# Solução Lista 01

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## Exercício 01

```r
firstMatrix <- matrix(c(12, -1, -5, 0, -1, 7, 2, -1, -5, 2, 10, 1, 0, -1, 1, 3), nrow = 4)

secondMatrix <- matrix(c(1, 2, 3, 4), ncol=1)

solve(firstMatrix, secondMatrix)
```

```
##            [,1]
## [1,] 0.1873874
## [2,] 0.4738739
## [3,] 0.1549550
## [4,] 1.4396396
```

## Exercício 02

```r
    isPositiveMatrix <- function(matrix) {
        if (matrix[1:1, 1:1] < 0) {
            return(FALSE)
        }
        for (i in 2:dim(matrix)[1]) {
            if (det(matrix[1:i, 1:i]) < 0) {
                return(FALSE)
            }
        }
        return(TRUE)
    }

test_matrix <- matrix(c(12, -1, -5, 0, -1, 7, 2, -1, -5, 2, 10, 1, 0, -1, 1, 3), nrow = 4)

isPositiveMatrix(test_matrix)
```
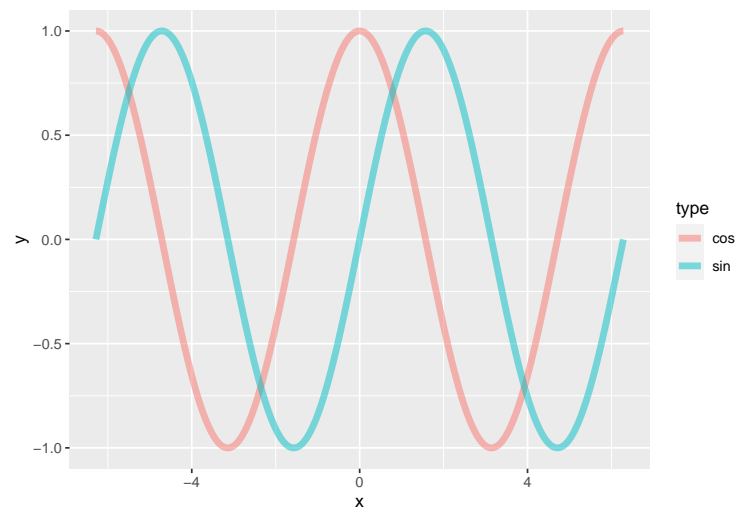
```
## [1] TRUE
```

## Exercício 03

```r
sin_tibble <- tibble(x = seq(-2*pi, 2*pi, length=1000), y = sin(x), type = "sin")

cos_tibble <- tibble(x = seq(-2*pi, 2*pi, length=1000), y = cos(x), type = "cos")

plot_tibble <- sin_tibble %>% bind_rows(cos_tibble)

p <- ggplot(plot_tibble) + aes(x = x, y = y, color = type) + geom_line( size = 2, alpha = 0.5)

p
```



## Exercício 04

```r
set.seed(1)
X = matrix(runif(100,-1,1),nrow=10)
A = t(X) %*% X

x_seq <- 0:99
kappas <- unlist(map(x_seq, function(x) kappa(A + x * diag(10))))

kappa_tibble = tibble(x = x_seq, y = kappas, type = "kappa")

p <- ggplot(kappa_tibble) + aes(x = x, y = y, color = type) + geom_line( size = 2, alpha = 0.5)

p
```