

# Calculations with data vectors

**How R behaves with data vectors?**

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

# R as a calculator

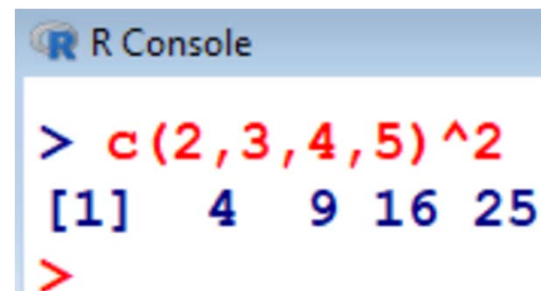
## Power operators with vector versus scalar

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

# command: application to a vector

# output

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

A screenshot of the R Console window. The title bar says "R Console". The console shows the command "> c(2,3,4,5)^2" in red text, followed by the output "[1] 4 9 16 25" in blue text. A red prompt ">" is visible at the bottom.

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

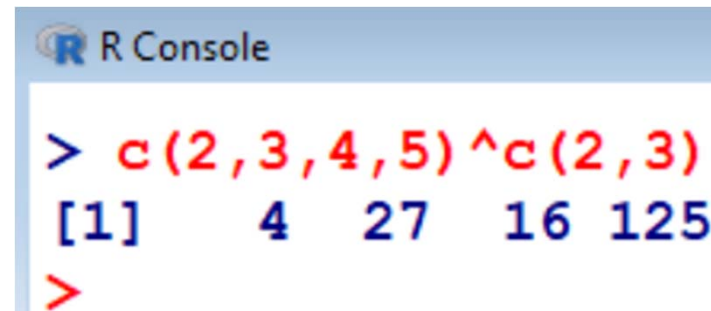
# R as a calculator

## Power operators with vector versus vector

```
> c(2,3,4,5)^c(2,3) # !!ATTENTION! Observe the operation
```

```
[1] 4 27 16 125 # output
```

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



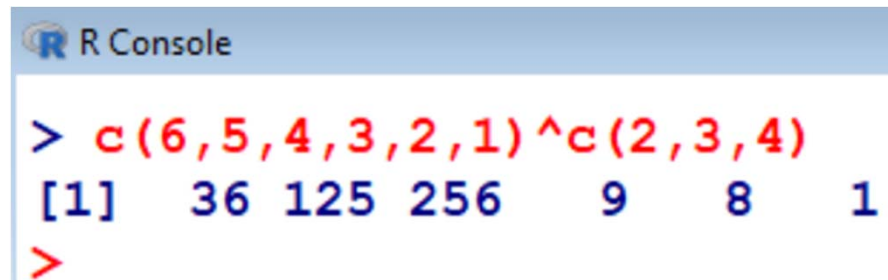
```
R Console  
> c(2,3,4,5)^c(2,3)  
[1] 4 27 16 125  
>
```

# R as a calculator

## Power operators with vector versus vector

```
> c(6,5,4,3,2,1)^c(2,3,4) # command: application  
                             to a vector with vector  
[1] 36 125 256 9 8 1 # output
```

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



```
R Console  
> c(6,5,4,3,2,1)^c(2,3,4)  
[1] 36 125 256 9 8 1  
>
```

# R as a calculator

## Power operators with vector versus vector

```
> c(6,5,4,3)^c(3,4,5)      # Warning message  
[1] 216  625 1024   27      # output
```

Warning message:

In c(6,5,4,3)^c(3,4,5) :longer object length is  
not a multiple of shorter object length

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

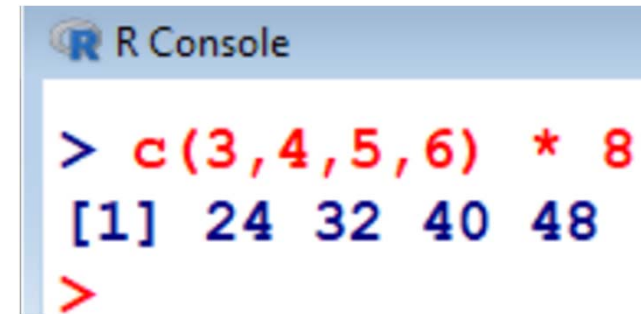
```
R Console  
> c(6,5,4,3)^c(3,4,5)  
[1] 216  625 1024   27  
Warning message:  
In c(6, 5, 4, 3)^c(3, 4, 5) :  
  longer object length is not a multiple of shorter object length  
> |
```

## R as a calculator

### Multiplication with vector versus scalar

```
> c(3,4,5,6) * 8  
[1] 24 32 40 48
```

3x8, 4x8, 5x8, 6x8

A screenshot of the R Console window. The title bar says "R Console". The console shows the command `> c(3,4,5,6) * 8` and the output `[1] 24 32 40 48`. The prompt `>` is shown at the bottom.

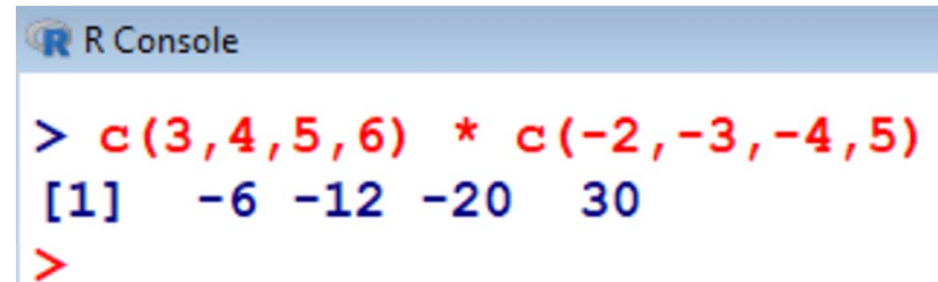
```
> c(3,4,5,6) * 8  
[1] 24 32 40 48  
>
```

## R as a calculator

### Multiplication with vector versus vector

```
> c(3,4,5,6) * c(-2,-3,-4,5)
[1] -6  -12 -20  30
```

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



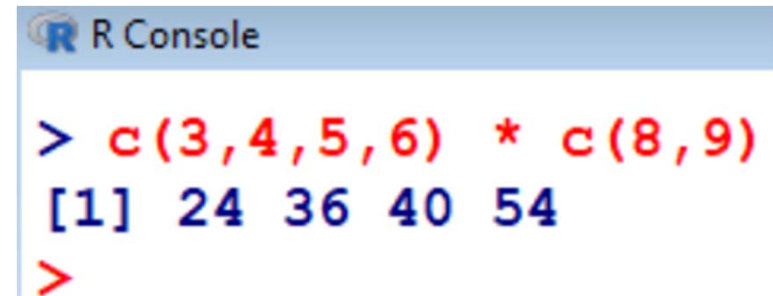
```
R Console
> c(3,4,5,6) * c(-2,-3,-4,5)
[1] -6 -12 -20 30
>
```

## R as a calculator

### Multiplication with vector versus vector

```
> c(3,4,5,6) * c(8,9)
[1] 24 36 40 54
```

3x8, 4x9, 5x8, 6x9

A screenshot of the R Console window. The title bar says "R Console". The prompt ">" is followed by the command "c(3,4,5,6) \* c(8,9)" in red text. The output "[1] 24 36 40 54" is shown in blue text. A red ">" prompt is visible on the next line.

```
> c(3,4,5,6) * c(8,9)
[1] 24 36 40 54
>
```



# R as a calculator

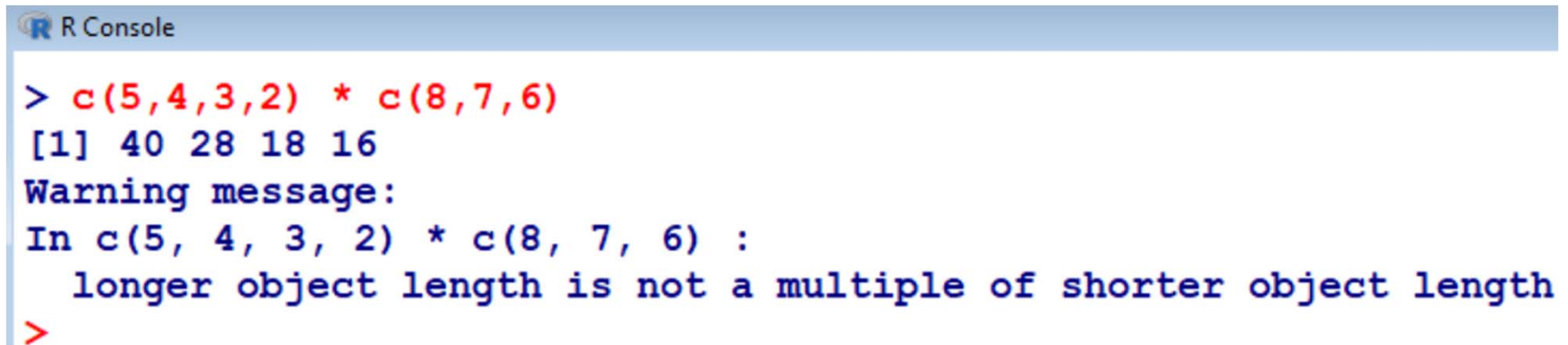
## Multiplication with vector versus vector

```
> c(5,4,3,2) * c(8,7,6) # Warning message  
[1] 40 28 18 16
```

Warning message:

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

5x8, 4x7, 3x6, 2x8



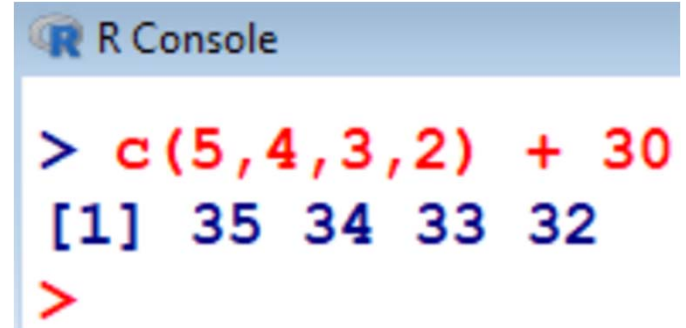
```
R Console  
> c(5,4,3,2) * c(8,7,6)  
[1] 40 28 18 16  
Warning message:  
In c(5, 4, 3, 2) * c(8, 7, 6) :  
  longer object length is not a multiple of shorter object length  
>
```

## R as a calculator

### Addition with vector versus scalar

```
> c(5,4,3,2) + 30  
[1] 35 34 33 32
```

5+30, 4+30, 3+30, 2+30



```
R Console  
> c(5,4,3,2) + 30  
[1] 35 34 33 32  
>
```

# R as a calculator

## Addition with vector versus vector

```
> c(3,4,5,6) + c(8,7,6) # Warning message  
[1] 11 11 11 14
```

Warning message:

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

longer object length is not a multiple of  
shorter object length

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

```
R Console  
> c(3,4,5,6) + c(8,7,6)  
[1] 11 11 11 14  
Warning message:  
In c(3, 4, 5, 6) + c(8, 7, 6) :  
longer object length is not a multiple of shorter object length  
> |
```