

**ORGANIZING DATA
INTO MATRICES
UNIT 04 LESSON 02**



OBJECTIVES

STUDENTS WILL BE ABLE TO:

Add and subtract matrices

KEY VOCABULARY:

- Matrices
- Addition
- Subtraction
- Order of Matrices
- Identity Matrix

ADDITION AND SUBTRACTION OF MATRICES

ADDITION

Sum of two matrices A and B (of the same dimensions) may be written as

$$\mathbf{C} = \mathbf{A} + \mathbf{B}$$

The sum is defined by adding entries with the same indices.

$$\begin{bmatrix} 1 & 3 \\ 2 & 5 \end{bmatrix} + \begin{bmatrix} 1 & 6 \\ 4 & 5 \end{bmatrix}$$

$$= \begin{bmatrix} 1 + 1 & 6 + 3 \\ 2 + 4 & 5 + 5 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & 9 \\ 6 & 10 \end{bmatrix}$$

ADDITION AND SUBTRACTION OF MATRICES

SUBTRACTION

Difference of two matrices A and B (of the same dimensions) may be written as

$$\mathbf{C} = \mathbf{A} - \mathbf{B}$$

The difference is defined by subtracting entries with the same indices.

$$\begin{bmatrix} 8 & 3 \\ 6 & 5 \end{bmatrix} - \begin{bmatrix} 4 & 3 \\ 2 & 8 \end{bmatrix}$$

$$= \begin{bmatrix} 8 - 4 & 3 - 3 \\ 6 - 2 & 5 - 8 \end{bmatrix}$$

$$= \begin{bmatrix} 4 & 0 \\ 4 & -3 \end{bmatrix}$$

FINDING VALUE OF A CONSTANT

If $\begin{bmatrix} 4 \\ 3 \end{bmatrix} + \begin{bmatrix} k \\ 2 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$, then find the value of k.

$$\begin{bmatrix} 4 \\ 3 \end{bmatrix} + \begin{bmatrix} k \\ 2 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$$

$$\begin{bmatrix} 4 + k \\ 3 + 2 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$$

$$\begin{bmatrix} 4 + k \\ 5 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$$

ADDITION AND SUBTRACTION OF MATRICES

$$\begin{bmatrix} 4 + k \\ 5 \end{bmatrix} - \begin{bmatrix} 10 \\ 5 \end{bmatrix} = 0$$

$$\begin{bmatrix} 4 + k - 10 \\ 5 - 5 \end{bmatrix} = 0$$

$$[4 + k - 10] = 0$$

$$k - 6 = 0$$

$$k = 6$$

ADDITION AND SUBTRACTION OF MATRICES

PROBLEM 1

Evaluate: $\begin{bmatrix} 4 \\ -7 \end{bmatrix} + \begin{bmatrix} 3 \\ 8 \end{bmatrix}$.

$$= \begin{bmatrix} 4 \\ -7 \end{bmatrix} + \begin{bmatrix} 3 \\ 8 \end{bmatrix}$$

$$= \begin{bmatrix} 4 + 3 \\ -7 + 8 \end{bmatrix}$$

$$= \begin{bmatrix} 7 \\ 1 \end{bmatrix}$$

PROBLEM 2

If the order of matrix A is 3×2 and the order of matrix B is 2×2 , then the order of the matrix formed by $A+B$ will be:

- a. 3×2
- b. 2×2
- c. 3×3
- d. Doesn't exist

ADDITION AND SUBTRACTION OF MATRICES

PROBLEM 2

If the order of matrix A is 3×2 and the order of matrix B is 2×2 , then the order of the matrix formed by $A+B$ will be:

It doesn't exist because matrices can't be added if their order is different.

PROBLEM 3

State whether the following statement is true or false.

a. $A + B = A - B$

T/F

b. $A + I = I + A = A$

T/F

c. $A + 0 = 0 + A = A$

T/F

d. $A + B = B + A$

T/F

e. $A + (B + C) = (A + B) + C$

T/F

f. $A - 0 = 0 - A$

T/F

ADDITION AND SUBTRACTION OF MATRICES

PROBLEM 3

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d. $A + B = B + A$

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e. $A + (B + C) = (A + B) + C$

T/F

f. $A - 0 = 0 - A$

T/F