7.2 Day 1 KEY

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7.2 DAY 1 : MATRICES

① definitions
② add & subtract
③ scalar multiplication

Definition of a matrix: an $m \times n$ matrix is a rectangular organizer of numbers

(m = rows, n = columns)

Example: $\begin{bmatrix} 2 & 0 \\ -1 & 5 \\ 7 & -4 \end{bmatrix}$ ① ② ③ ROWS ⇒ so this is a 3×2 matrix (also called the matrix order)

① ② COLUMNS

Identifying Matrix components using shorthand notation: $[a_{ij}]$ (i = row identifier, j = column identifier)

Example: Find the $[a_{32}]$ element in the above matrix. -4

You try: Find $[a_{21}]$. -1

Matrix Addition & Subtraction

① the matrices must have the same order (same # of rows & columns)

② add or subtract the corresponding elements in each matrix to get the sum or difference matrix

Example 1: $\begin{bmatrix} 2 & -1 \\ 0 & 3 \end{bmatrix} + \begin{bmatrix} -4 & 1 \\ 5 & 2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 5 & 5 \end{bmatrix}$

Example 2: $\begin{bmatrix} 7 & -1 & -4 \\ 2 & 0 & 9 \\ 6 & 5 & 3 \end{bmatrix} - \begin{bmatrix} 1 & 4 & -2 \\ -3 & 0 & 0 \\ 2 & 1 & -1 \end{bmatrix} = \begin{bmatrix} 6 & -5 & -2 \\ 5 & 0 & 9 \\ 4 & 4 & 4 \end{bmatrix}$

You try! $\begin{bmatrix} 3 & 4 \\ 2 & 5 \\ 1 & 6 \end{bmatrix} - \begin{bmatrix} 1 & -2 \\ -1 & 3 \\ 2 & -3 \end{bmatrix} = \begin{bmatrix} 2 & 6 \\ 3 & 2 \\ -1 & 9 \end{bmatrix}$

Scalar Multiplication

Multiplication of a matrix & a real number.

Example 1: $3 \times \begin{bmatrix} -4 & 0 & 1 \\ 3 & 2 & -5 \\ 1 & -1 & -2 \end{bmatrix} = \begin{bmatrix} -12 & 0 & 3 \\ 9 & 6 & -15 \\ 3 & -3 & -6 \end{bmatrix}$

You try! $2A$ where $A = \begin{bmatrix} 4 & -2 \\ -1 & 5 \end{bmatrix}$ ⇒ $3 \times \begin{bmatrix} 4 & -2 \\ -1 & 5 \end{bmatrix} = \begin{bmatrix} 12 & -6 \\ -3 & 15 \end{bmatrix}$