

# **STAT 224 Lecture/Activity on 9/29**

## **Intro to R Markdown**

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Please download the files below from Canvas

- LA0928\_demo1.Rmd
- LA0928\_demo2.Rmd
- LA0928\_demo3.Rmd

# Itemized List

## R Markdown

```
* item 1
* item 2
  + sub-item 1
  + sub-item 2
* item 3
  + sub-item 1
```

- Leave a blank line before the list
- Indent using at least 4 spaces

## Knitted Output:

- item 1
- item 2
  - sub-item 1
  - sub-item 2
- item 3
  - sub-item 1

# Ordered List

## R Markdown:

1. item 1
2. item 2
  - a. sub-item 1
  - b. sub-item 2
3. item 3
  - a. sub-item 1

- Leave a blank line before the list
- Indent using at least 4 spaces

## Knitted Output

1. item 1
2. item 2
  - a. sub-item 1
  - b. sub-item 2
3. item 3
  - a. sub-item 1

## R Markdown:

1. `**This text is bold.**`
1. `*This text is in italics*`.
1. You can even `~~strikethrough text~~`

## Knitted Output:

1. **This text is bold.**
2. *This text is in italics.*
3. You can even ~~strikethrough~~text

# Header

# Header 1

## Header 2

### Header 3

ordinary text

# Table

## R Markdown:

```
Table Header | Second Header
----- | -----
Table Cell 1 | Cell 2
Cell 3       | Cell 4
```

## Knitted Output:

---

Table Header	Second Header
Table Cell 1	Cell 2
Cell 3	Cell 4

---

You can center, right-, or left-justify text in your tables as you like.

## R Markdown:

```
Centered | Right-Justified | Left-Justified
```

```
:-----:|-----:|:-----
```

```
A      | 24          | My Friend's Name
B      | 5           | My Name
CC     | 167        | Firstname Lastname
DDD    | 48         | Another Name
```

## Knitted Output:

---

Centered	Right-Justified	Left-Justified
A	24	My Friend's Name
B	5	My Name
CC	167	Firstname Lastname
DDD	48	Another Name

---



## Inline Math Symbols & Expressions ( $\text{\LaTeX}$ )

R Markdown supports  $\text{\LaTeX}$  math symbols & expressions. Inline math symbols & expressions are placed between `$ ... $`.

### R markdown:

You can write Greek letters: `$$\alpha$`, `$$\beta$`, `$$\gamma$`, `$$\delta$`, `$$\epsilon$`, `$$\varepsilon$` ...

**Subscripts** are written as `$a_{b}$` and **superscripts** as `$a^{b}$`.

Simple Linear Regression Model: `$$Y_{ij}=\beta_0+\beta_1 X +\varepsilon_{ij}$$`

### Knitted Output:

You can write Greek letters:  $\alpha, \beta, \gamma, \delta, \epsilon, \varepsilon \dots$

**Subscripts** are written as  $a_b$  and **superscripts** as  $a^b$ .

Simple Linear Regression Model:  $Y_{ij} = \beta_0 + \beta_1 X + \varepsilon_{ij}$

Place **two dollar signs** around math expressions in **display mode** like  
\$\$... \$\$

## R Markdown

**Fractions** in **inline** math mode:  $\frac{a}{b}$  and  
in **display** math mode: 
$$\frac{a}{b}$$

Logistic Regression Model:

\$\$

$P(Y=1) = \frac{e^{\{\alpha+\beta x\}}}{1+e^{\{\alpha+\beta x\}}}$

\$\$

## Knitted Output:

**Fractions** in **inline** math mode:  $\frac{a}{b}$  and in **display** math mode:

$$\frac{a}{b}$$

Logistic Regression Model:

$$P(Y = 1) = \frac{e^{\alpha+\beta x}}{1 + e^{\alpha+\beta x}}$$

# Log, Exp, Square-root, and Summation

## R Markdown:

`\log(x)`, `\exp(x)`, `\sqrt{x}`, `\sum_{i=1}^n x_i`

## Knitted Output:

$\log(x)$ ,  $\exp(x)$ ,  $\sqrt{x}$ ,  $\sum_{i=1}^n x_i$

Be sure to place the black-slash `\`, or they would look like

## R Markdown:

`log(x)`, `exp(x)`, `sqrt{x}`, `sum_{i=1}^n x_i`

## Knitted Output:

$\log(x)$ ,  $\exp(x)$ ,  $\sqrt{x}$ ,  $\sum_{i=1}^n x_i$

[https://www.overleaf.com/learn/latex/Learn\\_LaTeX\\_in\\_30\\_minutes](https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes)

You can just look at the section “Adding math to  $\text{\LaTeX}$ ” and all the sub-sections underneath.

- Mathematical expressions
- Subscripts and superscripts
- Brackets and Parentheses
- Fractions and Binomials
- Aligning Equations
- Operators
- Spacing in math mode
- Integrals, sums and limits
- Display style in math mode
- List of Greek letters and math symbols
- Mathematical fonts

## R Code Chunks

An R code chunk begin with 3 **back-tick** and then `{r}` and end with another 3 **back-tick**

```
```{r}
```

```
x = c(1,2,3,5)
```

```
mean(x)
```

```
```
```



Use `echo=TRUE` or `echo=FALSE` to control whether to display the R codes.

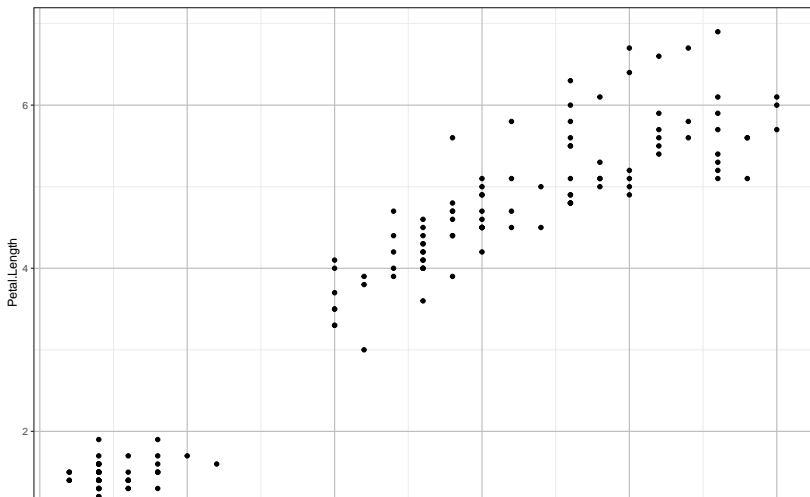
Use `eval=TRUE` or `eval=FALSE` to control whether to evaluate the code chunks.

# The Iris Data

```
data(iris)
str(iris)
'data.frame':  150 obs. of  5 variables:
 $ Sepal.Length: num  5.1 4.9 4.7 4.6 5 5.4 4.6 5 4.4 4.9 ...
 $ Sepal.Width  : num  3.5 3 3.2 3.1 3.6 3.9 3.4 3.4 2.9 3.1 ...
 $ Petal.Length: num  1.4 1.4 1.3 1.5 1.4 1.7 1.4 1.5 1.4 1.5 ...
 $ Petal.Width  : num  0.2 0.2 0.2 0.2 0.2 0.4 0.3 0.2 0.2 0.1 ...
 $ Species      : Factor w/ 3 levels "setosa","versicolor",...: 1 1 1 1 1
```

# R Plots

```
library(ggplot2)
ggplot(iris, aes(x=Petal.Width, y=Petal.Length))+
  geom_point()
```





## How to Adjust Size of R Plots

Adjust you can resize your plots by adjusting `fig.width` and `fig.height` in the code chunk.

Use `out.width` to adjust the relative width of the plot to the document

See `LA0920_demo3.Rmd`.

## Center, Left- or Right-Justify R Plots

Use `fig.align='center'` to center your plot

Use `fig.align='right'` or `fig.align='left'` to left- or right-justify your plot.

See `LA0920_demo3.Rmd`.

## Placing Two Plots Side-by-Side

Use `fig.show='hold'` and `out.width`

See `LA0920_demo3.Rmd`.