Homework 1

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Below I will introduce the data set which is available in base R, named '*trees*'. I will then investigate the data by performing a simple numerical summary and a basic plot.

Introduction to "Trees" Data

The '*trees*' data consists of the measurements of **31 felled black cherry trees**. The measurements recorded include the **diameter** (labelled '**girth**'), **height** and **volume** of the timber. The girth of each tree is measured at 4 ft 6 in above the ground.

The following units were used for each measurement:

- **Height:** feet
- **Girth:** inches
- **Volume:** cubic feet

Data Exploration

Below I perform a basic exploration of the data. The first rows can be seen below:

```
  Girth Height Volume
1   8.3     70   10.3
2   8.6     65   10.3
3   8.8     63   10.2
4  10.5     72   16.4
5  10.7     81   18.8
6  10.8     83   19.7
```

A numerical summary of the data:

```
     Girth           Height       Volume
 Min.   : 8.30   Min.   :63   Min.   :10.20
 1st Qu.:11.05   1st Qu.:72   1st Qu.:19.40
 Median :12.90   Median :76   Median :24.20
 Mean   :13.25   Mean   :76   Mean   :30.17
 3rd Qu.:15.25   3rd Qu.:80   3rd Qu.:37.30
 Max.   :20.60   Max.   :87   Max.   :77.00
```

We can see the numerical summary above. The following observations can be made:

- **Girth:**
  - The values **span** from 8.30 to 20.60 inches.
  - The **mean** value is 13.25 inches.
- **Height:**
  - The values **span** from 63 to 87 feet.
  - The **mean** value is 76 feet.
- **Volume:**
  - The values **span** from 10.20 to 77.00 cubic feet.
  - The **mean** value is 30.17 cubic feet.

Note that the volume measurements span a wide range relative to the other measurements, likely due to the dimensionality of the volume measurement.

Scatter Plot

Below, I plot the **volume** of the felled trees against their **girth**. This plot allows for the visualization of the relationship between the volume and girth of the trees.

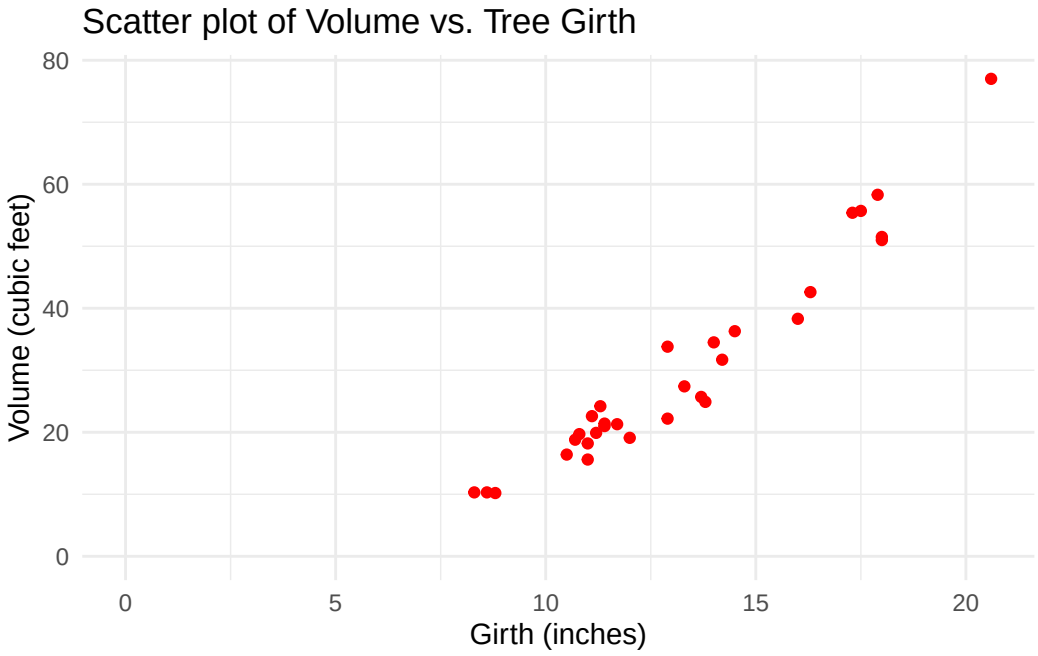

Figure 1: Scatter plot of Tree Volume against Tree Girth

We can see above that there is a **clear positive relationship** between the **volume** of the tree timber and the **girth**. We see that as the girth increases, the volume can also be seen to increase. This relationship would be **expected**. This relationship could be explored further, for example the presence of a linear or quadratic relationship could be investigated.