# Intro to R and Tidyverse Cheatsheet

**The tables below consist of valuable functions and commands that will help you through this module.**

**Each table represents a different library/tool and the corresponding commands.**

> Please note that these tables are not intended to tell you all the information you need to know about each command.
>
> The hyperlinks found in each piece of code will take you to the documentation for further information on the usage of each command.

# Base `R`

Read the Base `R` documentation [here](#).

| Library/Package | Piece of code | What it's called | What it does |
|---|---|---|---|
| Base `R` | `library()` | Library | Loads and attaches additional packages to the R environment. |
| Base `R` | `<-` | Assignment operator | Assigns a name to something in the R environment. |
| Base `R` | `c()` | Combine | Combines values into a vector or list. |
| Base `R` | `%in%` | "in" logical operator | Checks if the given value(s) on the left side of the operator are in the vector or other R object defined on the right side of the operator. It returns a logical `TRUE` or `FALSE` statement. |
| Base `R` | `rm(x)` | Remove | Removes object(s) `x` from your environment. |
| Base `R` | `==, <=, >=, !=` | Relational Operators | These are binary operators which allow for the comparison of values in an object. |
| Base `R` | `str(x)` | Object Structure | Gets a summary of the object `x` structure. |
| Base `R` | `class(x)` | Object Class | Returns the type of the values in object `x`. |
| Base `R` | `nrow(x)` ; `ncol(x)` | Number of Rows; Number of Columns | Get the number of rows and the number of columns in an object `x`, respectively. |
| Base `R` | `length(x)` | Number of Rows | Returns how long the object `x` is. |
| Base `R` | `min(x)` | Minimum | Returns the minimum value of all values in an object `x`. |
| Base `R` | `sum(x)` | Sum | Returns the sum of all values (values must be integer, numeric, or logical) in object `x`. |
| Base `R` | `mean(x)` | Mean | Returns the arithmetic mean of all values (values must be integer or numeric) in object `x` or logical vector `x`. |
| Base `R` | `log(x)` | Logarithm | Gives the natural logarithm of object `x`. `log2(x)` can be used to give the logarithm of the object in base 2. Or the base can be specified as an argument. |
| Base `R` | `head()` | Head | Returns the top 6 rows of an object in the environment by default. You can specify how many rows you want by including the `n =` argument. |

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|---|---|---|---|
| Base `R` | `tail()` | Tail | Returns the bottom 6 rows of an object in the environment by default. You can specify how many rows you want by including the `n =` argument. |
| Base `R` | `factor(x)` or `as.factor(x)` | Factor | Coerces object x into a factor (which is used to represent categorical data). This function can be used to coerce object `x` into other data types, i.e., `as.character`, `as.numeric`, `as.data.frame`, `as.matrix`, etc. |
| Base `R` | `levels(x)` | Levels attributes | Returns or sets the value of the levels in an object `x`. |
| Base `R` | `summary(x)` | Object summary | Returns a summary of the values in object `x`. |
| Base `R` | `data.frame()` | Data Frame | Creates a data frame where the named arguments will be the same length. |
| Base `R` | `sessionInfo()` | Session Information | Returns the R version information, the OS, and the attached packages in the current R session. |
| Base `R` | `file.path()` | File path | Constructs the path to a desired file. |
| Base `R` | `dir()` | Directory | Lists the names of the files and/or directories in the named directory. |
| Base `R` | `getwd()` | Get working directory | Finds the current working directory. |
| Base `R` | `setwd()` | Set working directory | Changes the current working directory. |
| Base `R` | `dir.exists()` | Directory exists | Checks the file path to see if the directory exists there. |
| Base `R` | `dir.create()` | Create directory | Creates a directory at the specified file path. |
| Base `R` | `apply()` | Apply | Returns a vector or list of values after applying a specified function to values in each row/column of an object. |
| Base `R` | `round()` | Round | Rounds the values of an object to the specified number of decimal places (default is 0). |
| Base `R` | `names()` | Names | Gets or sets the names of an object. |
| Base `R` | `colnames()` | Column names | Gets or sets the column names of a matrix or data frame. |
| Base `R` | `all.equal()` | All equal | Checks if two R objects are nearly equal. |
| Base `R` | `all()` | All | Checks if all of the values are `TRUE` in a logical vector. |

| Base R | t() | Transpose | Returns the transpose of a matrix or data frame. If given a data frame, returns a matrix. |

## `tidyverse`

Read the `tidyverse` package documentation **here**.

## `dplyr`

Read the `dplyr` package documentation **here**.
A vignette on the usage of the `dplyr` package can be found **here**.

| Library/Package | Piece of code | What it's called | What it does |
|---|---|---|---|
| `dplyr` | `%>%` | Pipe operator | Funnels a data.frame through tidyverse operations |
| `dplyr` | `filter()` | Filter | Returns a subset of rows matching the conditions of the specified logical argument |
| `dplyr` | `arrange()` | Arrange | Reorders rows in ascending order. `arrange(desc())` would reorder rows in descending order. |
| `dplyr` | `select()` | Select | Selects columns that match the specified argument |
| `dplyr` | `mutate()` | Mutate | Adds a new column that is a function of existing columns |
| `dplyr` | `summarise()` | Summarise | Summarises multiple values in an object into a single value. This function can be used with other functions to retrieve a single output value for the grouped values. `summarize` and `summarise` are synonyms in this package. However, note that this function does not work in the same manner as the base R `summary` function. |
| `dplyr` | `rename()` | Rename | Renames designated columns while keeping all variables of the data.frame |
| `dplyr` | `group_by()` | Group By | Groups data into rows that contain the same specified value(s) |
| `dplyr` | `inner_join()` | Inner Join | Joins data from two data frames, retaining only the rows that are in both datasets. |

## `ggplot2`

Read the `ggplot2` package documentation **here**.
A vignette on the usage of the `ggplot2` package can be found **here**.

| Library/Package | Piece of code | What it's called | What it does |
|---|---|---|---|
| `ggplot2` | `ggplot()` | GG Plot | Begins a plot that is finished by adding layers. |
| `ggplot2` | `aes()` | Aesthetic Mappings | Designates how variables in the data object are mapped to the visual properties of the ggplot. |
| `ggplot2` | `geom_boxplot()` | Boxplot | Creates a boxplot when added as a layer to a `ggplot()` object. |
| `ggplot2` | `geom_density()` | Density Plot | Creates a smoothed plot when added as a layer to a `ggplot()` object based on the computed density estimate. |
| `ggplot2` | `geom_point()` | Scatterplot | Creates a scatterplot when added as a layer to a `ggplot()` object. |
| `ggplot2` | `geom_line()` | Line plot | Creates a line plot when added as a layer to a `ggplot()` object by connecting the points in order of the x axis variable. |
| `ggplot2` | `geom_hline()` | Horizontal line | Annotates a plot with horizontal lines when added as a layer to a `ggplot()` object with one of the `geom` functions used to draw the plot, for example, `geom_point()`. |
| `ggplot2` | `theme_classic()` | Classic Theme | Displays `ggplot` without gridlines. The ggtheme documentation has descriptions on additional themes that can be used. |
| `ggplot2` | `xlab()`; `ylab()`; `ggtitle()` | X Axis Labels; Y Axis Labels; GG Title | Modifies the labels on the x axis and on the y axis, and sets the title of a `ggplot`, respectively. |
| `ggplot2` | `facet_wrap()` | Facet Wrap | Plots individual graphs using specified variables to subset the data. |
| `ggplot2` | `ggsave()` | GG Save | Saves the last plot in working directory. |
| `ggplot2` | `last_plot()` | Last plot | Returns the last plot produced. |

## `readr`, `tibble` and `tidyr`

Read the `readr` package documentation **here** and the package vignette **here**.
Read the `tibble` package documentation **here** and the package vignette **here**. Read the `tidyr` package documentation **here** and

the package vignette **here**.

| Library/Package | Piece of code | What it's called | What it does |
|---|---|---|---|
| `readr` | `read_tsv()` | Read TSV | Reads in a TSV file from a specified file path. This function can be tailored to read in other common types of files. i.e. read*csv(), read*rds(), etc. |
| `tibble` | `column_to_rownames()` | Column to Rownames | Transforms an existing column called by a string into the rownames. |
| `tibble` | `rownames_to_column()` | Rownames to Column | Transforms the rownames of a data frame into a column (which is added to the start of the data frame). The string supplied as an argument will be the name of the new column. |
| `tidyr` | `pivot_longer()` | Pivot Longer | Lengthens a data frame by increasing the number of rows and decreasing the number of columns. |