How can I create a log-log plot in R?

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April 28, 2024

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RECOMMENDED CITATION

stats writer (2024). *How can I create a log-log plot in R?*. PSYCHOLOGICAL SCALES. Retrieved from https://scales.arabpsychology.com/?p=140648

Creating a log-log plot in R involves using the "plot" function and specifying the logarithmic scale for both the x and y axes. This can be done by using the "log" argument and setting it to "x" and "y". Additionally, the data being plotted should also be transformed into logarithmic values using the "log10" function. This will result in a plot with evenly spaced tick marks on both axes, representing equal increments in log values. Overall, creating a log-log plot in R involves setting the appropriate scale and transforming the data to accurately represent the relationships between variables on a logarithmic scale.

Create a Log-Log Plot in R

A log-log plot is a plot that uses logarithmic scales on both the x-axis and the y-axis.

This type of plot is useful for visualizing two variables when the true relationship between them follows some type of power law.

This tutorial explains how to create a log-log plot in R using both base R and the data visualization package .

Method 1: Create a Log-Log Plot in Base R

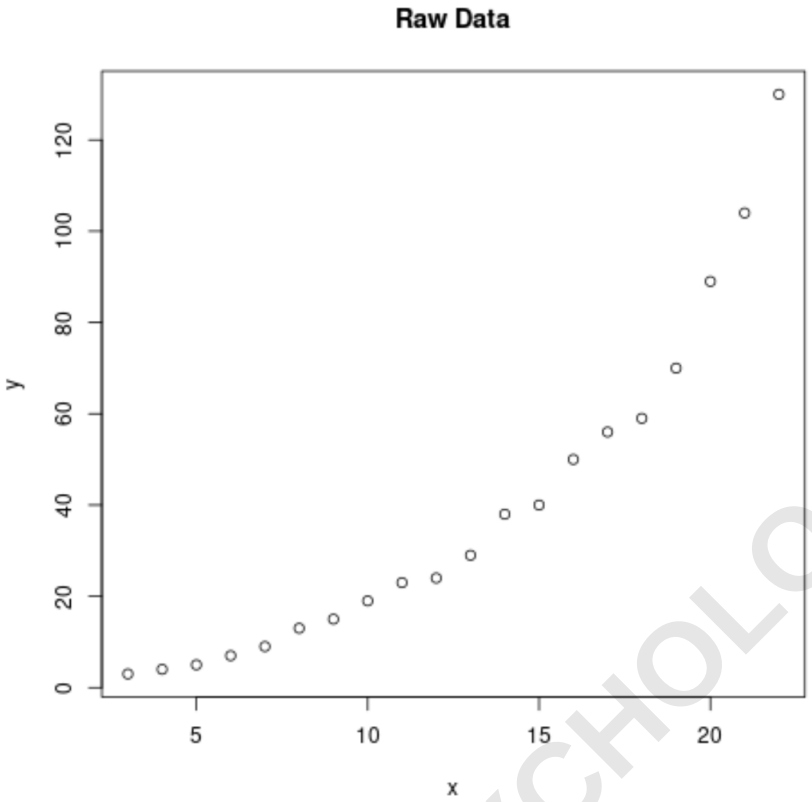
Suppose we have the following dataset in R:

```
#create data
df <- data.frame(x=3:22,
y=c(3, 4, 5, 7, 9, 13, 15, 19, 23, 24, 29,
38, 40, 50, 56, 59, 70, 89, 104, 130))

#create scatterplot of x vs. y
```

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```
plot(df$x, df$y, main='Raw Data')
```

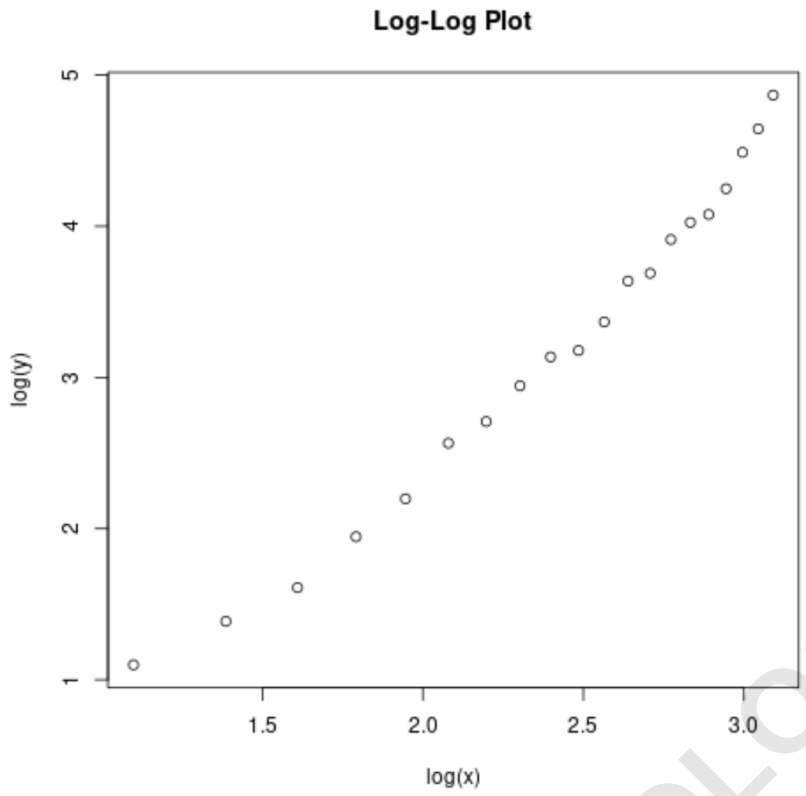


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Clearly the relationship between variables *x* and *y* follows a power law.

The following code shows how to create a log-log plot for these two variables in base R:

```
#create log-log plot of x vs. y
plot(log(df$x), log(df$y), main='Log-Log Plot')
```



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Notice how the relationship between log(x) and log(y) is much more linear compared to the previous plot.

Method 2: Create a Log-Log Plot in ggplot2

The following code shows how to create a log-log plot for the exact same dataset using ggplot2:

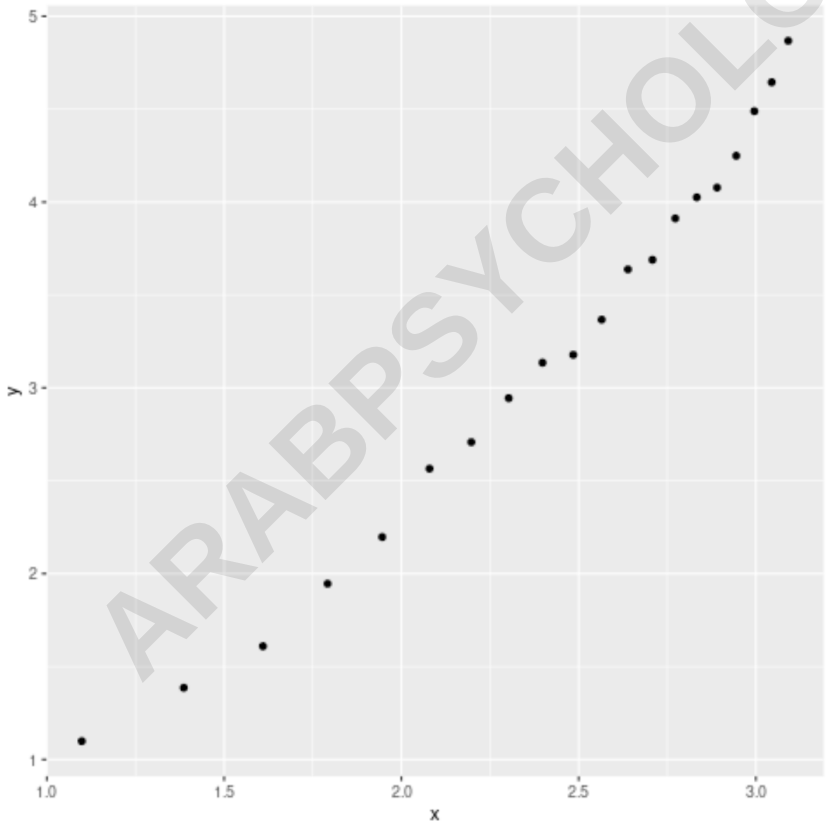
```
library(ggplot2)

#create data
df <- data.frame(x=3:22,
y=c(3, 4, 5, 7, 9, 13, 15, 19, 23, 24, 29,
```

```
38, 40, 50, 56, 59, 70, 89, 104, 130))

#define new data frame
df_log <- data.frame(x=log(df$x),
y=log(df$y))

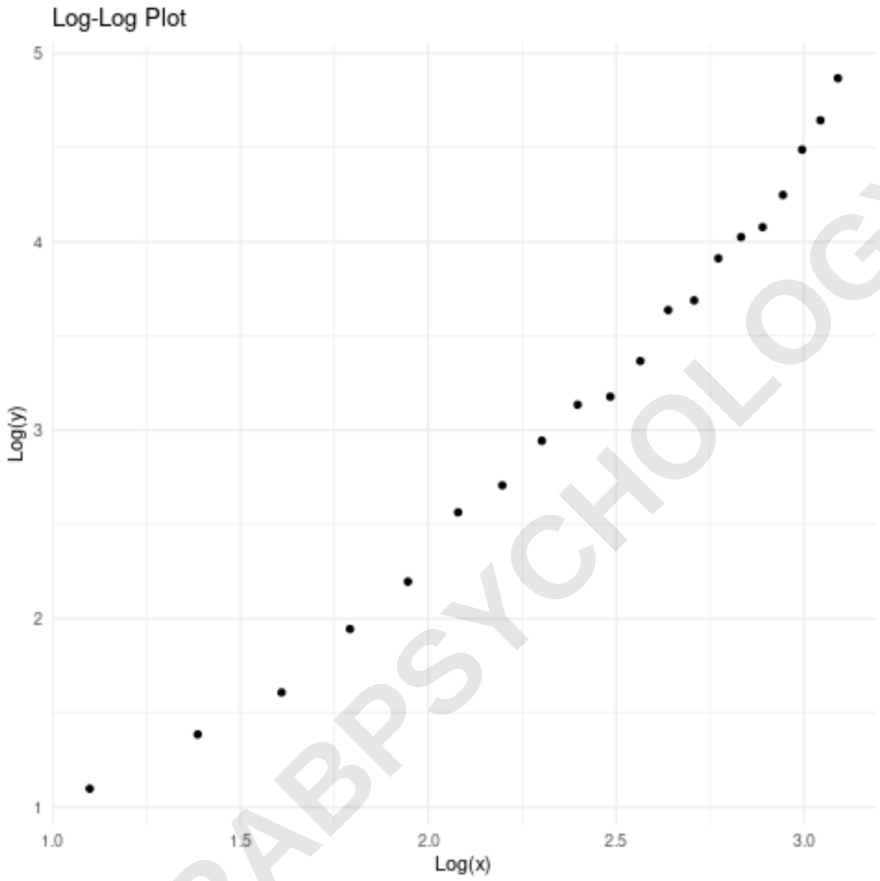
#create scatterplot using ggplot2
ggplot(df_log, aes(x=x, y=y)) +
geom_point()
```



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Feel free to customize the title, axis labels, and theme to make the plot more aesthetically pleasing:

```
ggplot(df_log, aes(x=x, y=y)) +
geom_point() +
labs(title='Log-Log Plot', x='Log(x)', y='Log(y)') +
theme_minimal()
```



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