CONCEPT MAP

FORM 5

MATRICES

Equal Matrices

Two equal matrices have the same order and each corresponding element is the same.

Operations on Matrices

Addition/Subtraction of Matrices

The addition / subtraction of two or more matrices of the same order produces a matrix such that its elements are the sum/difference of corresponding elements.

Multiplication of a Matrix by a Number

$$k\begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} ka & kb \\ kc & kd \end{pmatrix}$$

Product of Two Matrices

The product of a matrix with the order $h \times k$ with another matrix with the order $k \times m$ produce a matrix $h \times m$ such that its element, a_{ij}, is the sum of all the products between the corresponding elements at row i of the first matrix and at the column j of the second matrix

Identity Matrices

An identity matrix, I, when multiplied by any matrix A, will produce back A.

$$AI = IA = A$$

Inverse Matrices

- If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ such that $ad - bc \neq 0$, then its inverse matrix,
  $$A^{-1} = \frac{1}{ad - bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$
- $AA^{-1} = A^{-1}A = I$
- If $PQ = I$, then $Q = P^{-1}$ and $P = Q^{-1}$.

Solving Simultaneous Linear Equations using the Matrix Method

The simultaneous linear equations

$ax + by = h$ ... ①

$cx + dy = k$ ... ②

can be written in the form of a matrix equation

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} h \\ k \end{pmatrix}$$

Hence, $\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{ad - bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}\begin{pmatrix} h \\ k \end{pmatrix}$

Solving Problems in Daily Real-Life Situations by Forming a Matrix Equation and Solving it

© EPH Publishing (M) Sdn. Bhd. (473626-T) 2021