Matrix Calculation

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Define matrices

```
A = matrix(data = c(2, -1, 0, 5, 0, -2), nrow = 3, ncol = 2, byrow = FALSE, dimnames = NULL) # a
ll arguments expressed outloud
B = matrix(data = c(3, 0, 0, 1), nrow =2, ncol = 2) # omit arguments with default values
C = matrix(c(1,2,3,1,1,1,4,5,6), 3, 3) # omit variable names for arguments
d = matrix(c(2,1,0), 3, 1)
print(A)
```

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

```
print(B)
```

```
##      [,1] [,2]
## [1,]    3    0
## [2,]    0    1
```

```
print(C)
```

```
##      [,1] [,2] [,3]
## [1,]    1    1    4
## [2,]    2    1    5
## [3,]    3    1    6
```

```
print(d)
```

```
##      [,1]
## [1,]    2
## [2,]    1
## [3,]    0
```

Matrix Calculation

1. AB

```
Y1 = A%*%B # pay attention to the "%" for matrix multiplication
print(Y1)
```

```
##      [,1] [,2]
## [1,]   6    5
## [2,]  -3    0
## [3,]   0   -2
```

2. 5B; BI

```
Y2a = 5*B
Y2b = B*diag(x = 1,nrow = 2)
print(Y2a)
```

```
##      [,1] [,2]
## [1,]   15    0
## [2,]    0    5
```

```
print(Y2b)
```

```
##      [,1] [,2]
## [1,]    3    0
## [2,]    0    1
```

3. d'A

```
Y3 = t(d)%*%A
print(Y3)
```

```
##      [,1] [,2]
## [1,]    3   10
```

4. C+C'

```
Y4 =  C+t(C)
print(Y4)
```

```
##      [,1] [,2] [,3]
## [1,]    2    3    7
## [2,]    3    2    6
## [3,]    7    6   12
```

5. trace(C)

```
Y5 =  sum(diag(C))
print (Y5)
```

```
## [1] 8
```

6. rank(A)

```
Y6 = qr(A)$rank
print(Y6)
```

```
## [1] 2
```

7. rank(C)

```
Y7 = qr(C)$rank
print(Y7)
```

```
## [1] 2
```

8. determinant(C)

```
Y8 = det(C)
print(Y8)
```

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