

R Markdown Tutorial

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R Markdown General Rule

Notice that the file contains three types of content:

1. An (optional) YAML header surrounded by `---`
2. R code chunks surrounded by `““`s
3. text mixed with simple text formatting

To render the pdf

```
# Input in the console
library(rmarkdown)
render("/directory/example.Rmd")
```

Or press Command + Shift + K

```
# R syntax here
v1 = rnorm(100)
summary(v1)
```

```
##      Min.   1st Qu.   Median     Mean  3rd Qu.    Max.
## -3.05187 -0.60025   0.02277 -0.06298  0.58503   2.15931
```

Formatting text

Header

A First Level Header

A Second Level Header

This is a paragraph

Header 3

This is a blockquote.

This is the second paragraph in the blockquote.

This is an H2 in a blockquote

Emphasize and underline

Words *are emphasized* using a pair of asterisks.

Words can be also *emphasized* in this way (using a pair of underscores).

Use two asterisks for **strong emphasis**.

Or, **use two underscores instead**.

If you want, ~~strike-through~~.

Lists

- Apple.
- Cherry.
- Banana.
- Pineapple.
- Papaya.
- Melon.
- Asia.
- North America.
- Europe.

Ordered lists

1. First
2. Second
3. Third

Link

Inline-style links use parentheses immediately after the link text. For example:

This is an [Formatting Tutorial](#).

This is an [example link](#).

Math notations ()

Currently html only

Inline vs Display

This is an inline: X_i

This is a display

$$X_i$$

Superscript and Subscript

This is the superscript y^2

Subscript

$$X_i$$

$$X_{i,j}$$

Both superscript and subscript

$$X_{i,j}^2$$

Square Root

Use the sqrt operator

$$\sqrt{b^2 - 4ac}$$

Fractions

Use the operator

$$\frac{4z^3}{16}$$

Summation

$$\sum_{i=1}^n X_i^3$$

Greek letters

$$\alpha, \beta, \gamma, \Gamma$$

Special Symbols

$$a \pm b$$

$$x \geq 15$$

$$a_i \geq 0 \quad \forall i$$

Special Functions

$$\int_0^{2\pi} \sin x \, dx$$

Matrices

$$\begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{matrix}$$

Another way to present a matrix

$$\mathbf{X} = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

Examples

We can write fractions: $\frac{2}{3}$. We can also handle things like estimated population growth rate, e.g., $\hat{\lambda} = 1.02$. And, $\sqrt{4} = 2$.

$$\alpha, \beta, \gamma, \Gamma$$

$$a \pm b$$

$$x \geq 15$$

$$a_i \geq 0 \quad \forall i$$

Matrix

$$A_{m,n} = \begin{pmatrix} a_{1,1} & a_{1,2} & \cdots & a_{1,n} \\ a_{2,1} & a_{2,2} & \cdots & a_{2,n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m,1} & a_{m,2} & \cdots & a_{m,n} \end{pmatrix}$$

Statistics

The binomial probability:

$$f(y|N, p) = \frac{N!}{y!(N-y)!} \cdot p^y \cdot (1-p)^{N-y} = \binom{N}{y} \cdot p^y \cdot (1-p)^{N-y}$$

To calculate the **mean** of n observations of variable x , you can use:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

Note that this equation looks quite nice above where it's in display math mode. It is more compact but not quite as nice looking if we present it using inline mode, e.g., $\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$.

Let's do the same with the equation for **variance**. First the inline version, which is $\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}$. And then the display mode version:

$$\sigma^2 = \frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}$$

And, finally, we'll end with the **standard deviation**. Here's the inline version, $\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$.

And here's the display version.

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (x_i - \bar{x})^2}{n-1}}$$

There are helpful online editors - check this one out