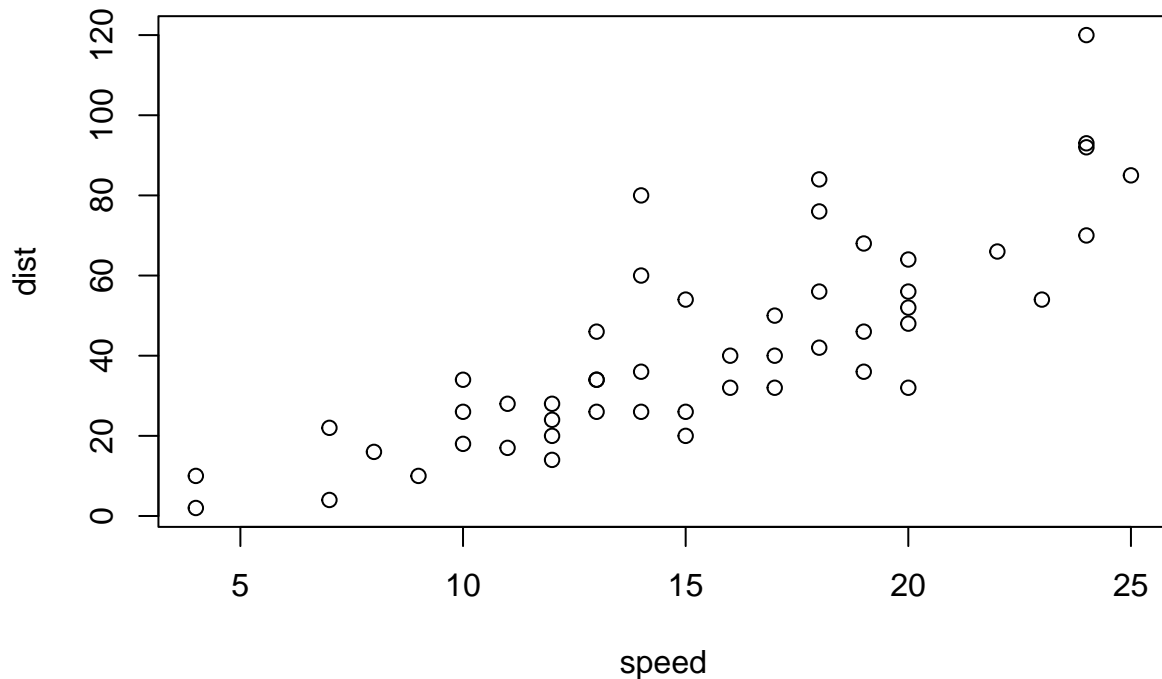# R Notebook

This is an R Markdown Notebook. When you execute code within the notebook, the results appear beneath the code.

Try executing this chunk by clicking the *Run* button within the chunk or by placing your cursor inside it and pressing *Cmd+Shift+Enter*.

```
plot(cars)
```


Add a new chunk by clicking the *Insert Chunk* button on the toolbar or by pressing *Cmd+Option+I*.

When you save the notebook, an HTML file containing the code and output will be saved alongside it (click the *Preview* button or press *Cmd+Shift+K* to preview the HTML file).

The preview shows you a rendered HTML copy of the contents of the editor. Consequently, unlike *Knit*, *Preview* does not run any R code chunks. Instead, the output of the chunk when it was last run in the editor is displayed.

MS Excel Challenge

Load the packages and data

```
library(tidyverse)
```

```
## -- Attaching packages -------------------------------------- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5      v purrr   0.3.4
## v tibble  3.1.6      v dplyr   1.0.8
## v tidyr   1.2.0      v stringr 1.4.0
## v readr   2.1.2      v forcats 0.5.1
```

```
## -- Conflicts ----------------------------------------- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(lubridate)
```

```
##
## Attaching package: 'lubridate'
```

```
## The following objects are masked from 'package:base':
##
##     date, intersect, setdiff, union
```

```
temps <- read.csv("../data/SACTN_SAWS.csv")
```

Inspect the data

```
head(temps)
```

```
##   X          site       date     temp
## 1 1 Port Nolloth 1973-07-01 11.72222
## 2 2 Port Nolloth 1973-08-01 11.53448
## 3 3 Port Nolloth 1973-09-01 10.87931
## 4 4 Port Nolloth 1973-10-01 11.78571
## 5 5 Port Nolloth 1973-11-01 12.30769
## 6 6 Port Nolloth 1973-12-01 12.34000
```

```
unique(temps$site)
```

```
##  [1] "Port Nolloth"       "Hondeklipbaai"     "Doringbaai"
##  [4] "Lamberts Bay"       "St Helena Bay"     "Paternoster"
##  [7] "Saldanha Bay"       "Dassen Island"     "Yzerfontein"
## [10] "Sea Point"          "Hout Bay"          "Kommetjie"
## [13] "Fish Hoek"          "Kalk Bay"          "Muizenberg"
## [16] "Gordons Bay"        "Hermanus"          "Gansbaai"
## [19] "Cape Agulhas"       "Stilbaai"          "Mossel Bay"
## [22] "Knysna"             "Plettenberg Bay"   "Tsitsikamma"
## [25] "Storms River Mouth" "Pollock Beach"     "Humewood"
## [28] "Port Alfred"        "Eastern Beach"     "Orient Beach"
## [31] "Nahoon Beach"       "Mzamba"            "Port Edward"
## [34] "Southbroom"         "Umtentweni"        "Scottburgh"
## [37] "Durban"             "Ballito"           "Salt Rock"
## [40] "Zinkwazi"           "Richards Bay"
```

Do stuff

```r
temps_mo <- temps %>%
  mutate(yr = year(date),
         mo = month(date)) %>%
  group_by(site, mo) %>%
  summarise(mean_temp = mean(temp, na.rm = TRUE)) %>%
  ungroup()
```

```
## `summarise()` has grouped output by 'site'. You can override using the
## `.groups` argument.
```

```r
temps_yr <- temps %>%
  mutate(yr = year(date),
         mo = month(date)) %>%
  group_by(site, yr) %>%
  summarise(mean_temp = mean(temp, na.rm = TRUE)) %>%
  ungroup()
```

```
## `summarise()` has grouped output by 'site'. You can override using the
## `.groups` argument.
```

```r
temps_yr
```

```
## # A tibble: 832 x 3
##    site             yr mean_temp
##    <chr>         <dbl>     <dbl>
##  1 Ballito        1990      22.0
##  2 Ballito        1991      22.3
##  3 Ballito        1992      21.9
##  4 Cape Agulhas   1986      17.3
##  5 Cape Agulhas   1987      17.9
##  6 Cape Agulhas   1988      17.3
##  7 Cape Agulhas   1989      17.1
##  8 Cape Agulhas   1990      16.7
##  9 Cape Agulhas   1991      18.0
## 10 Cape Agulhas   1992      18.1
## # ... with 822 more rows
```

Make the graphs

```r
ggplot(temps_mo, aes(x = mo, y = mean_temp)) +
  geom_line(aes(group = site), colour = "red") +
  scale_x_continuous(breaks = seq(2, 12, 2)) +
  facet_wrap(~site, nrow = 6) +
  labs(x = "Year", y = "Temperature (°C)",
       title = "Monthly mean temperature")
```

Monthly mean temperature
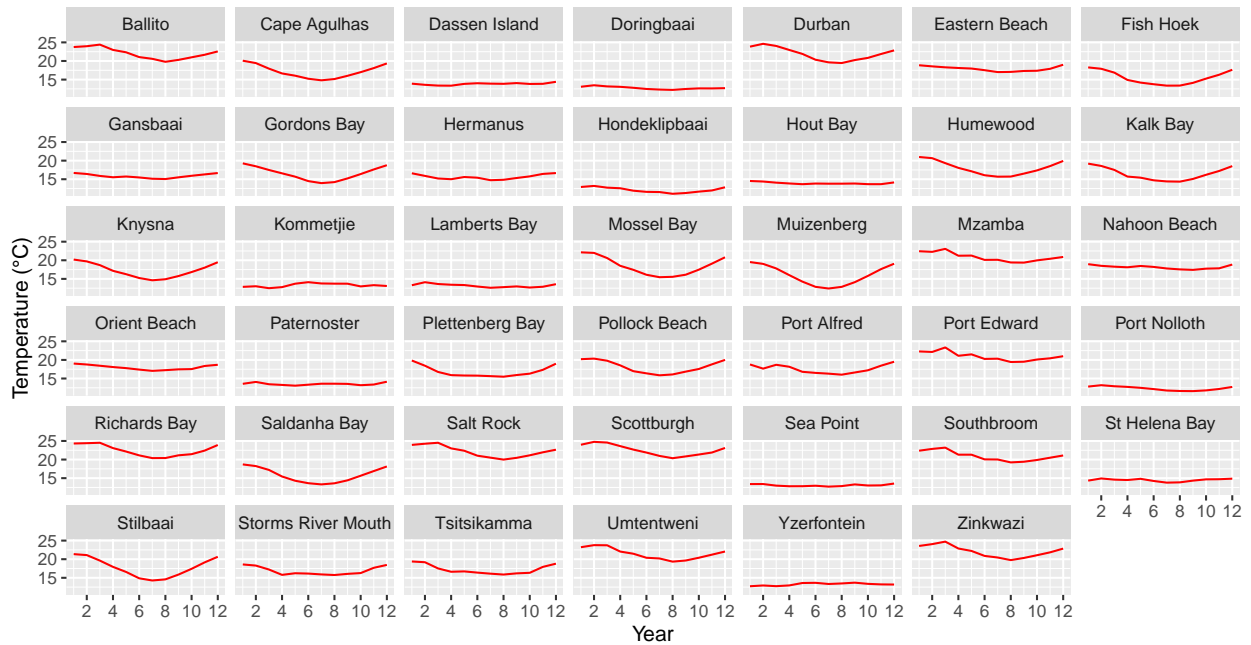

```
ggplot(temps_yr, aes(x = yr, y = mean_temp)) +
  geom_line(aes(group = site), colour = "red") +
  scale_x_continuous(breaks = seq(1980, 2010, 15)) +
  facet_wrap(~site, nrow = 6) +
  labs(x = "Year", y = "Temperature (°C)",
       title = "Annual mean temperature")
```

Annual mean temperature