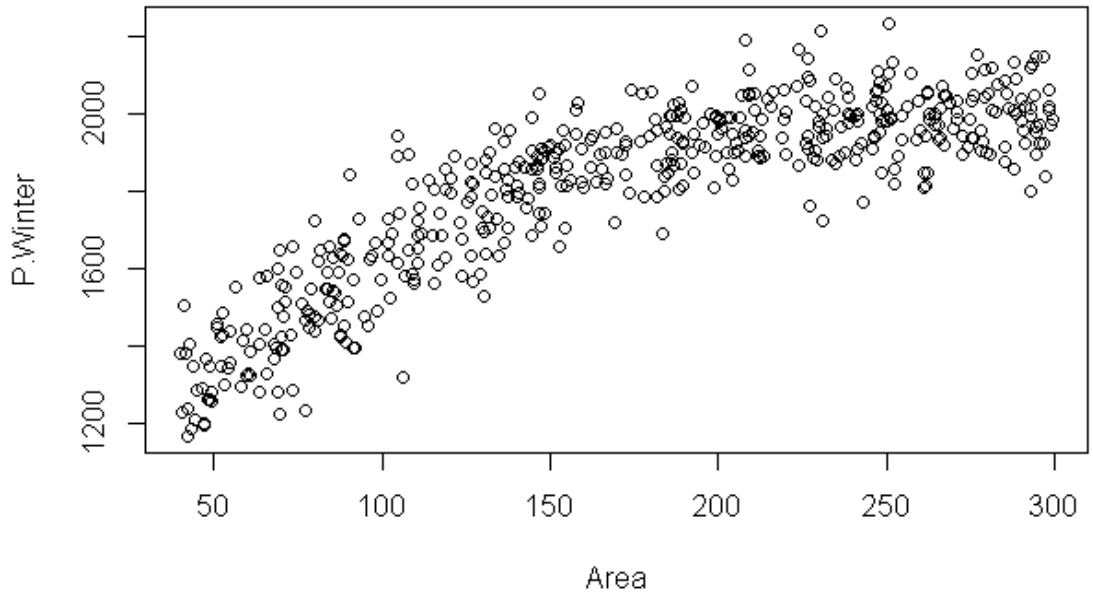
F)

Repeat tasks A-E for "P.Winter" and "P.Summer".

1."P.Winter"

A)

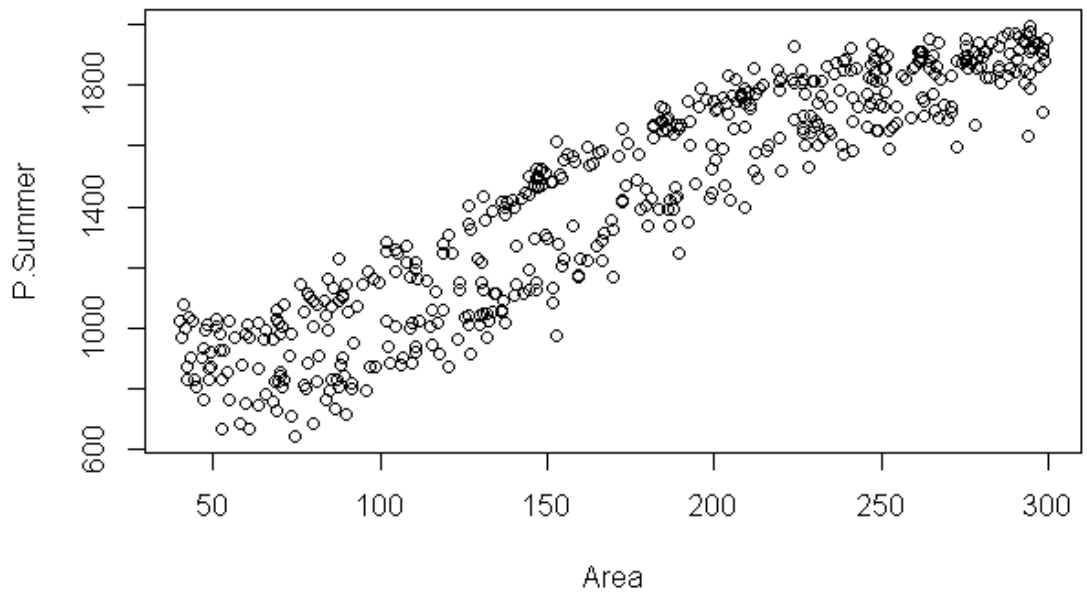
```
> splot_Winter = scatterplot(df,'P.Winter')
```



2."P.Summer"

A)

```
splot_Summer = scatterplot(df,'P.Summer')
```



G)

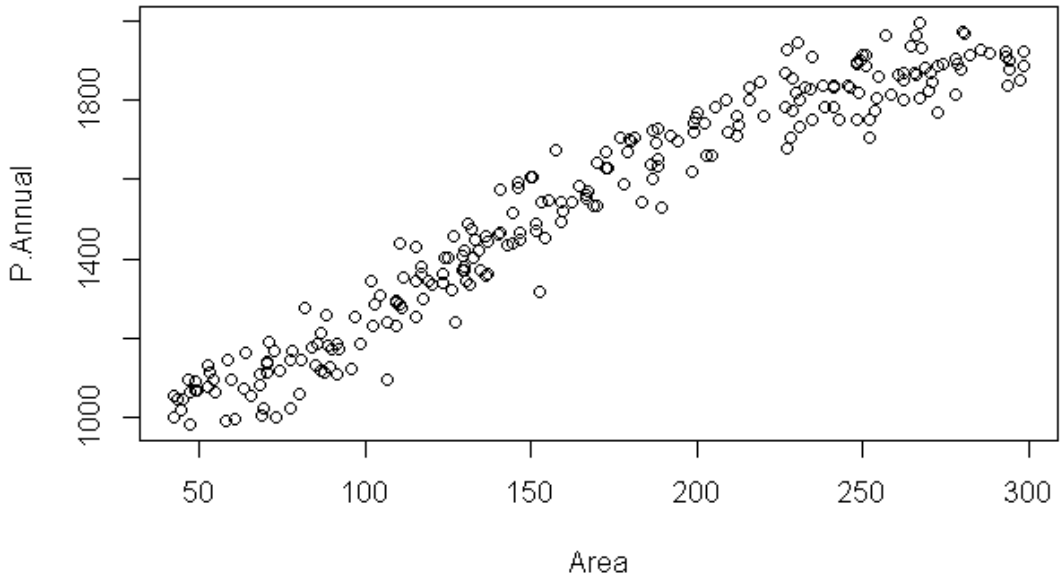
Repeat task A-F for Auckland and Wellington sub data sets.

1.Auckland

1.1 "P.Annual"

A)

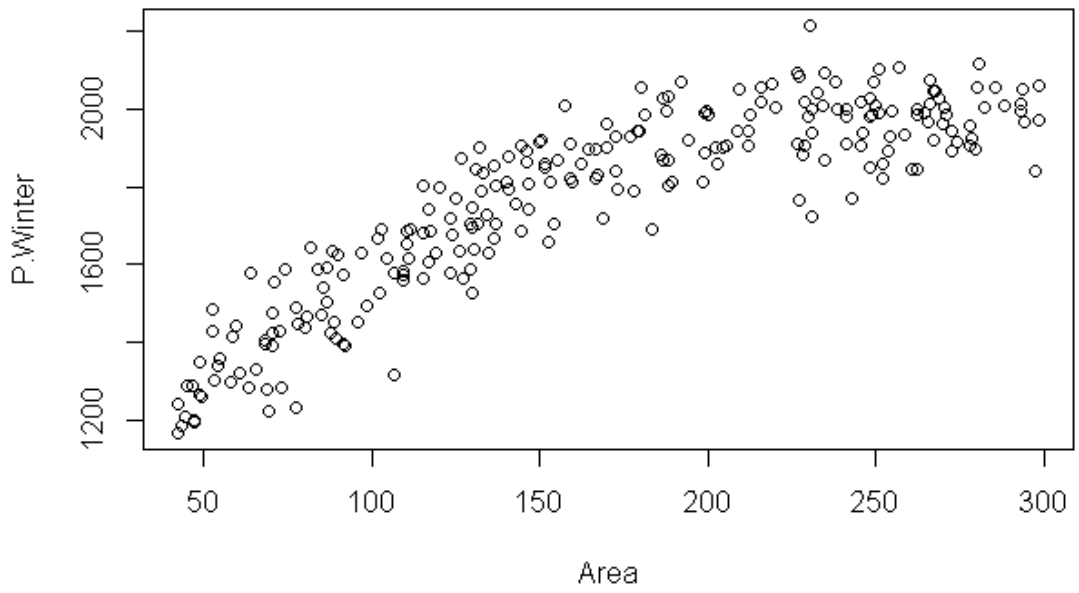
```
> splot_Annual = scatterplot(df_Auckland,'P.Annual')
```



1.2 "P.Winter"

A)

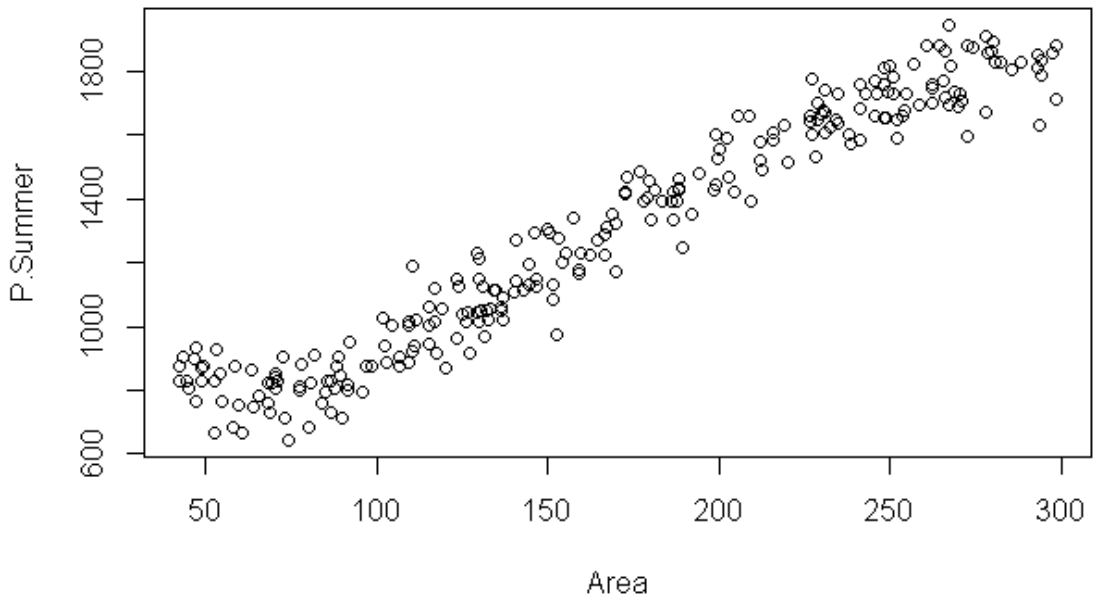
```
> splot_Winter = scatterplot(df_Auckland,'P.Winter')
```



1.3."P.Summer"

A)

```
> splot_Summer = scatterplot(df_Auckland,'P.Summer')
```

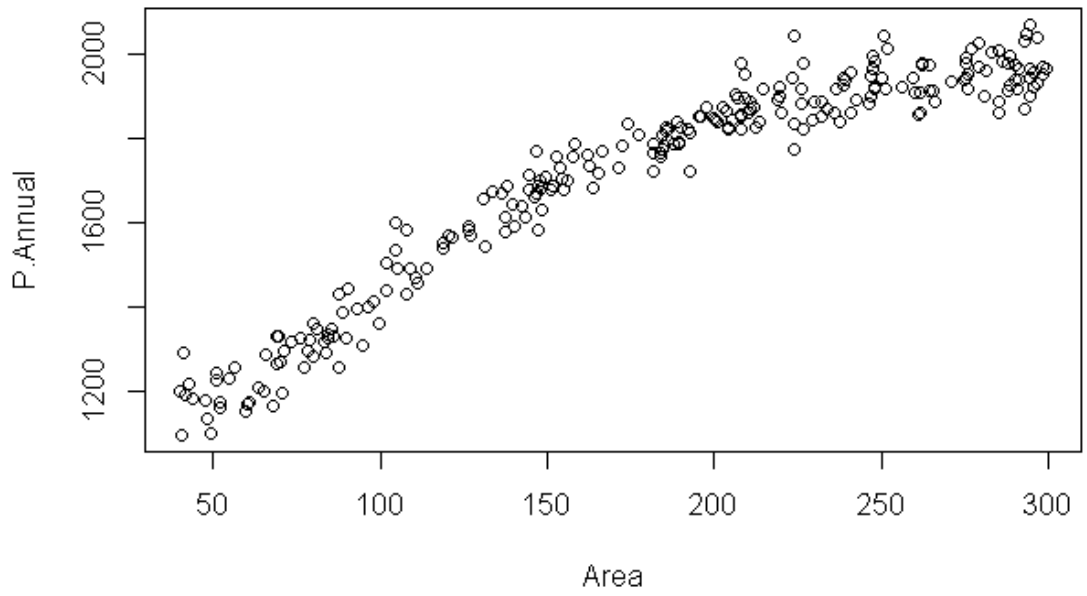


2.Wellington

2.1 "P.Annual"

A)

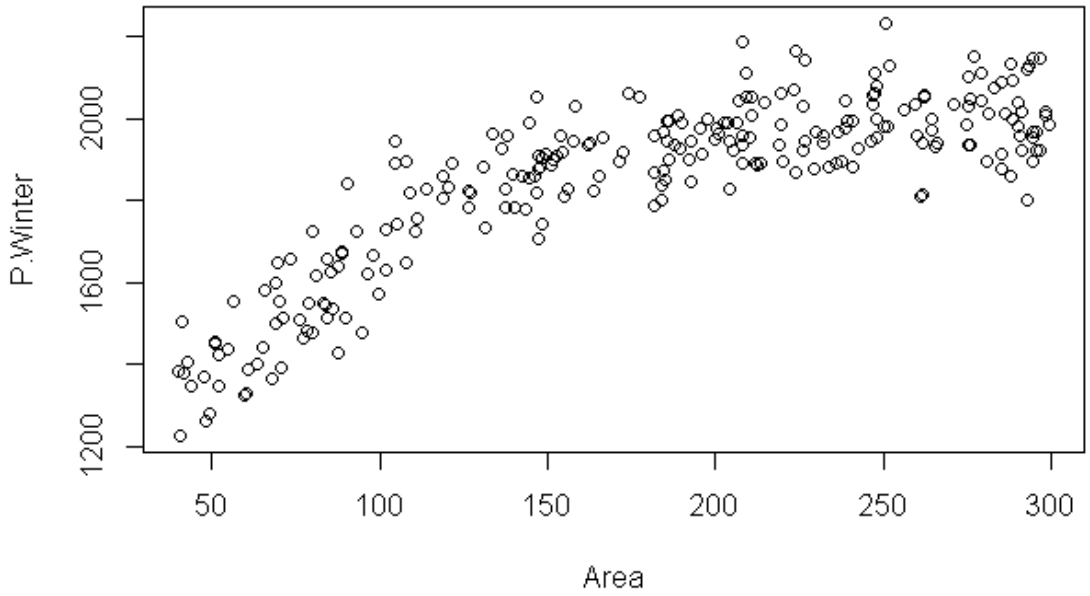
```
> splot_Annual = scatterplot(df_Wellington,'P.Annual')
```



2.2. "P.Winter"

A)

```
> splot_Winter = scatterplot(df_Wellington,'P.Winter')
```



2.3 "P.Summer"

A)

```
> splot_Summer = scatterplot(df_Wellington,'P.Summer')
```