

# caracas is an R package for symbolic mathematics.

## Creating symbols

```
def_sym(a, b)          a
                        b
v <- vector_sym(2, "v") [[v1, v2]]^T
M <- matrix_sym(2, 2, "m") [[m11, m12],
                           [m21, m22]]
D <- matrix_sym_diag(2) [[v1, 0],
                        [ 0, v2]]
```

## Subsetting and substitution

```
M[1, ]          [[m11, m12]]^T
M[2:1, ]        [[m21, m22],
                 [m11, m12]]
M[1, 1]         m11
M[1, 2] <- 0
```

## Algebra

```
simplify(cos(a)^2 + sin(a)^2) 1
solve_sys(a^2, -1, a)          a = -1i
                                a = 1i
solve(M)                       output omitted
factor_(a^3 - a^2 + a - 1)     (a - 1)*(a^2 + 1)
expand((a - 1) * (a^2 + 1))    a^3 - a^2 + a - 1
```

## Calculus

```
der(3 * a + a^2, a)           2*a + 3
sum_(1/a^2, a, 1, Inf)        pi^2/6
s <- sum_(1/a^2, a, 1, Inf, doit = FALSE)
s                                $\sum_{a=1}^{\infty} \frac{1}{a^2}$ 
doit(s)                        pi^2/6
lim((1 + a)^(1/a), a, 0)       exp(1)
f <- taylor(cos(a), x0 = 0, n = 3 + 1)
drop_remainder(f)              1 - a^2/2
```

## Output

Functions: `tex()`, `print(..., method = "prettyascii")` and others.

Chunk type `rtex` for e.g. `rmarkdown`/Quarto.



Bridging a gap

**caracas**  
SYMBOLIC MATH IN R