

My R Markdown Primer

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2025-11-20

Introduction

R Markdown mixes narrative, code, and output.
It makes analysis reproducible.
You can knit to HTML or PDF and share the result.

Quick math examples

Inline example: $\alpha + \beta = \gamma$.

Displayed equation:

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

Load data and show summary

```
# load dataset and show first rows and basic summary  
data("mtcars", package = "datasets")  
head(mtcars)
```

```
##           mpg cyl  disp  hp  drat    wt  qsec vs am gear carb  
## Mazda RX4      21.0   6  160 110 3.90 2.620 16.46  0  1    4    4  
## Mazda RX4 Wag  21.0   6  160 110 3.90 2.875 17.02  0  1    4    4  
## Datsun 710     22.8   4  108  93 3.85 2.320 18.61  1  1    4    1  
## Hornet 4 Drive  21.4   6  258 110 3.08 3.215 19.44  1  0    3    1  
## Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2  
## Valiant        18.1   6  225 105 2.76 3.460 20.22  1  0    3    1
```

```
summary(mtcars$mpg)
```

```
##      Min. 1st Qu.  Median    Mean 3rd Qu.    Max.   
##   10.40   15.43   19.20   20.09   22.80   33.90
```

Compute simple statistics

```
# compute mean and sd of mpg and group means by cyl  
mean_mpg <- mean(mtcars$mpg, na.rm = TRUE)  
sd_mpg <- sd(mtcars$mpg, na.rm = TRUE)  
group_means <- aggregate(mpg ~ cyl, data = mtcars, FUN = mean)  
mean_mpg
```

```
## [1] 20.09062
```

```
sd_mpg
```

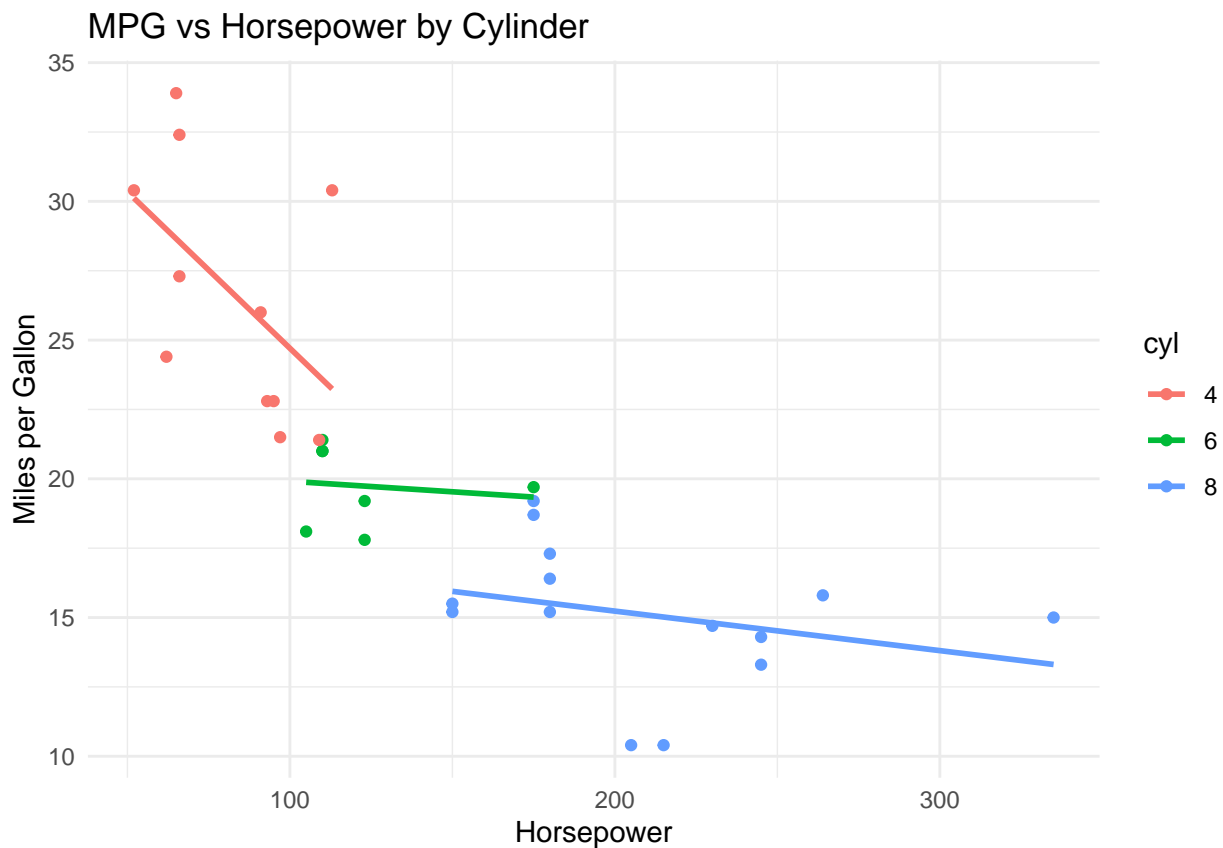
```
## [1] 6.026948
```

```
group_means
```

```
##   cyl      mpg  
## 1    4 26.66364  
## 2    6 19.74286  
## 3    8 15.10000
```

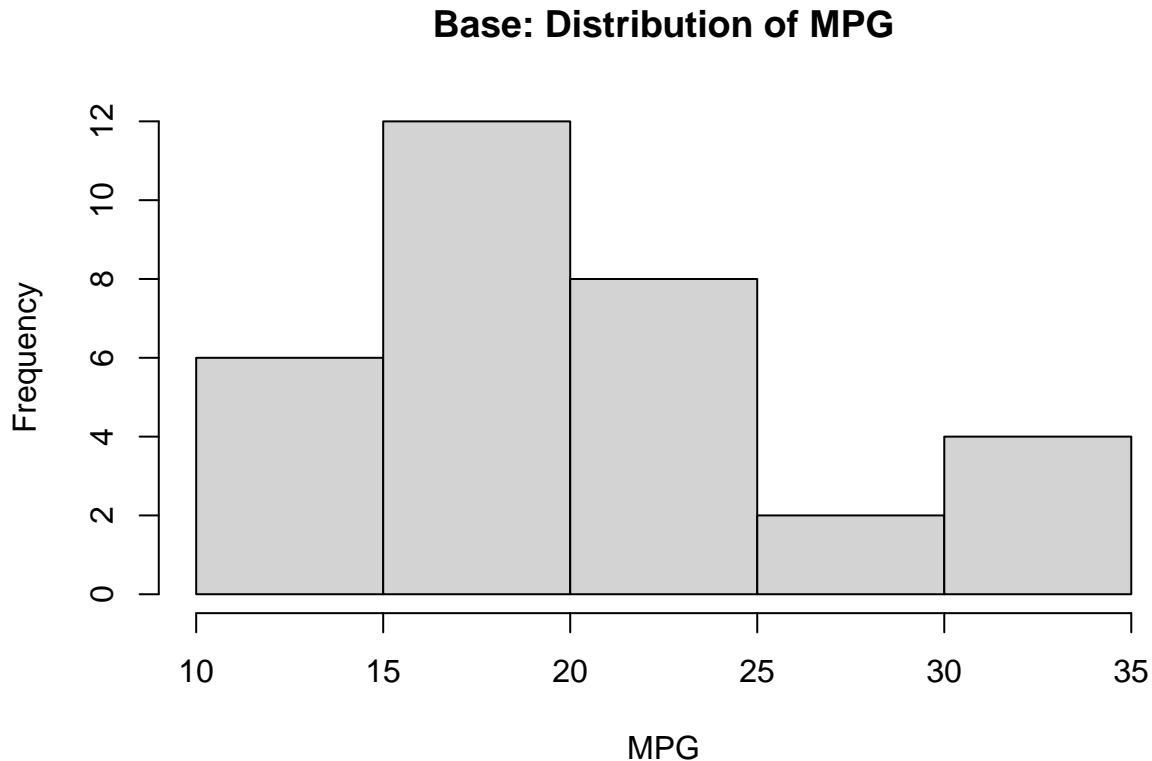
Make a quick ggplot

```
# create a scatter with trend lines colored by cylinder  
if (!requireNamespace("ggplot2", quietly = TRUE)) install.packages("ggplot2")  
library(ggplot2)  
ggplot(mtcars, aes(x = hp, y = mpg, color = factor(cyl))) +  
  geom_point() +  
  geom_smooth(method = "lm", se = FALSE) +  
  labs(title = "MPG vs Horsepower by Cylinder",  
        x = "Horsepower",  
        y = "Miles per Gallon",  
        color = "cyl") +  
  theme_minimal()
```



Small base R plot

```
# simple base histogram of mpg
hist(mtcars$mpg,
     breaks = 8,
     main = "Base: Distribution of MPG",
     xlab = "MPG")
```



Reflection

R Markdown kept code and text together.
Knitting produced an HTML file with code output and plots.
I liked that I can edit code and re-knit to update results.
One tip. Run chunks interactively first to catch errors before knitting.

Session info

```
sessionInfo()

## R version 4.2.3 (2023-03-15)
## Platform: x86_64-apple-darwin17.0 (64-bit)
## Running under: macOS Big Sur ... 10.16
##
## Matrix products: default
## BLAS: /Library/Frameworks/R.framework/Versions/4.2/Resources/lib/libRblas.0.dylib
## LAPACK: /Library/Frameworks/R.framework/Versions/4.2/Resources/lib/libRlapack.dylib
##
## locale:
```

```
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] stats      graphics  grDevices  utils      datasets  methods   base
##
## other attached packages:
## [1] ggplot2_3.5.1
##
## loaded via a namespace (and not attached):
## [1] highr_0.10      pillar_1.9.0    compiler_4.2.3  tools_4.2.3
## [5] digest_0.6.33   evaluate_1.0.3  lifecycle_1.0.4  tibble_3.2.1
## [9] gtable_0.3.4    nlme_3.1-162    lattice_0.20-45  mgcv_1.8-42
## [13] pkgconfig_2.0.3  rlang_1.1.2     Matrix_1.5-3     cli_3.6.2
## [17] rstudioapi_0.16.0  yaml_2.3.8      xfun_0.49        fastmap_1.2.0
## [21] withr_3.0.2     dplyr_1.1.4     knitr_1.45       generics_0.1.3
## [25] vctrs_0.6.5     grid_4.2.3      tidyselect_1.2.0 glue_1.6.2
## [29] R6_2.5.1        fansi_1.0.6     rmarkdown_2.28   farver_2.1.1
## [33] magrittr_2.0.3   scales_1.3.0    htmltools_0.5.8.1  splines_4.2.3
## [37] colorspace_2.1-0  labeling_0.4.3  utf8_1.2.4       munsell_0.5.1
```