Step-1

Let A be a 2×2 matrix.

Let $A=\begin{bmatrix} a_{11} & b \\ c & d \end{bmatrix}$, where $b\neq 0$, $c\neq 0$ and $d=0$.

We have,

$$\begin{aligned}\det(A)&=(a_{11}d)-(bc)\\&=0-bc\\&=-bc\\&\neq 0\end{aligned}$$

Therefore, in such case, whatever is the value of a_{11}, determinant of A cannot be zero.

Step-2

Let A be a 2×2 matrix.

Let $A=\begin{bmatrix} a_{11} & b \\ c & d \end{bmatrix}$, where $b=0$ and $d=0$.

We have,

$$\begin{aligned}\det(A)&=(a_{11}d)-(bc)\\&=0-0\\&=0\end{aligned}$$

Therefore, in such case, whatever is the value of a_{11}, determinant of A is always zero.

Step-3

Otherwise, the determinant of A can be found out from the cofactor expression as follows:

$$\det A=a_{11}C_{11}+a_{12}C_{12}+\ldots+a_{1n}C_{1n}$$

Now suppose $\det A=0$. This gives,

$$\begin{aligned}a_{11}C_{11}+a_{12}C_{12}+\ldots+a_{1n}C_{1n}&=0\\a_{11}C_{11}&=-\left(a_{12}C_{12}+\ldots+a_{1n}C_{1n}\right)\\a_{11}&=\frac{-\left(a_{12}C_{12}+\ldots+a_{1n}C_{1n}\right)}{C_{11}}\end{aligned}$$

Step-4

Since, the matrix A is fixed, the value of $\frac{-\left(a_{12}C_{12}+\ldots+a_{1n}C_{1n}\right)}{C_{11}}$ is also fixed. Therefore, only when $\boxed{a_{11}=\frac{-\left(a_{12}C_{12}+\ldots+a_{1n}C_{1n}\right)}{C_{11}}}$, we get $\det A=0$.