```
R version 3.3.1 (2016-06-21) -- "Bug in Your Hair"
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Platform: x86_64-apple-darwin13.4.0 (64-bit)

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  Natural language support but running in an English locale

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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[R.app GUI 1.68 (7238) x86_64-apple-darwin13.4.0]

[History restored from /Users/kellybarr/.Rapp.history]

> ?mean
starting httpd help server ... done
> apropos("mean")
 [1] ".colMeans"     ".rowMeans"     "colMeans"      "kmeans"
 [5] "mean"          "mean.Date"     "mean.default"  "mean.difftime"
 [9] "mean.POSIXct"  "mean.POSIXlt"  "rowMeans"      "weighted.mean"
> RSiteSearch("violin",restrict=c("functions"))
A search query has been submitted to http://search.r-project.org
The results page should open in your browser shortly
> a<-2+3
> a
[1] 5
> b<-a+a
> a+a;a+b
[1] 10
[1] 15
> Y<-c(8.3,8.6,10.7,10.8,11,11,11.1,11.2,11.2,11.4)
> Y
 [1]  8.3  8.6 10.7 10.8 11.0 11.0 11.1 11.2 11.2 11.4
> 1:4
[1] 1 2 3 4
> 4:1
[1] 4 3 2 1
> -1:3
[1] -1  0  1  2  3
> -(1:3)
[1] -1 -2 -3
> seq(1,3,by=0.2)
```

```
 [1] 1.0 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 2.8 3.0
> seq(1,3,length=7)
[1] 1.000000 1.333333 1.666667 2.000000 2.333333 2.666667 3.000000
> rep(1,3)
[1] 1 1 1
> rep(1:3,2)
[1] 1 2 3 1 2 3
> rep(1:3,each=2)
[1] 1 1 2 2 3 3
> sum(Y)
[1] 105.3
> mean(Y)
[1] 10.53
> max(Y)
[1] 11.4
> length(Y)
[1] 10
> summary(Y)
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
   8.30   10.72   11.00   10.53   11.18   11.40
> Names<-c("Sarah","Yunluan")
> Names
[1] "Sarah"   "Yunluan"
> b<-c(TRUE,FALSE)
> b
[1]  TRUE FALSE
> class(Y)
[1] "numeric"
> class(b)
[1] "logical"
> Y>10
 [1] FALSE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE
> Y>mean(Y)
 [1] FALSE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE
> Y==11
 [1] FALSE FALSE FALSE FALSE  TRUE  TRUE FALSE FALSE FALSE FALSE
> Y!=11
 [1]  TRUE  TRUE  TRUE  TRUE FALSE FALSE  TRUE  TRUE  TRUE  TRUE
> a<-1:3
> b<-4:6
> a+b
[1] 5 7 9
> a*b
[1]  4 10 18
> a/b
[1] 0.25 0.40 0.50
> a+1
[1] 2 3 4
> a*2
[1] 2 4 6
> 1/a
```

```
[1] 1.0000000 0.5000000 0.3333333
> a*1:2
[1] 1 4 3
Warning message:
In a * 1:2 :
  longer object length is not a multiple of shorter object length
> a*c(1,2,1)
[1] 1 4 3
> 1:4*1:2
[1] 1 4 3 8
> 1:4*1:2
[1] 1 4 3 8
> Y[1]
[1] 8.3
> Y[1:3]
[1]  8.3  8.6 10.7
> Y>mean(Y)
 [1] FALSE FALSE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE  TRUE
> Y[Y>mean(Y)]
[1] 10.7 10.8 11.0 11.0 11.1 11.2 11.2 11.4
> a<-c(5,3,6,NA)
> a
[1]  5  3  6 NA
> is.na(a)
[1] FALSE FALSE FALSE  TRUE
> !is.na(a)
[1]  TRUE  TRUE  TRUE FALSE
> a[!is.na(a)]
[1] 5 3 6
> na.exclude(a)
[1] 5 3 6
attr(,"na.action")
[1] 4
attr(,"class")
[1] "exclude"
> mean(a)
[1] NA
> mean(a,na.rm=TRUE)
[1] 4.666667
> d<-na.exclude(a)
> mean(d)
[1] 4.666667
> matrix(letters[1:4],ncol=2)
     [,1] [,2]
[1,] "a"  "c"
[2,] "b"  "d"
> M<-matrix(1:4,nrow=2)
> M
     [,1] [,2]
[1,]    1    3
[2,]    2    4
```

```
> M2<-matrix(1:4,nrow=2,byrow=TRUE)
> M2
     [,1] [,2]
[1,]    1    2
[2,]    3    4
> I<-diag(1,nrow=2)
> I
     [,1] [,2]
[1,]    1    0
[2,]    0    1
> Minv<-solve(M)
> M%*%Minv
     [,1] [,2]
[1,]    1    0
[2,]    0    1
> M[1,2]
[1] 3
> M[1,1:2]
[1] 1 3
> M[,2]
[1] 3 4
> M[2]
[1] 2
> M[,]]
Error: unexpected ']' in "M[,]]"
> M[,]
     [,1] [,2]
[1,]    1    3
[2,]    2    4
> N<-matrix(0:3,nrow=2)
> N
     [,1] [,2]
[1,]    0    2
[2,]    1    3
> M*N
     [,1] [,2]
[1,]    0    6
[2,]    2   12
> M%*%N
     [,1] [,2]
[1,]    3   11
[2,]    4   16
> N%*%M
     [,1] [,2]
[1,]    4    8
[2,]    7   15
> 1:2%*%M
     [,1] [,2]
[1,]    5   11
> M%*%1:2
     [,1]
```

```
[1,]    7
[2,]   10
> V<-matrix(1:2,ncol=1)
> M%*%V
     [,1]
[1,]    7
[2,]   10
> try(V%*%M)
Error in V %*% M : non-conformable arguments
> M+N
     [,1] [,2]
[1,]    1    5
[2,]    3    7
> M+2
     [,1] [,2]
[1,]    3    5
[2,]    4    6
> t(M)
     [,1] [,2]
[1,]    1    2
[2,]    3    4
> dat<-
data.frame(species=c("S.altissima","S.rugosa","E.graminifolia","A.pilosus"),treat
ment=factor(c("Control","Water","Control","Water")),height=c(1.1,0.8,0.9,1),width
=c(1,1.7,0.6,0.2))
> dat
         species treatment height width
1    S.altissima   Control    1.1   1.0
2       S.rugosa     Water    0.8   1.7
3 E.graminifolia   Control    0.9   0.6
4      A.pilosus     Water    1.0   0.2
> dat[2,]
   species treatment height width
2 S.rugosa     Water    0.8   1.7
> dat[3,4]
[1] 0.6
> dat[,2]=="Water"
[1] FALSE  TRUE FALSE  TRUE
> dat[dat[,2]=="Water",]
    species treatment height width
2  S.rugosa     Water    0.8   1.7
4 A.pilosus     Water    1.0   0.2
> subset(dat,treatment=="Water")
    species treatment height width
2  S.rugosa     Water    0.8   1.7
4 A.pilosus     Water    1.0   0.2
>
```