

# How can we calculate the Euclidean distance in R, and could you provide some examples?

Authored by  
**stats writer**

April 21, 2024

## RECOMMENDED CITATION

stats writer (2024). *How can we calculate the Euclidean distance in R, and could you provide some examples?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=137568>

Calculating the Euclidean distance in R involves using the "dist()" function, which calculates the distance between two or more points in a multidimensional space. It takes the coordinates of the points as inputs and computes the straight-line distance between them. For example, if we have two points A(1,2) and B(3,4), the Euclidean distance between them would be  $\sqrt{(3-1)^2 + (4-2)^2} = \sqrt{8} = 2.83$ . This function can also be used to calculate the distance between multiple points simultaneously.

## Calculate Euclidean Distance in R (With Examples)

The Euclidean distance between two vectors, A and B, is calculated as:

$$\text{Euclidean distance} = \sqrt{\sum(A_i - B_i)^2}$$

To calculate the Euclidean distance between two vectors in R, we can define the following function:

```
euclidean <- function(a, b) sqrt(sum((a - b)^2))
```

We can then use this function to find the Euclidean distance between any two vectors:

```
#define two vectors
```

```
a <- c(2, 6, 7, 7, 5, 13, 14, 17, 11, 8)
```

```
b <- c(3, 5, 5, 3, 7, 12, 13, 19, 22, 7)
```

```
#calculate Euclidean distance between vectors
```

```
euclidean(a, b)
```

## 12.40967

The Euclidean distance between the two vectors turns out to be 12.40967.

Note that we can also use this function to calculate the Euclidean distance between two columns of a data frame:

```
#define data frame
```

```
df <- data.frame(a=c(3, 4, 4, 6, 7, 14, 15),  
b=c(4, 8, 8, 9, 14, 13, 7),  
c=c(7, 7, 8, 5, 15, 11, 8),  
d=c(9, 6, 6, 7, 6, 15, 19))
```

```
#calculate Euclidean distance between columns a and d  
euclidean(df$a, df$d)
```

7.937254

Note that this function will produce a warning message if the two vectors are not of equal length:

```
#define two vectors of unequal length
```

```
a <- c(2, 6, 7, 7, 5, 13, 14)
```

```
b <- c(3, 5, 5, 3, 7, 12, 13, 19, 22, 7)
```

```
#attempt to calculate Euclidean distance between  
vectors
```

```
euclidean(a, b)
```

```
23.93742
```

```
Warning message:
```

```
In a - b : longer object length is not a multiple of shorter  
object length
```

*You can refer to [this Wikipedia page](#) to learn more details about Euclidean distance.*