

# 109-1 統計學實習課

15. Sep

# 課程內容介紹

# 助教介紹



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# 助教介紹



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# 實習課目標&內容

## Goal

實際操作統計軟體(R)，輔助正課

## Content

- R的基本操作
- 課程相關的統計運算
- 統計圖表

# 工作分配

前半學期(廖振鐸老師上課部分)：

黃亭禎助教-上實習課以及實習課作業的批改

林名珊助教-批改正課作業

後半學期(邱春火老師上課部分)：

黃亭禎助教-批改正課作業

林名珊助教-上實習課以及批改實習作業

# 作業(佔學期成績20%)

## 正課作業：

- 1.紙本繳交
- 2.請盡量列出計算過程
- 3.會在正課的課間下課收，所以上課記得帶來

## 實習作業：

- 1.線上繳交至ceiba的作業區
  - 2.請交pdf檔，交pdf 檔，交pdf檔! 非繳交pdf檔斟酌扣分
  - 3.請附上程式碼以及結果(請適當截圖)，並依照題號回答問題
- 2.請按時繳交作業，不接受遲交

# 實習課注意事項

- 1.電腦教室的電腦設定可能會跟同學們自己的電腦不一樣，所以同學們也可以自己帶電腦來上課
- 2.實習課需要簽到，當作**出席成績(佔學期總成績10%)**
- 3.電腦教室禁止飲食，飲料跟食物請一律放在教室外面，請同學們務必配合，因為如果被抓到，我們就不能再使用電腦教室了
- 4.垃圾請自行帶走
- 5.離開前請記得關機、關螢幕
- 6.實習課不會有期中、期末考試，所以期中、期末考當天不用上實習課





# The R Project for Statistical Computing

“R is a free software environment for statistical computing and graphics.”

- Free!
- 跨平台: Windows, macOS, Linux
- 很多隨時更新的套件 (package) , 尤其是統計相關的
- 缺點：迴圈計算慢QAQ

# Install R

# Step 1.

Google : R ...▶



[\[Home\]](#)

## Download

[CRAN](#)

## R Project

[About R](#)

[Logo](#)

[Contributors](#)

[What's New?](#)

[Reporting Bugs](#)

[Conferences](#)

[Search](#)

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[Developer Pages](#)

[R Blog](#)

## R Foundation

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# The R Project for Statistical Computing

## Getting Started

R is a free software environment for statistical computing and graphics. It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS. To **download R**, please choose your preferred [CRAN mirror](#).

If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

## News

- [R version 4.0.2 \(Taking Off Again\)](#) has been released on 2020-06-22.
- [useR! 2020 in Saint Louis has been cancelled](#). The European hub planned in Munich will not be an in-person conference. Both organizing committees are working on the best course of action.
- [R version 3.6.3 \(Holding the Windsock\)](#) has been released on 2020-02-29.
- You can support the R Foundation with a renewable subscription as a [supporting member](#)

## News via Twitter



The R Foundation Retweeted



**useR2020muc**

@useR2020muc



Please let us know how you liked [#useR2020](#)

# Step 2.

<https://ftp.cixug.es/CRAN/>

<https://cran.rediris.es/>

Sweden

<https://ftp.acc.umu.se/mirror/CRAN/>

Switzerland

<https://stat.ethz.ch/CRAN/>

Taiwan

<https://cran.csie.ntu.edu.tw/>

Thailand

<http://mirrors.psu.ac.th/pub/cran/>

Turkey

<https://cran.pau.edu.tr/>

<https://cran.gedik.edu.tr/>

<https://cran.ncc.metu.edu.tr/>

UK

<https://www.stats.bris.ac.uk/R/>

Oficina de software libre (CIXUG)

Spanish National Research Network, Madrid

Academic Computer Club, Umeå University

ETH Zürich

National Taiwan University, Taipei

Prince of Songkla University, Hatyai

Pamukkale University, Denizli

Istanbul Gedik University

Middle East Technical University Northern Cyprus Campus, Mersin

University of Bristol

# Step 3.

## The Comprehensive R Archive Network

### Download and Install R

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

### Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2020-06-22, Taking Off Again) [R-4.0.2.tar.gz](#), read [what's new](#) in the latest version.

# Step 4.

## R for Windows

Subdirectories:

[base](#)

Binaries for base distribution. This is what you want to [install R for the first time.](#)

[contrib](#)

Binaries of contributed CRAN packages (for R  $\geq$  2.13.x; managed by Uwe Ligges).  
There is also information on [third party software](#) available for CRAN Windows services and corresponding environment and make variables.

[old contrib](#)

Binaries of contributed CRAN packages for outdated versions of R (for R  $<$  2.13.x; managed by Uwe Ligges).

[Rtools](#)

Tools to build R and R packages. This is what you want to build your own packages on Windows, or to build R itself.

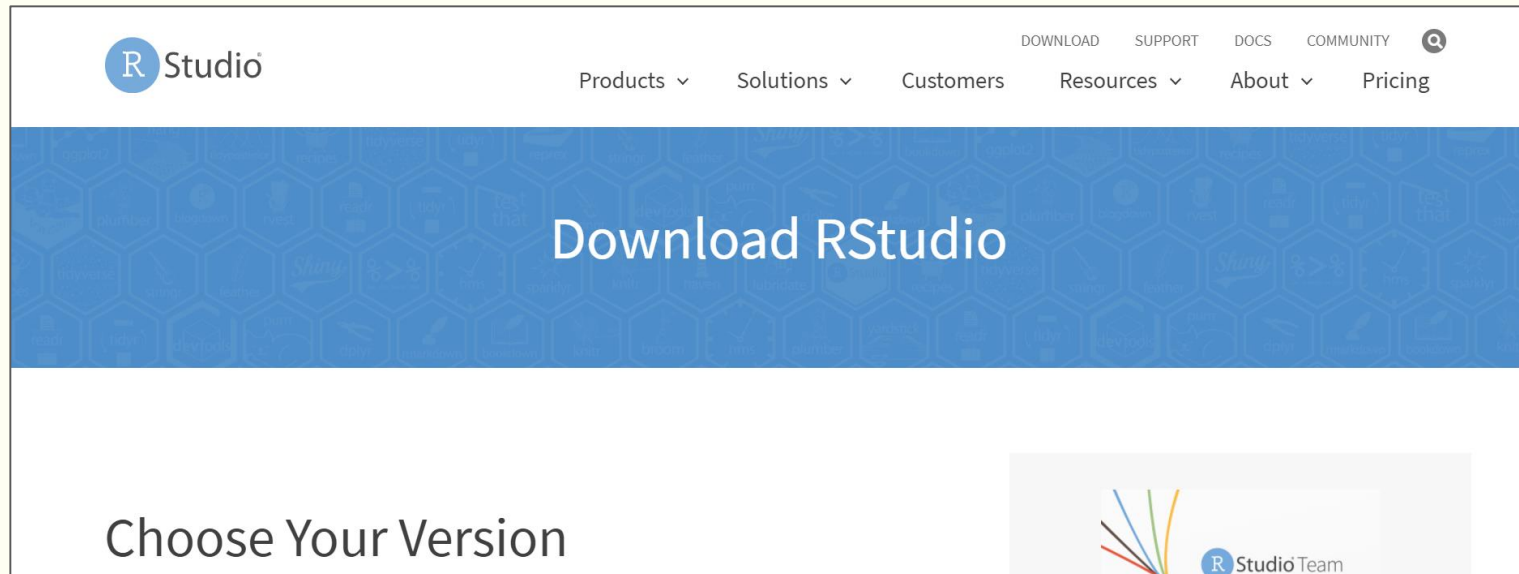
# Install RStudio

整合開發環境

介面比較漂亮~

Google : RStudio

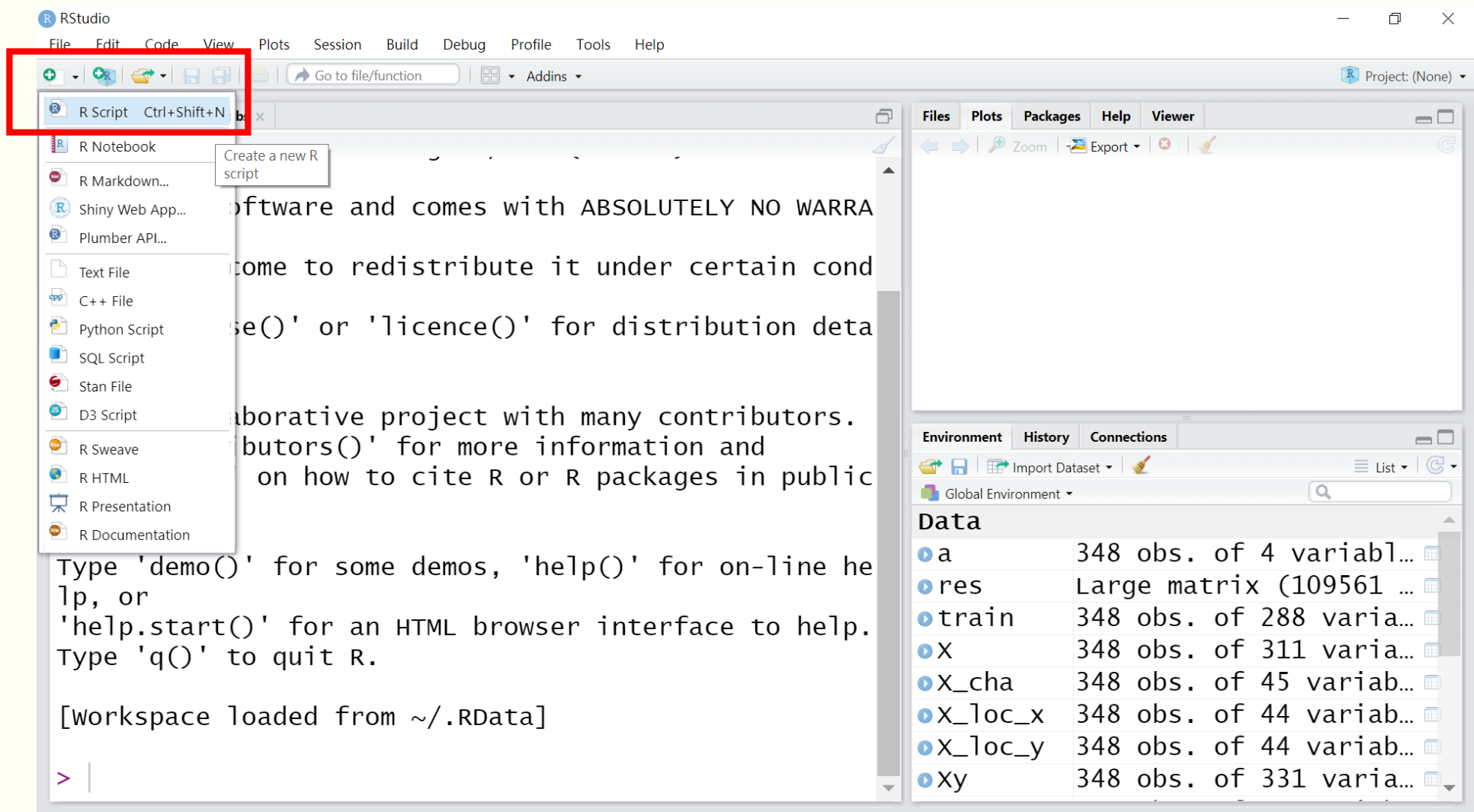
<https://rstudio.com/products/rstudio/download/>



OS	Download	Size	SHA-256
Windows 10/8/7	<a href="#">RStudio-1.3.1073.exe</a>	171.62 MB	<a href="#">2fea472a</a>
macOS 10.13+	<a href="#">RStudio-1.3.1073.dmg</a>	148.66 MB	<a href="#">0878b305</a>
Ubuntu 16	<a href="#">rstudio-1.3.1073-amd64.deb</a>	124.07 MB	<a href="#">6d71c5ff</a>
Ubuntu 18/Debian 10	<a href="#">rstudio-1.3.1073-amd64.deb</a>	126.78 MB	<a href="#">86be9352</a>
Fedora 19/Red Hat 7	<a href="#">rstudio-1.3.1073-x86_64.rpm</a>	146.95 MB	<a href="#">01abb3d8</a>
Fedora 28/Red Hat 8	<a href="#">rstudio-1.3.1073-x86_64.rpm</a>	151.04 MB	<a href="#">4b4e4878</a>
Debian 9	<a href="#">rstudio-1.3.1073-amd64.deb</a>	126.98 MB	<a href="#">0226bbc2</a>
SLES/OpenSUSE 12	<a href="#">rstudio-1.3.1073-x86_64.rpm</a>	119.43 MB	<a href="#">7c1a6f2c</a>
OpenSUSE 15	<a href="#">rstudio-1.3.1073-x86_64.rpm</a>	128.39 MB	<a href="#">29078f11</a>



# RStudio 的介面介紹



# RStudio 的介面介紹

檔案位置

圖片

已安裝的套件

The screenshot shows the RStudio IDE with the following components and annotations:

- Source Editor:** Contains R code: 

```
1 x = seq(0,20,0.5)
2 plot(x,dnorm(x),type='l')
3
```

 A red box highlights the text: "R script: 編寫程式的記事本，可以存檔".
- Plots Panel:** Displays a line plot of the density function  $dnorm(x)$  against  $x$ . A red arrow points from the label "圖片" to this panel.
- Console:** Shows the executed commands: 

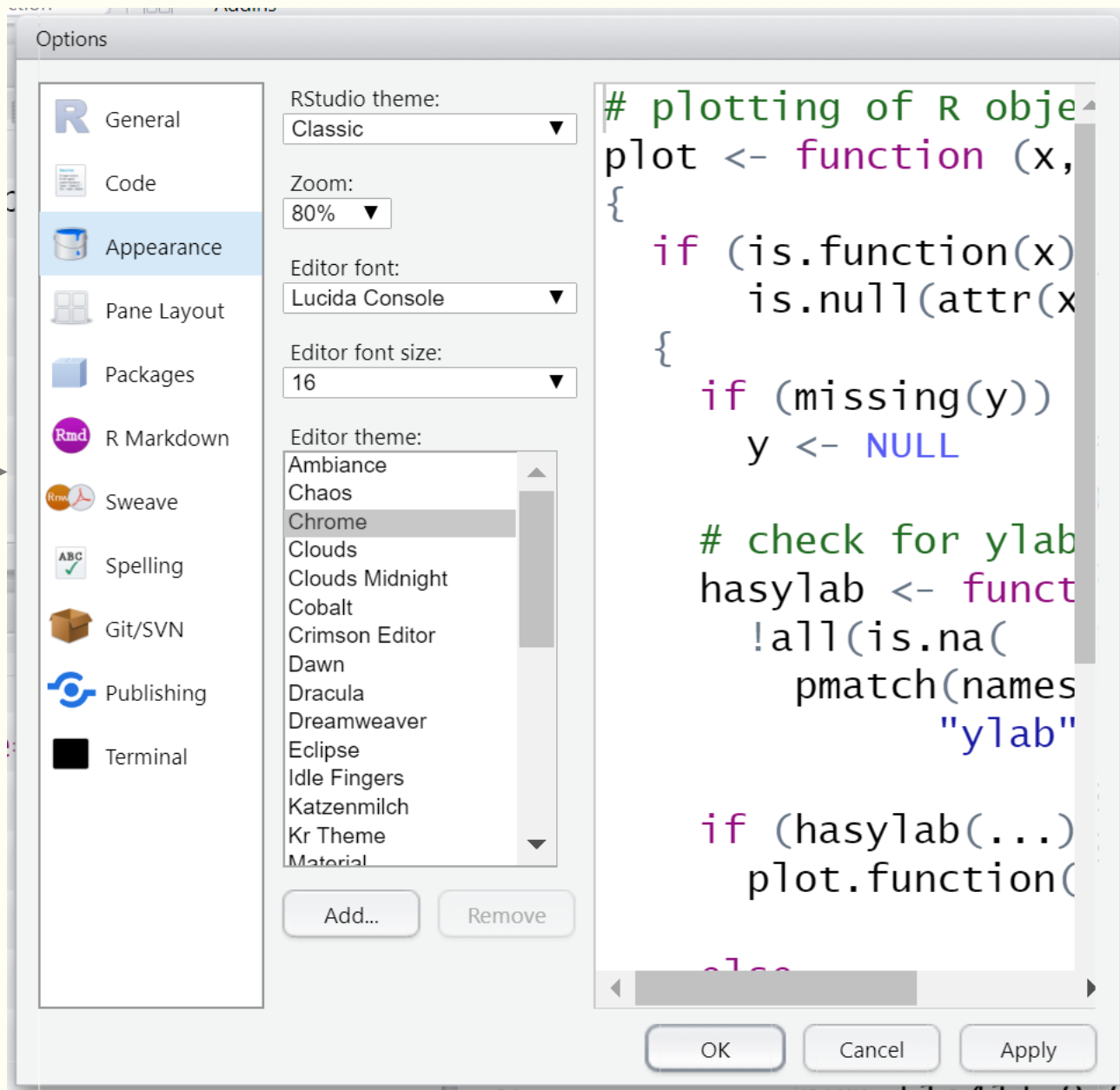
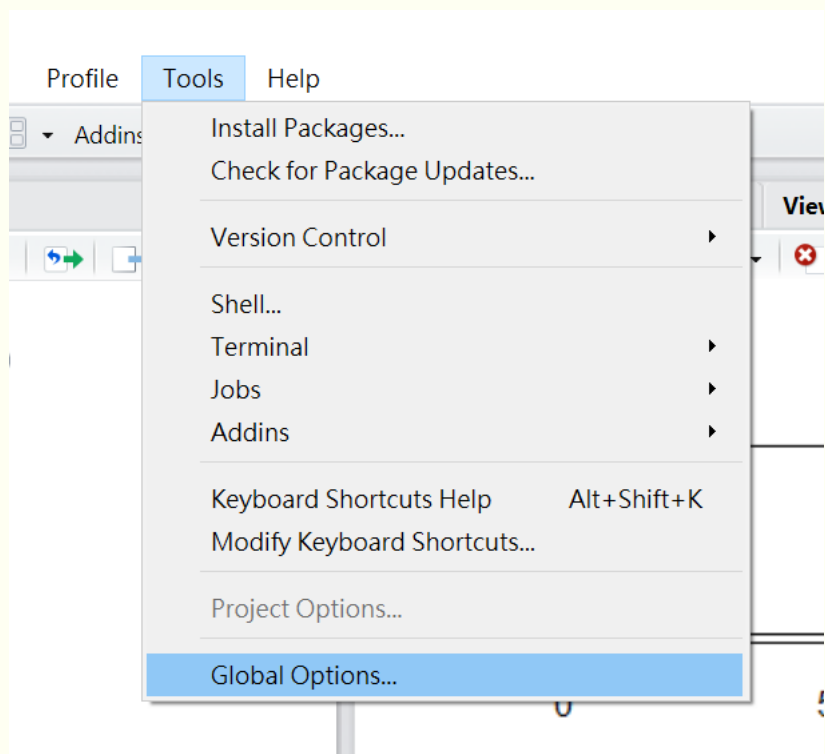
```
> x = seq(0,20,0.5)
> plot(x,dnorm(x),type='l')
>
```

 A red box highlights the text: "R console: 執程式碼，以及分析結果".
- Environment Panel:** Lists the objects in the global environment: 

Object	Description
Xy	348 obs. of 331 variables
y	348 obs. of 20 variables
values	
i	20L
l	44L
type	chr [1:268] "character" "numeric"...
x	num [1:41] 0 0.5 1 1.5 2 2.5 3 3...

 A red box highlights the text: "記錄暫存的變數".
- Annotations:** Three red arrows point from the top labels to the interface: "檔案位置" points to the top toolbar, "圖片" points to the Plots panel, and "已安裝的套件" points to the Packages tab in the right sidebar.

# 更換字體大小



# 加減乘除!

加： $+$ ，減： $-$ ，乘： $*$ ，除： $/$

除法的整數部分： $\%/%$

除法的餘數部分： $\%\%$

次方： $\wedge$  OR  $**$

開根號： $\text{sqrt}()$

正負號： $\text{sign}()$

取絕對值： $\text{abs}()$

指數： $\text{exp}()$ ，對數： $\text{log}(x, \text{base})$

三角函數： $\text{sin}()$ ,  $\text{cos}()$ ,  $\text{tan}()$ ...

function :  
name(variable)

# 執行程式碼

我全都要！ `ctrl + alt + R`

只要跑當行 `ctrl + enter`

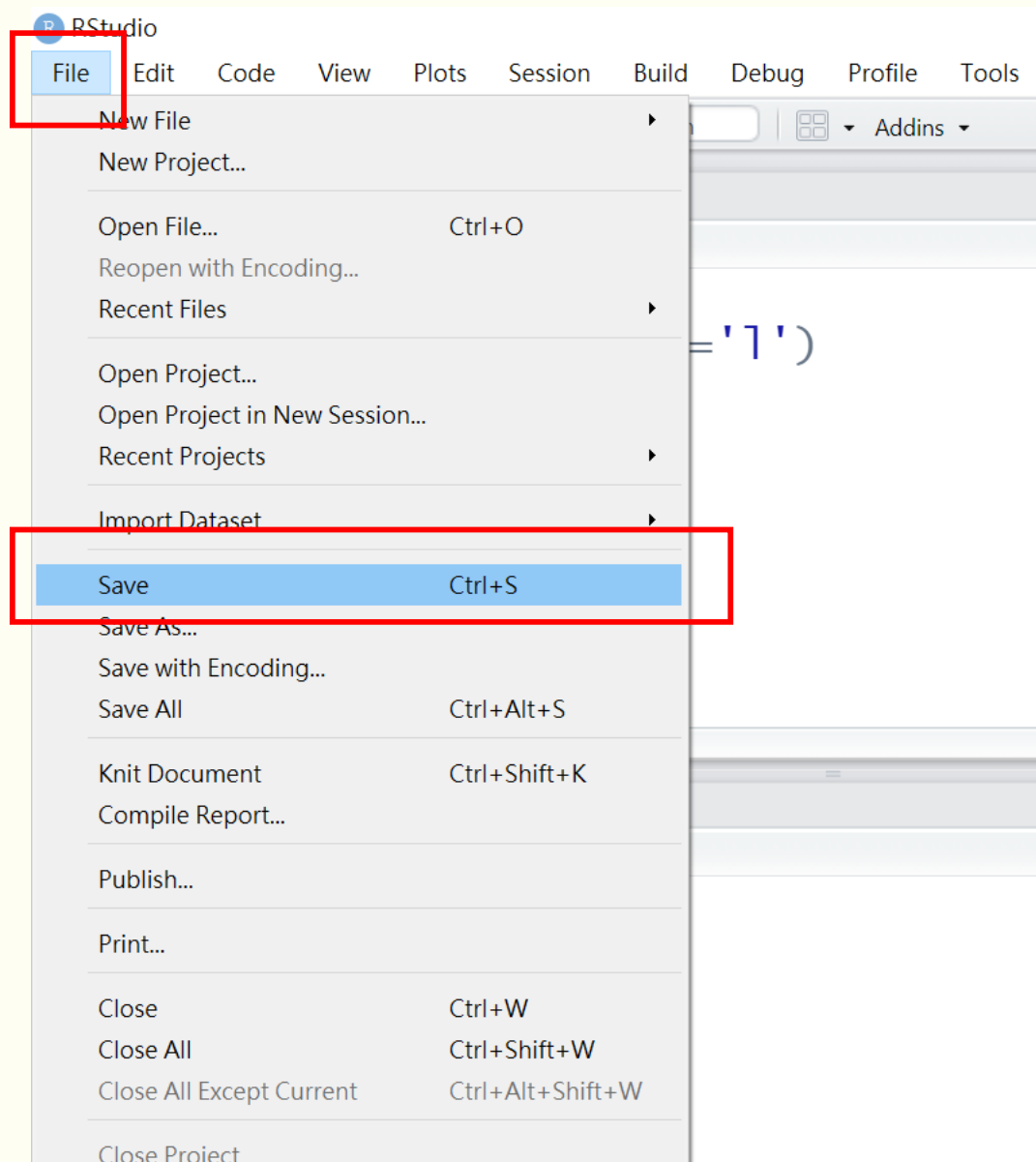
終止執行 `esc`

小試身手

$$2\sqrt{2}$$

$$| \ln(0.5) |$$

# 儲存寫好的程式碼



不會用的function，問R最快

? functionname()



# HW

安裝 R & Rstudio