

9.2 - Matrices II

- A. If two matrices have the same dimensions, they may be added by finding the sums of the corresponding elements.

Example: If $A = \begin{bmatrix} 1 & 3 & -2 \\ 4 & 0 & -5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 & -5 \\ 0 & -7 & 2 \end{bmatrix}$, find $A + B$.

$$A + B = \begin{bmatrix} 1+3 & 3+1 & -2+(-5) \\ 4+0 & 0+(-7) & -5+2 \end{bmatrix} = \begin{bmatrix} 4 & 4 & -7 \\ 4 & -7 & -3 \end{bmatrix}$$

- B. If two matrices have the same dimensions, they may be subtracted by finding the difference of the corresponding elements.

Example: If $A = \begin{bmatrix} 1 & 3 & -2 \\ 4 & 0 & -5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 & -5 \\ 0 & -7 & 2 \end{bmatrix}$, find $A - B$.

$$A - B = \begin{bmatrix} 1-3 & 3-1 & -2-(-5) \\ 4-0 & 0-(-7) & -5-2 \end{bmatrix} = \begin{bmatrix} -2 & 2 & 3 \\ 4 & 7 & -7 \end{bmatrix}$$

Example: Top Three Western Conference Teams

Home Games

Wins Losses

LA Lakers	37	4
Utah	36	5
Portland	35	6

Away Games

Wins Losses

LA Lakers	26	15
Utah	19	22
Portland	24	17

Add these matrices. What does the result represent?

LA Lakers $\begin{bmatrix} 63 & 19 \\ 53 & 27 \end{bmatrix}$
Utah $\begin{bmatrix} 55 & 21 \\ 59 & 23 \end{bmatrix}$
Portland $\begin{bmatrix} 59 & 27 \\ 59 & 23 \end{bmatrix}$

Total number of wins and losses.

- C. Two matrices are equal only if they have the same dimensions and the elements in all corresponding positions are equal.

Examples: Find the value of each variable.

1. $\begin{bmatrix} x & 3 \\ y & z \end{bmatrix} = \begin{bmatrix} -9 & 3 \\ -2 & -6 \end{bmatrix}$

$$\begin{aligned} x &= -9 \\ y &= -2 \\ z &= -6 \end{aligned}$$

2. $\begin{bmatrix} x+y & 3 \\ x-y & 5 \end{bmatrix} = \begin{bmatrix} 7 & 3 \\ 1 & 5 \end{bmatrix}$

$$\begin{aligned} x+y &= 7 & 4+y &= 7 \\ x-y &= 1 & y &= 3 \\ \hline 2x &= 8 & & \\ x &= 4 & & \end{aligned}$$