

# **Descriptive Statistics With R Software**

**Calculations with R Software**

**:::**

**Calculations with Data Vectors**

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# R as a calculator

**How R behaves with data vectors?**

**What happens when a scalar is added/subtracted/multiplied/divided in a data vector?**

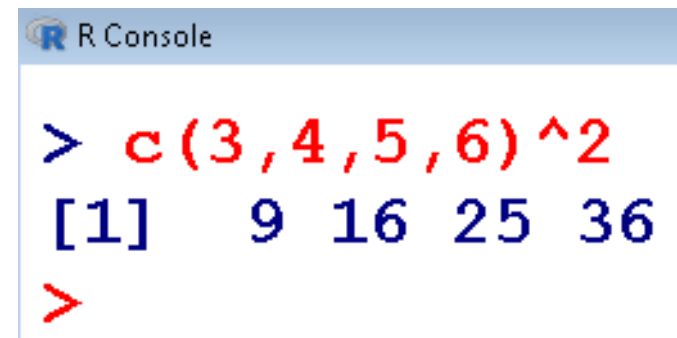
**What happens when a data vector is added/subtracted/multiplied/divided in a data vector?**

# R as a calculator

## Power operators with vector versus scalar

```
> c(3,4,5,6)^2      # command: application to a  
                      vector  
[1] 9 16 25 36       # output
```

$3^2, 4^2, 5^2, 6^2$



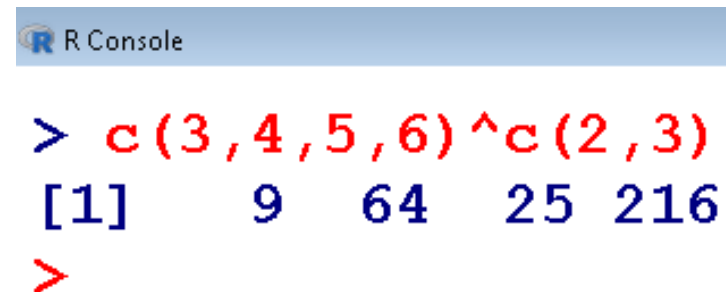
```
R Console  
> c(3,4,5,6)^2  
[1] 9 16 25 36  
>
```

# R as a calculator

## Power operators with vector versus vector

```
> c(3,4,5,6)^c(2,3) # !!ATTENTION! Observe the
                        operation
[1]  9 64 25 216      # output
```

$3^2, 4^3, 5^2, 6^3$

A screenshot of an R console window. The title bar is light blue and contains the R logo and the text "R Console". The console shows a command and its output in a monospaced font. The command is in red, and the output is in blue.

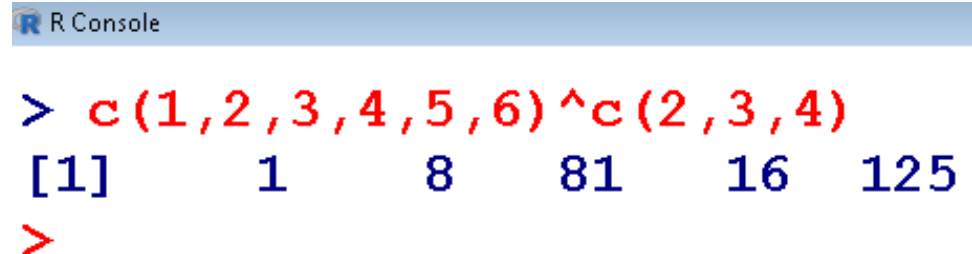
```
> c(3,4,5,6)^c(2,3)
[1]  9 64 25 216
>
```

# R as a calculator

## Power operators with vector versus vector

```
> c(1,2,3,4,5,6)^c(2,3,4) # command: application  
                                to a vector with vector  
[1]  1  8 81 16 125 1296 # output
```

$1^2, 2^3, 3^4, 4^2, 5^3, 6^4$

A screenshot of an R console window. The title bar says "R Console". The prompt is ">". The command entered is "c(1,2,3,4,5,6)^c(2,3,4)" in red text. The output is "[1] 1 8 81 16 125" in blue text. The prompt ">" is shown again in red text at the bottom.

```
> c(1,2,3,4,5,6)^c(2,3,4)  
[1] 1 8 81 16 125  
>
```

# R as a calculator

## Power operators with vector versus vector

```
> c(2,3,4,5)^c(3,4,5)      #error message  
[1] 8 81 1024 125           # output
```

Warning message:

In c(2,3,4,5)^c(3,4,5) :longer object length is  
not a multiple of shorter object length

$2^3, 3^4, 4^5, 5^3$

# R as a calculator

## Power operators with vector versus vector

```
R Console  
> c(2,3,4,5)^c(3,4,5)  
[1]      8    81 1024   125  
Warning message:  
In c(2, 3, 4, 5)^c(3, 4, 5) :  
  longer object length is not a multiple of shorter object length  
> |
```

# R as a calculator

## Multiplication with vector versus scalar

```
> c(2,3,4,5) * 6  
[1] 12 18 24 30
```

$2 \times 6, 3 \times 6, 4 \times 6, 5 \times 6$

R Console

```
> c(2,3,4,5) * 6  
[1] 12 18 24 30  
>
```



# R as a calculator

## Multiplication with vector versus vector

```
> c(2,3,4,5) * c(-2,-3,-4,6)
[1] -4  -9 -16  30
```

$$2 \times (-2), \quad 3 \times (-3), \quad 4 \times (-4), \quad 5 \times 6$$

R Console

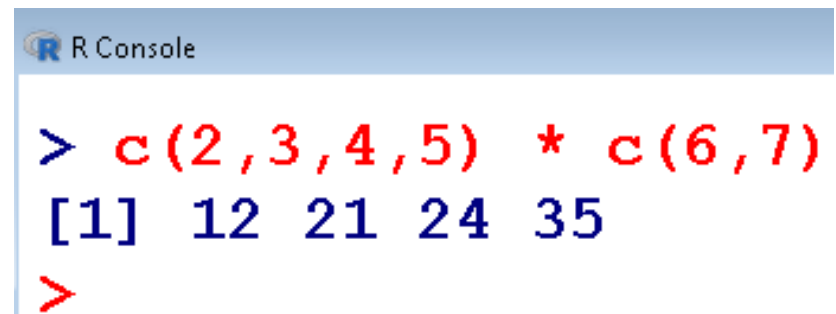
```
> c(2,3,4,5) * c(-2,-3,-4,6)
[1]  -4  -9 -16  30
> |
```

# R as a calculator

## Multiplication with vector versus vector

```
> c(2,3,4,5) * c(6,7)
[1] 12 21 24 35
```

$2 \times 6, 3 \times 7, 4 \times 6, 5 \times 7$

A screenshot of the R Console window. The title bar is light blue and contains the R logo and the text "R Console". The console area has a white background and displays the same R code and output as the previous block: a prompt character followed by the command c(2,3,4,5) \* c(6,7) in red, the output [1] 12 21 24 35 in blue, and a new red prompt character on the next line.

```
> c(2,3,4,5) * c(6,7)
[1] 12 21 24 35
>
```

# R as a calculator

## Multiplication with vector versus vector

```
> c(2,3,4,5) * c(6,7,8) # error message
```

```
[1] 12 21 32 30
```

Warning message:

```
In c(2,3,4,5) * c(6,7,8) :longer object length  
is not a multiple of shorter object length
```

$2 \times 6, \quad 3 \times 7, \quad 4 \times 8, \quad 5 \times 6$
--

# R as a calculator

## Multiplication with vector versus vector

R Console

```
> c(2,3,4,5) * c(6,7,8)
```

```
[1] 12 21 32 30
```

```
Warning message:
```

```
In c(2, 3, 4, 5) * c(6, 7, 8) :
```

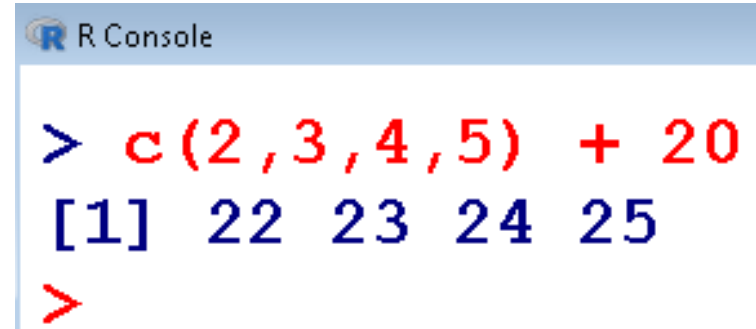
```
longer object length is not a multiple of shorter object length
```

# R as a calculator

## Addition with vector versus scalar

```
> c(2,3,4,5) + 20  
[1] 22 23 24 25
```

$2 + 20, 3 + 20, 4 + 20, 5 + 20$

A screenshot of the R Console window. The title bar is light blue and contains the R logo and the text "R Console". The console area has a white background and shows the same R code and output as the previous block: a red prompt character followed by the command `c(2,3,4,5) + 20` in red, the output `[1] 22 23 24 25` in blue, and a final red prompt character.

```
> c(2,3,4,5) + 20  
[1] 22 23 24 25  
>
```

# R as a calculator

## Addition with vector versus vector

```
> c(2,3,4,5) + c(6,7,8) # error message
```

```
[1] 8 10 12 11
```

Warning message:

```
In c(2, 3, 4, 5) + c(6, 7, 8) :
```

```
  longer object length is not a multiple of  
shorter object length
```

$2+6, 3+7, 4+8, 5+6$

# R as a calculator

## Addition with vector versus vector

R Console

```
> c(2,3,4,5) + c(6,7,8)
```

```
[1]  8 10 12 11
```

Warning message:

```
In c(2, 3, 4, 5) + c(6, 7, 8) :
```

```
longer object length is not a multiple of shorter object length
```