

Arithmetic in R

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Abstract

In this article we give some examples of basic arithmetic and plotting in R. Install packages:Sweave, ggplot2

1 Addition

Addition in R is done with the `+` sign¹. First, lets store some values into variables.

```
x<-4
y<-3

x+y

## [1] 7
```

2 Subtraction

For subtraction, we use the `-` sign. Here's is an example:

```
x<-8
y<-3

x-y

## [1] 5
```

3 Multiplication

To multiply, we use the asterisk:

¹This is detailed expertly in Ousley's fine book on addition.

```
x<-2
y<-6

x*y

## [1] 12
```

4 Division

We can also divide by using the forward slash:

```
x<-7
y<-4

x/y

## [1] 1.75
```

5 Plotting

While plotting is normally not categorized under arithmetic, it is an important part of mathematics. First, lets store some values:

```
x<-seq(1,10,.1)
```

The command seq generates a sequence from 1 to 10 going by intervals of length .1:

```
## [1] 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
## [15] 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7
## [29] 3.8 3.9 4.0 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 5.0 5.1
## [43] 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9 6.0 6.1 6.2 6.3 6.4 6.5
## [57] 6.6 6.7 6.8 6.9 7.0 7.1 7.2 7.3 7.4 7.5 7.6 7.7 7.8 7.9
## [71] 8.0 8.1 8.2 8.3 8.4 8.5 8.6 8.7 8.8 8.9 9.0 9.1 9.2 9.3
## [85] 9.4 9.5 9.6 9.7 9.8 9.9 10.0
```

Now let's square every x -value:

```
y<-x^2
```

To see the result:

```
## [1] 1.00 1.21 1.44 1.69 1.96 2.25 2.56 2.89 3.24 3.61
## [11] 4.00 4.41 4.84 5.29 5.76 6.25 6.76 7.29 7.84 8.41
## [21] 9.00 9.61 10.24 10.89 11.56 12.25 12.96 13.69 14.44 15.21
## [31] 16.00 16.81 17.64 18.49 19.36 20.25 21.16 22.09 23.04 24.01
## [41] 25.00 26.01 27.04 28.09 29.16 30.25 31.36 32.49 33.64 34.81
## [51] 36.00 37.21 38.44 39.69 40.96 42.25 43.56 44.89 46.24 47.61
## [61] 49.00 50.41 51.84 53.29 54.76 56.25 57.76 59.29 60.84 62.41
## [71] 64.00 65.61 67.24 68.89 70.56 72.25 73.96 75.69 77.44 79.21
## [81] 81.00 82.81 84.64 86.49 88.36 90.25 92.16 94.09 96.04 98.01
## [91] 100.00
```

We can create a data-frame this way:

```
df<-data.frame(x,y)
df
##      x      y
## 1  1.0  1.00
## 2  1.1  1.21
## 3  1.2  1.44
## 4  1.3  1.69
## 5  1.4  1.96
## 6  1.5  2.25
## 7  1.6  2.56
## 8  1.7  2.89
## 9  1.8  3.24
## 10 1.9  3.61
## 11 2.0  4.00
## 12 2.1  4.41
## 13 2.2  4.84
## 14 2.3  5.29
## 15 2.4  5.76
## 16 2.5  6.25
## 17 2.6  6.76
## 18 2.7  7.29
## 19 2.8  7.84
## 20 2.9  8.41
## 21 3.0  9.00
## 22 3.1  9.61
## 23 3.2 10.24
## 24 3.3 10.89
## 25 3.4 11.56
## 26 3.5 12.25
## 27 3.6 12.96
## 28 3.7 13.69
## 29 3.8 14.44
```

##	30	3.9	15.21
##	31	4.0	16.00
##	32	4.1	16.81
##	33	4.2	17.64
##	34	4.3	18.49
##	35	4.4	19.36
##	36	4.5	20.25
##	37	4.6	21.16
##	38	4.7	22.09
##	39	4.8	23.04
##	40	4.9	24.01
##	41	5.0	25.00
##	42	5.1	26.01
##	43	5.2	27.04
##	44	5.3	28.09
##	45	5.4	29.16
##	46	5.5	30.25
##	47	5.6	31.36
##	48	5.7	32.49
##	49	5.8	33.64
##	50	5.9	34.81
##	51	6.0	36.00
##	52	6.1	37.21
##	53	6.2	38.44
##	54	6.3	39.69
##	55	6.4	40.96
##	56	6.5	42.25
##	57	6.6	43.56
##	58	6.7	44.89
##	59	6.8	46.24
##	60	6.9	47.61
##	61	7.0	49.00
##	62	7.1	50.41
##	63	7.2	51.84
##	64	7.3	53.29
##	65	7.4	54.76
##	66	7.5	56.25
##	67	7.6	57.76
##	68	7.7	59.29
##	69	7.8	60.84
##	70	7.9	62.41
##	71	8.0	64.00
##	72	8.1	65.61
##	73	8.2	67.24
##	74	8.3	68.89

```
## 75 8.4 70.56
## 76 8.5 72.25
## 77 8.6 73.96
## 78 8.7 75.69
## 79 8.8 77.44
## 80 8.9 79.21
## 81 9.0 81.00
## 82 9.1 82.81
## 83 9.2 84.64
## 84 9.3 86.49
## 85 9.4 88.36
## 86 9.5 90.25
## 87 9.6 92.16
## 88 9.7 94.09
## 89 9.8 96.04
## 90 9.9 98.01
## 91 10.0 100.00
```

Finally, we can use ggplot2 to get a plot.

```
library(ggplot2)
ggplot()+
  geom_line(data=df, aes(x=x,y=y, width = .5, height = .5))
```

