

# Vectorized

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# Vectorized Operations

Many operations in R are vectorized making code more efficient, concise, and easier to read.

```
1 x <- 1:4; y <- 6:9  
2 x + y
```

```
[1]  7  9 11 13
```

```
1 x > 2
```

```
[1] FALSE FALSE  TRUE  TRUE
```

```
1 x >= 2
```

```
[1] FALSE  TRUE  TRUE  TRUE
```

```
1 y == 8
```

```
[1] FALSE FALSE  TRUE FALSE
```

```
1 x * y
```

```
[1]  6 14 24 36
```

```
1 x / y
```

```
[1] 0.1666667 0.2857143 0.3750000 0.4444444
```

# Vectorized Matrix Operations

```
1 x <- matrix(1:4, 2, 2); y <- matrix(rep(10, 4), 2, 2)
2 x * y # element-wise multiplication
```

```
      [,1] [,2]
[1,]    10    30
[2,]    20    40
```

```
1 x / y
```

```
      [,1] [,2]
[1,]  0.1  0.3
[2,]  0.2  0.4
```

```
1 x %*% y # true matrix multiplication
```

```
      [,1] [,2]
[1,]    40    40
[2,]    60    60
```

