How can circles be drawn in plots?

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Circles can be drawn in plots by using the appropriate mathematical equation or function, such as the Pythagorean Theorem, to generate the coordinates of points along the circumference of the circle. These coordinates can then be plotted on a graph to create the circle. Alternatively, most plotting software also has built-in functions for drawing circles, allowing users to simply specify the center and radius of the circle to be plotted. Circles are often used in plots to represent data points, to highlight specific areas or to create visual aids for understanding mathematical concepts. By utilizing mathematical equations or built-in functions, circles can easily be incorporated into plots for a variety of purposes.

R: Draw Circles in Plots (With Examples)

You can use the following methods to draw a circle in a plot in R:

Method 1: Draw Circle Using Base R

library(plotrix)

#create scatter plot
plot(x, y)

#add circle at specific (x, y) coordinates with specific radius
draw.circle(x=3, y=8, radius=.5)

Method 2: Draw Circle Using ggplot2

library(ggplot2)

```
library(ggforce)

#create scatter plot with circle at specific location with specific radius
ggplot(data = df, aes(x, y)) +
geom_point() +
geom_circle(aes(x0=3, y0=8, r=1), inherit.aes=FALSE) +
coord_fixed()
```

The following examples shows how to use each method in practice.

Example 1: Draw Circle Using Base R

To draw a circle on a plot in base R, you need to first install and load the plotrix package:

```
install.packages('plotrix')
library(plotrix)
```

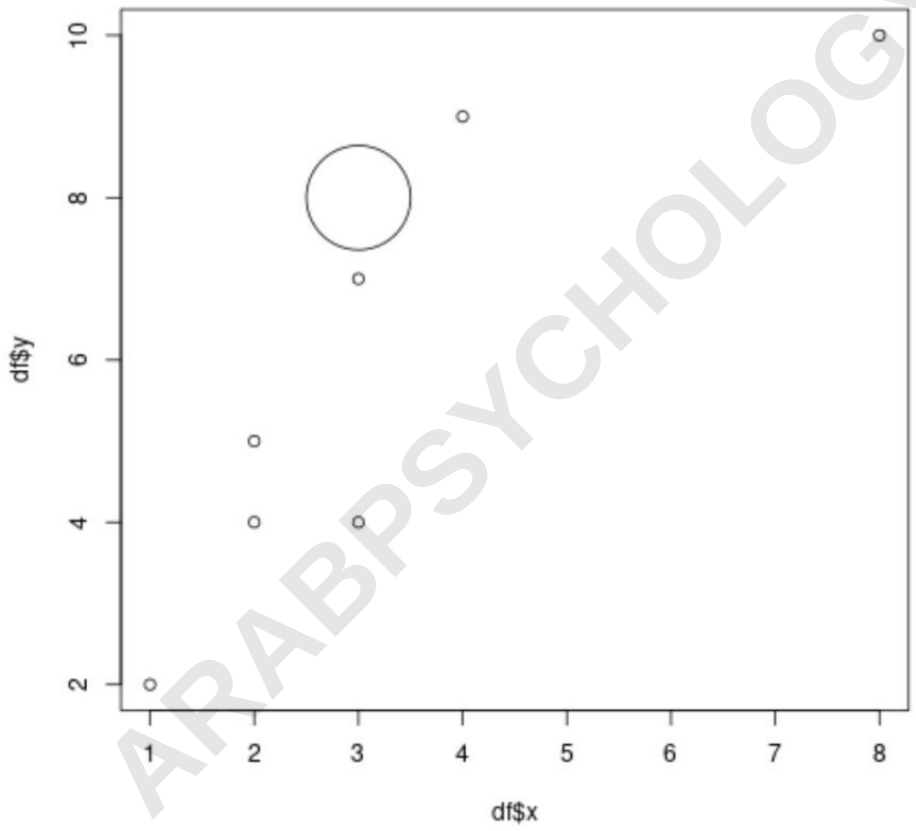
Next, we can use the draw.circle() function from the plotrix package to add a circle to a scatter plot in base R:

```
#create data frame
df <- data.frame(x=c(1, 2, 2, 3, 3, 4, 8),
```

```
y=c(2, 4, 5, 4, 7, 9, 10))

#create scatter plot
plot(df$x, df$y)

#add circle
draw.circle(x=3, y=8, radius=.5)
```



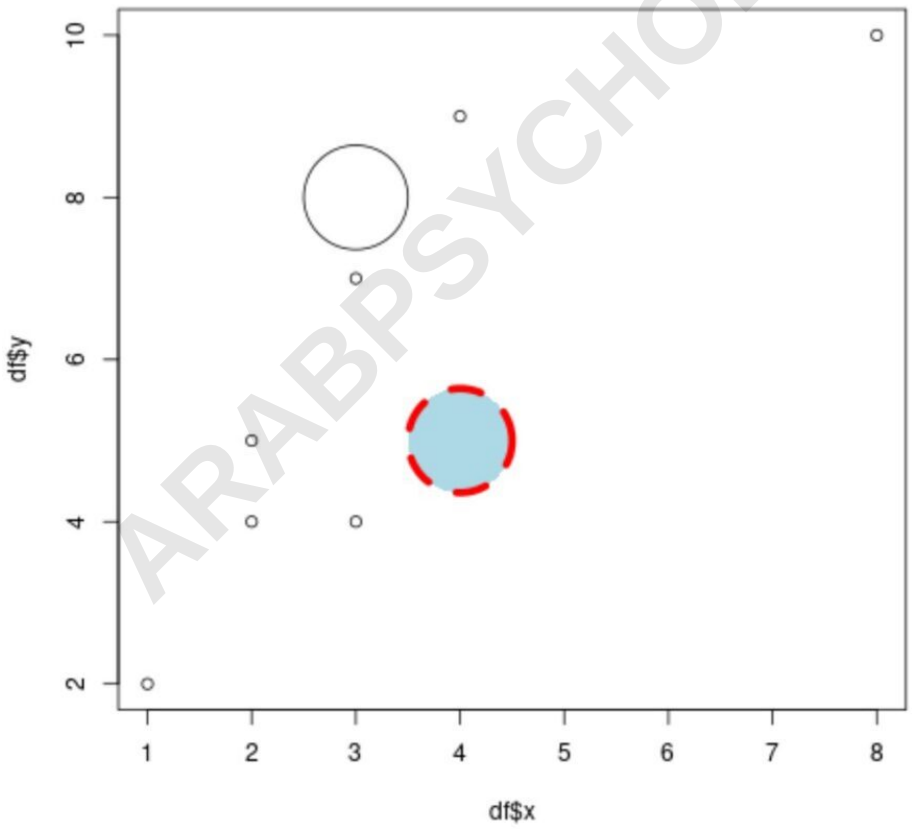
You can also use the draw.circle() function multiple times to plot multiple circles on the same plot:

```
#create data frame
```

```
df <- data.frame(x=c(1, 2, 2, 3, 3, 4, 8),
y=c(2, 4, 5, 4, 7, 9, 10))

#create scatter plot
plot(df$x, df$y)

#add multiple circles to plot
draw.circle(x=3, y=8, radius=.5)
draw.circle(x=4, y=5, radius=.5, border='red',
col='lightblue', lwd=5, lty='dashed')
```



Notice that multiple circles have been added to the plot

at the (x, y) coordinates that we specified.

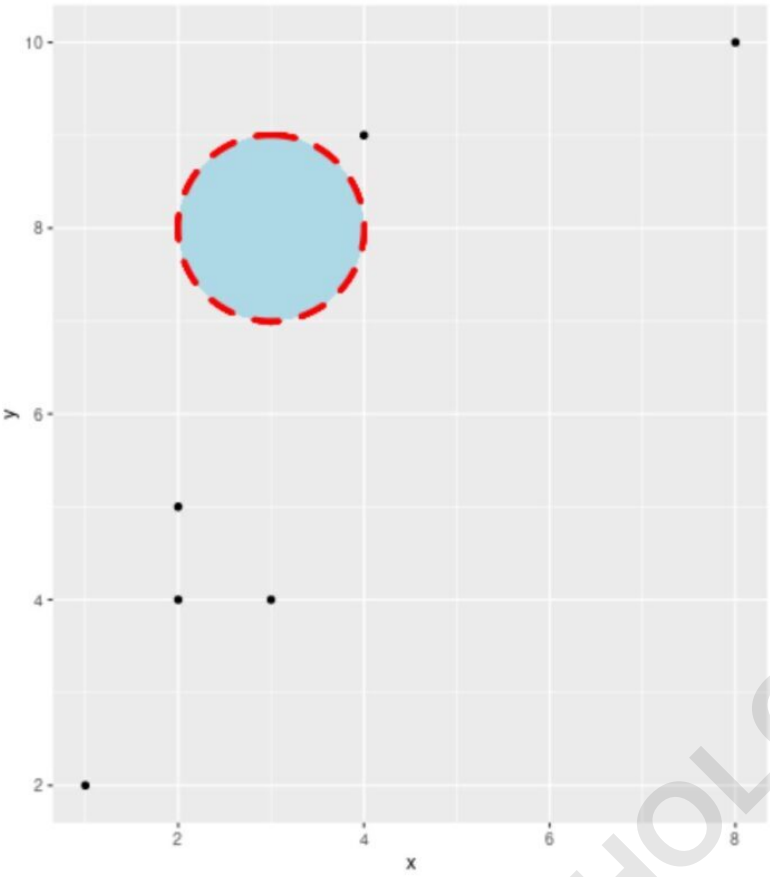
Example 2: Draw Circle Using ggplot2

```
install.packages('ggplot2')
install.packages('ggforce')
library(ggplot2)
library(ggforce)
```

Next, we can use the geom_circle() function from the ggforce package to add a circle to a scatter plot in ggplot2:

```
#create data frame
df <- data.frame(x=c(1, 2, 2, 3, 3, 4, 8),
y=c(2, 4, 5, 4, 7, 9, 10))

#create scatter plot with circle
ggplot(data = df, aes(x, y)) +
geom_point() +
geom_circle(aes(x0=3,  y0=8,  r=1),  linetype='dashed',
color='red',
fill='lightblue', lwd=1.5, inherit.aes=FALSE) +
coord_fixed()
```



The circle is placed in the exact (x, y) coordinates that we specified.

Note: If you don't use the coord_fixed() argument, the circle may appear as an ellipse instead.

Additional Resources

The following tutorials explain how to perform other common tasks in R: