

Week 1

find the determinant of:

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

$$\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 2 & 1 & 1 \\ 0 & 0 & 1 & 0 & 0 \end{array} = (-1+0+0) - (0+0-1) = 0$$

Singular

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

$$\begin{array}{cccc|c} 1 & 1 & 1 & 1 & 1 \\ 0 & 2 & 2 & 0 & 2 \\ 0 & 0 & 3 & 0 & 0 \end{array} = (6+0+0) - (0+0+0) = 6$$

Non Singular

$$\begin{bmatrix} 1 & 2 & 5 \\ 0 & 3 & -2 \\ 2 & 4 & 10 \end{bmatrix}$$

$$\begin{array}{cccc|c} 1 & 2 & 5 & 1 & 2 \\ 0 & 3 & -2 & 0 & 3 \\ 2 & 4 & 10 & 2 & 4 \end{array} = (30-8+0) - (30-5+0) = 0$$

Singular

$$\begin{bmatrix} 1 & 2 & 1 \\ 2 & 1 & 1 \\ -1 & 2 & 1 \end{bmatrix}$$

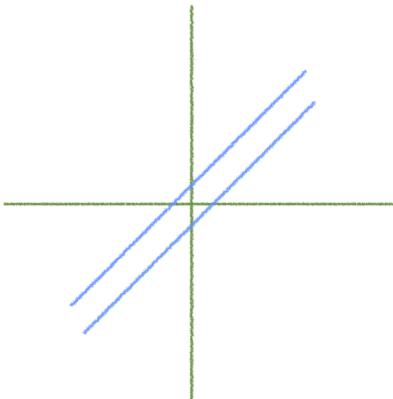
$$\begin{array}{cccc|c} 1 & 2 & 1 & 1 & 2 \\ 2 & 1 & 1 & 2 & 1 \\ -1 & 2 & 1 & -1 & 2 \end{array} = (1-2+4) - (-1+2+4) = -2$$

Non Singular

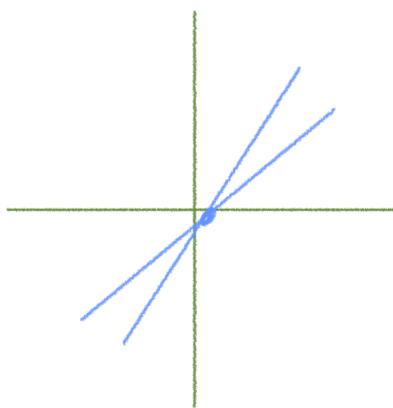
$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 2 \\ 1 & 4 & 5 \end{bmatrix}$$

$$\begin{array}{ccc|c} 1 & 2 & 3 & 1 \\ 0 & 2 & 2 & 0 \\ 1 & 4 & 5 & 1 \end{array} \quad = (10+9+0) - (6+8+0) = 0$$

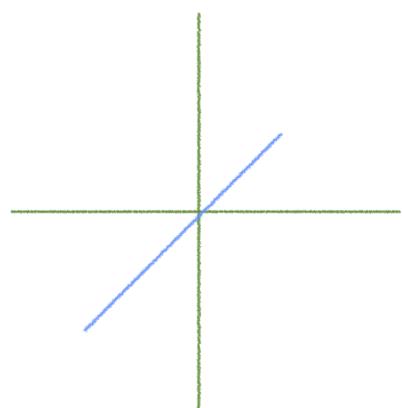
Singular



no Solution



one Solution



infinite
number
of Solution

Non Singular : has unique Solution

determinate $\neq 0$