

## Trigonometry and Matrices

### Linear equations

Find the value of  $k$  such that the system of equations.

$$x + ky + 3z = 0$$

$$4x + 3y + kz = 0$$

$$2x + y + 2z = 0$$

has non-trivial solution.

Sol.

$$\begin{bmatrix} 1 & k & 3 \\ 4 & 3 & k \\ 2 & 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

Because system has non-trivial sol.

$$\therefore |A| = 0$$

$$\begin{vmatrix} 1 & k & 3 \\ 4 & 3 & k \\ 2 & 1 & 2 \end{vmatrix} = 0$$

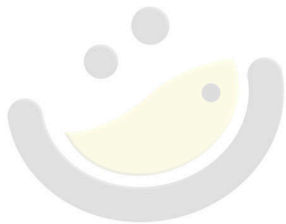
$$1(6 - k) - k(8 - 2k) + 3(4 - 6) = 0$$

$$~~6~~ - k - 8k + 2k^2 - ~~6~~ = 0$$

$$2k^2 - 9k = 0$$

$$k(2k - 9) = 0$$

$$k = 0, \underline{\underline{9/2}}$$



OMG { MATHS }

The poetry of logical ideas.