How do I create a log scale in ggplot2?

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Creating a log scale in ggplot2 is a simple process that allows for displaying data with a large range of values in a more visually accurate way. To create a log scale, one must specify the "scale_y_log10" or "scale_x_log10" function within the ggplot2 code. This will transform the data into a logarithmic scale, making it easier to interpret and compare data points with a large magnitude difference. By using a log scale, the data will be evenly spaced on the axis, making it easier to identify patterns and trends. Overall, the ability to create a log scale in ggplot2 adds a valuable tool for accurately visualizing and analyzing data.

Create a Log Scale in ggplot2

Often you may want to convert the x-axis or y-axis scale of a ggplot2 plot into a log scale.

You can use one of the following two methods to do so using only ggplot2:

1. Use scale_y_continuous() or scale_x_continuous()

```
ggplot(df, aes(x=x, y=y)) +
geom_point() +
scale_y_continuous(trans='log10') +
scale_x_continuous(trans='log10')
```

2. Use coord_trans()

```
ggplot(df, aes(x=x, y=y)) +
geom_point() +
coord_trans(y ='log10', x='log10')
```

If you'd like to format the axis labels to show exponents, you can use functions from the **scales** package:

```
ggplot(df, aes(x=x, y=y)) +
geom_point() +
scale_y_continuous(trans='log10',
breaks=trans_breaks('log10', function(x) 10^x),
labels=trans_format('log10', math_format(10^.x)))
```

This tutorial shows examples of how to use these functions in practice.

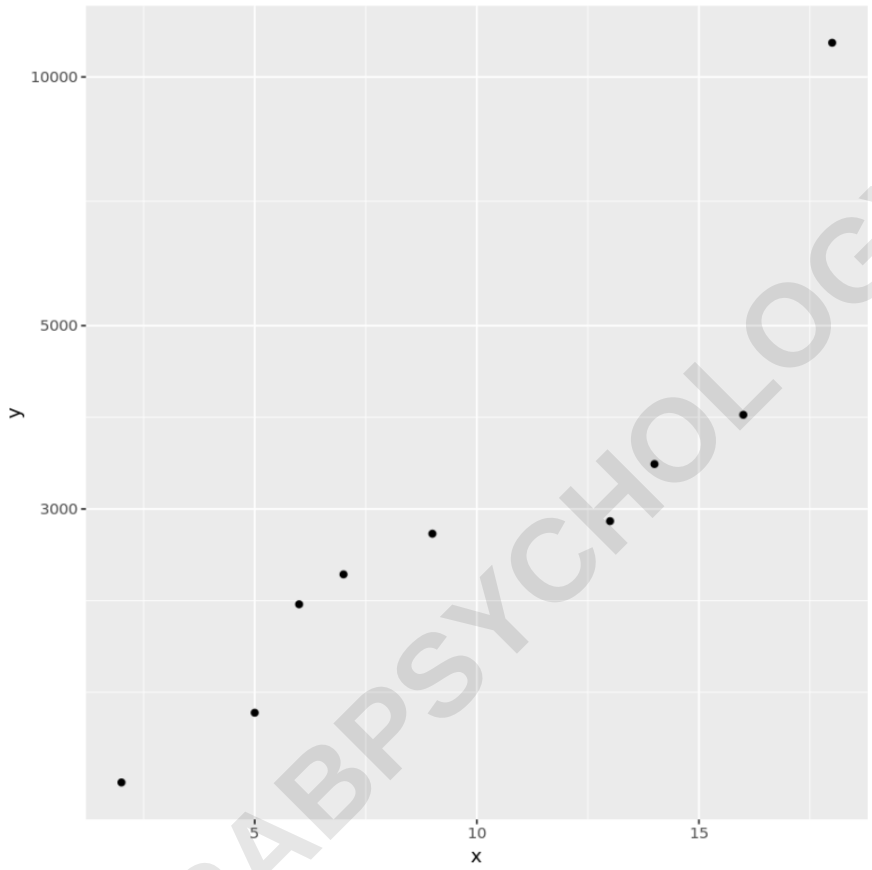
Example 1: Log Scale Using scale_y_continuous()

The following code shows how to use the scale_y_continuous() function to create a log scale for the y-axis of a scatterplot:

```
library(ggplot2)

#create data frame
df <- data.frame(x=c(2, 5, 6, 7, 9, 13, 14, 16, 18),
y=c(1400, 1700, 2300, 2500, 2800, 2900, 3400, 3900, 11000))
```

```
#create scatterplot with log scale on y-axis
ggplot(df, aes(x=x, y=y)) +
geom_point() +
scale_y_continuous(trans='log10')
```



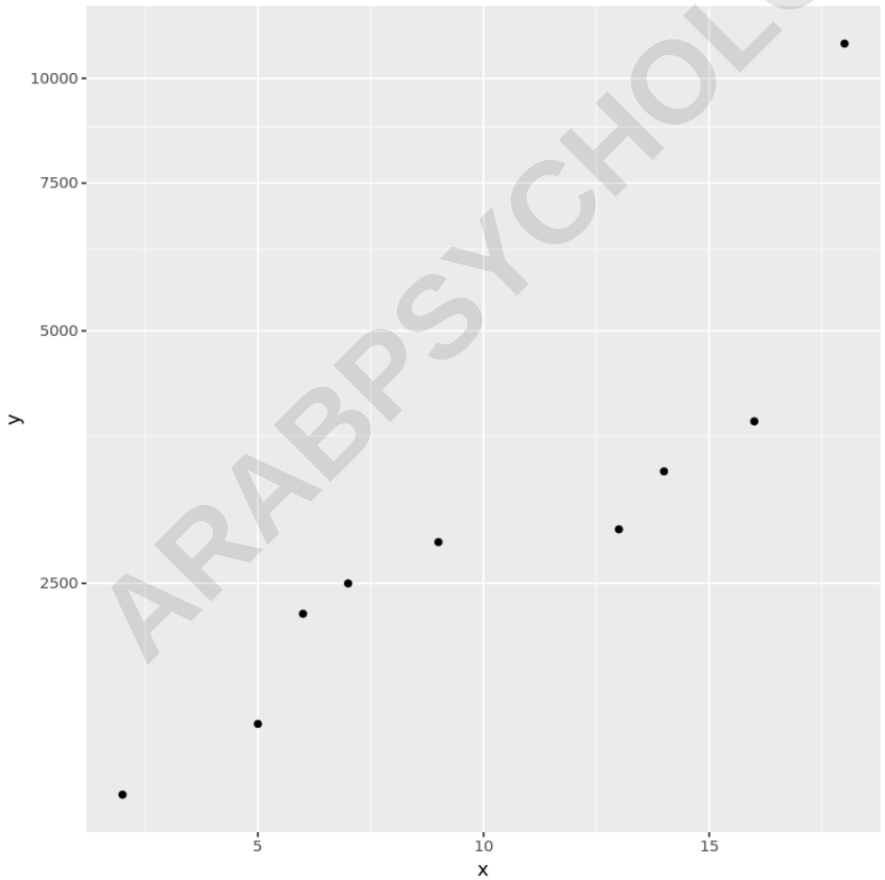
Example 2: Log Scale Using coord_trans()

The following code shows how to use the coord_trans() function to create a log scale for the y-axis of a scatterplot:

```
library(ggplot2)
```

```
#create data frame
df <- data.frame(x=c(2, 5, 6, 7, 9, 13, 14, 16, 18),
y=c(1400, 1700, 2300, 2500, 2800, 2900, 3400, 3900,
11000))

#create scatterplot with log scale on y-axis
ggplot(df, aes(x=x, y=y)) +
geom_point() +
coord_trans(y='log10')
```



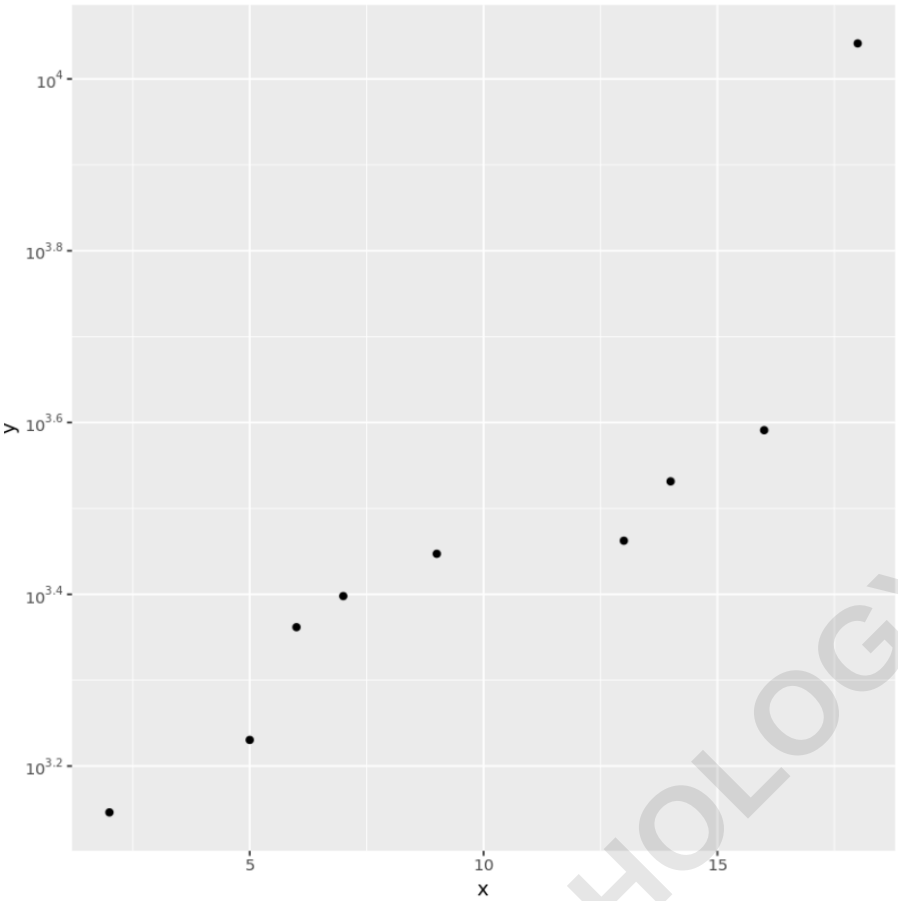
Example 3: Custom Log Scale Labels

The following code shows how to use functions from the scales package function to create a log scale for the y-axis of a scatterplot and add custom labels with exponents:

```
library(ggplot2)
library(scales)

#create data frame
df <- data.frame(x=c(2, 5, 6, 7, 9, 13, 14, 16, 18),
y=c(1400, 1700, 2300, 2500, 2800, 2900, 3400, 3900, 11000))

#create scatterplot with log scale on y-axis and custom labels
ggplot(df, aes(x=x, y=y)) +
geom_point() +
scale_y_continuous(trans='log10',
breaks=trans_breaks('log10', function(x) 10^x),
labels=trans_format('log10', math_format(10^.x)))
```



Notice that the y-axis labels have exponents, unlike the previous two plots.

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