Discussion Week 2 - Data 605

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Linear Algebra Problem DM.C28

Doing the computations by hand, find the determinant of the matrix A.

First let's find the determinant using the det() function.

```
A <- matrix(c(1,0,1,1,2,-1,-1,1,2,5,3,0,1,-1,0,1), nrow = 4, byrow = TRUE)
print(A)
```

```
##      [,1] [,2] [,3] [,4]
## [1,]    1    0    1    1
## [2,]    2   -1   -1    1
## [3,]    2    5    3    0
## [4,]    1   -1    0    1
```

```
det(A)
```

```
## [1] 7.771561e-16
```

```
round(det(A))
```

```
## [1] 0
```

And now by hand:

```
submatrix1_A <- matrix(c(-1,-1,1,5,3,0,-1,0,1), nrow = 3, byrow = TRUE)
submatrix2_A <- 0
submatrix3_A <- matrix(c(2,-1,1,2,3,0,1,0,1), nrow = 3, byrow = TRUE)
submatrix4_A <- matrix(c(2,-1,-1,2,5,3,1,-1,0), nrow = 3, byrow = TRUE)
```

Now to determine the determinant we

```
submatrix1_A - submatrix2_A + submatrix3_A - submatrix4_A
```

```
##      [,1] [,2] [,3]
## [1,]   -1   -1    3
## [2,]    5    1   -3
## [3,]   -1    1    2
```