

$$\begin{bmatrix} a_{1,1} & a_{1,2} & a_{1,3} \\ a_{2,1} & a_{2,2} & a_{2,3} \end{bmatrix} \begin{bmatrix} b_{1,1} \\ b_{2,1} \\ b_{3,1} \end{bmatrix}$$

$$= \begin{bmatrix} a_{1,1}b_{1,1} + a_{1,2}b_{2,1} + a_{1,3}b_{3,1} \\ a_{2,1}b_{1,1} + a_{2,2}b_{2,1} + a_{2,3}b_{3,1} \end{bmatrix}$$

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \begin{bmatrix} 7 \\ 8 \\ 9 \end{bmatrix} = \begin{bmatrix} 7 + 16 + 27 \\ 28 + 40 + 54 \end{bmatrix} = \begin{bmatrix} 50 \\ 122 \end{bmatrix}$$

```
a<-matrix(c(1,2,3,4,5,6), ncol = 3, byrow = T)
```

```
> a
```

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

```
b<-matrix(c(7,8,9), ncol = 1)
```

```
> b
```

```
      [,1]
[1,]    7
[2,]    8
[3,]    9
```

```
a %*% b
```

```
      [,1]
[1,]   50
[2,]  122
```