

2.1 Matrix Operations

A matrix is an array of numbers - organized in rows + columns

The dimensions of a matrix are given by rows then columns.

$$\begin{bmatrix} 1 & 3 & -2 \\ 5 & 0 & 12 \end{bmatrix}$$

This matrix is a 2 × 3 matrix.

Ex 1: Write the dimensions of each matrix.

(a) $A = \begin{bmatrix} 6 & 3 \\ -4 & 0 \end{bmatrix}$ 2×2

(b) $B = \begin{bmatrix} 3 \\ 22 \\ 34 \\ 6 \end{bmatrix}$ 4×1

(c) $C = \begin{bmatrix} 2 & 3 & 2 & 5 \\ 4 & 1 & 1 & 5 \end{bmatrix}$

2×4

(d) $E = [3 \ -1 \ 6]$ 1×3

Matrix Addition:

must be the SAME dimensions

Notes 2.1

Ex 2: Add the following matrices (if possible).

$$(a) \begin{bmatrix} 0 & -1 \\ 13 & 6.5 \end{bmatrix} + \begin{bmatrix} 7 & 2 \\ 2 & 0 \end{bmatrix} = \begin{bmatrix} 7 & 1 \\ 15 & 6.5 \end{bmatrix}$$

$$(b) \begin{bmatrix} -5 & 18 & 55 \\ 4 & 2 & 21 \end{bmatrix} + \begin{bmatrix} 2 & 0 & .5 \\ 23 & -40 & 3 \end{bmatrix} = \begin{bmatrix} -3 & 18 & 55.5 \\ 27 & -38 & 24 \end{bmatrix}$$

$$(c) \begin{bmatrix} 6 & 3 & 0 \\ 2 & 4 & -1 \end{bmatrix} + \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} = \text{no solution}$$

-not the same dimensions-

Multiplying a matrix by a constant (Scalar Multiplication)

DISTRIBUTE! ex $3 \begin{bmatrix} 2 & 4 \\ 8 & 3 \end{bmatrix} = \begin{bmatrix} 6 & 12 \\ 24 & 9 \end{bmatrix}$

Ex 3: $A = \begin{bmatrix} 3 & 2 & 4 & 2 \\ 5 & 10 & -3 & 12 \end{bmatrix}$

$$B = \begin{bmatrix} 2 & -4 & 1 \\ 3 & 6 & 3 \\ 12 & 0 & 2 \end{bmatrix}$$

(a) $4A$

$$4 \begin{bmatrix} 3 & 2 & 4 & 2 \\ 5 & 10 & -3 & 12 \end{bmatrix}$$

$$= \begin{bmatrix} 12 & 8 & 16 & 8 \\ 20 & 40 & -12 & 48 \end{bmatrix}$$

(b) $-1B$

$$-1 \begin{bmatrix} 2 & -4 & 1 \\ 3 & 6 & 3 \\ 12 & 0 & 2 \end{bmatrix}$$

$$= \begin{bmatrix} -2 & 4 & -1 \\ -3 & -6 & -3 \\ -12 & 0 & -2 \end{bmatrix}$$

Vertex Matrices $\triangle ABC$

$A(6, 6)$

$B(6, -2)$

$C(2, 3)$

$$\begin{array}{c} X \\ Y \end{array} \begin{bmatrix} A & B & C \\ 6 & 6 & 2 \\ 6 & -2 & 3 \end{bmatrix}$$

