

# Matrices

## Simultaneous Equation

# Simultaneous Equation

□ Solve for

$$2x + 3y = 7$$

$$4x + 2y = 10$$

Solution:

Putting the above equation in matrix form;

$$\begin{bmatrix} 2 & 3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 7 \\ 10 \end{bmatrix}$$

$A \quad X \quad K$

# Simultaneous Equation

$$\square X = A^{-1}K$$

$$|A| = \begin{vmatrix} 2 & 3 \\ 4 & 2 \end{vmatrix} = 4 - 12 = -8$$

$$\text{Cofactor of } 2 = 2;$$

$$\text{Cofactor of } 3 = -4$$

$$\text{Cofactor of } 4 = -3;$$

$$\text{Cofactor of } 2 = 2$$

$$\text{Adj } A = \begin{bmatrix} 2 & -3 \\ -4 & 2 \end{bmatrix}$$

# Simultaneous Equation

$$\square A^{-1} = \frac{1}{|A|} \cdot AdjA$$

$$A^{-1} = \frac{1}{-8} \times \begin{bmatrix} 2 & -3 \\ -4 & 2 \end{bmatrix} = \begin{bmatrix} -2/8 & 3/8 \\ 4/8 & -2/8 \end{bmatrix}$$

$$\therefore X = A^{-1}K$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -2/8 & 3/8 \\ 4/8 & -2/8 \end{bmatrix} \times \begin{bmatrix} 7 \\ 10 \end{bmatrix}$$

# Simultaneous Equation

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} \frac{-14}{8} + \frac{30}{8} \\ \frac{28}{8} - \frac{20}{8} \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} \frac{16}{8} \\ \frac{8}{8} \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$$

$\therefore x = 2$  and  $y = 1$  *Answer*

# Simultaneous Equation

**THANK YOU**