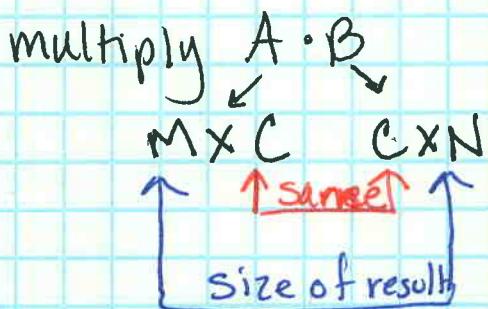


## 6-2-1 Matrix Multiplication

Look at Matrix size before you start  
size is important



columns in  $A =$  rows in  $B$

add the products of the elements  
of a row in  $A$  ( $r$ ) to corresponding  
column in  $B$  ( $c$ ).

Sum of the products is element  $X_{rc}$   
 resultant element  
 row of Matrix A  
 column of Matrix B

### Example A

multiply  $AB$

$$AB = X$$

$$A = \begin{bmatrix} 3 & -1 \\ 4 & 0 \end{bmatrix}_{2 \times 2} \quad B = \begin{bmatrix} -2 & 0 & 4 \\ 3 & 5 & 1 \end{bmatrix}_{2 \times 3}$$

$$X = \begin{bmatrix} (-4-3)_{11} & (0-5)_{12} & (18-1)_{13} \\ (-8+0)_{21} & (0+0)_{22} & (24+0)_{23} \end{bmatrix}$$

$$= \begin{bmatrix} -9 & -5 & 17 \\ -8 & 0 & 24 \end{bmatrix}$$

**Real-World Example 2** Multiply Matrices

**VOTING** The percent of voters of different ages who were registered as Democrats, Republicans, or Independents in a recent city election are shown. Use this information to determine whether there were more male voters registered as Democrats than there were female voters registered as Republicans.

Distribution by Party and Age (%)

Party	18-25	26-40	41-50	50+
Democrat	0.55	0.50	0.35	0.40
Republican	0.30	0.40	0.45	0.55
Independent	0.15	0.10	0.20	0.05

Distribution by Age and Gender

Age	Female	Male
18-25	18,500	16,000
26-40	20,000	24,000
41-50	24,500	22,500
50+	16,500	14,000

PARTY  $\times$  Gender  $D$   $\begin{bmatrix} F \\ R \\ I \end{bmatrix}$   $\begin{bmatrix} 35350 & 31275 \\ 33650 & 32225 \\ 10500 & 10500 \end{bmatrix}$

Yes  $\rightarrow$  there are more Male Dems  
than Female Rep.s.