Step-1

From the big formula for 6 terms, to have

$$
\begin{aligned}
|A| &= +a_{11}a_{22}a_{33} + a_{12}a_{23}a_{31} + a_{13}a_{21}a_{32} - a_{11}a_{23}a_{32} - a_{12}a_{21}a_{33} - a_{13}a_{22}a_{31} \\
&= +(1\cdot1\cdot1)+(2\cdot2\cdot3)+(3\cdot3\cdot2)-(1\cdot2\cdot2)-(2\cdot3\cdot1)-(3\cdot1\cdot3) \\
&= 1+12+18-4-6-9 \\
&= 12
\end{aligned}
$$

Since $|A| \neq 0$, therefore **rows are independent.**

Step-2

Consider the following matrix B:

$$
B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 4 & 4 \\ 5 & 6 & 7 \end{bmatrix}
$$

For the given matrix *B*, $n=3$ hence no. of terms is:

$$
\begin{aligned}
n! &= 3! \\
&= 6
\end{aligned}
$$

Step-3

From the big formula for 6 terms, to have

$$
\begin{aligned}
|B| &= +b_{11}b_{22}b_{33} + b_{12}b_{23}b_{31} + b_{13}b_{21}b_{32} - b_{11}b_{23}b_{32} - b_{12}b_{21}b_{33} - b_{13}b_{22}b_{31} \\
&= +(1\cdot4\cdot7)+(2\cdot4\cdot5)+(3\cdot4\cdot6)-(1\cdot4\cdot6)-(2\cdot4\cdot7)-(3\cdot4\cdot5) \\
&= 28+40+72-24-56-60 \\
&= 140-140 \\
&= 0
\end{aligned}
$$

Since $|B| = 0$, therefore **rows are dependent.**

Step-4

Consider the following matrix C:

$$
C = \begin{bmatrix} A & 0 \\ 0 & B \end{bmatrix}
$$

For the matrix C, $n = 3$ hence no. of terms is:

$$\begin{aligned} n! &= 3! \\ &= 6 \end{aligned}$$

Step-5

From the big formula for 6 terms, to have

$$\begin{aligned} |C| &= +c_{11}c_{22}c_{33} + c_{12}c_{23}c_{31} + c_{13}c_{21}c_{32} - c_{11}c_{23}c_{32} - c_{12}c_{21}c_{33} - c_{13}c_{22}c_{31} \\ &= +(1\cdot 1\cdot 0) + (1\cdot 0\cdot 1) + (1\cdot 1\cdot 0) - (1\cdot 0\cdot 0) - (1\cdot 1\cdot 0) - (1\cdot 1\cdot 1) \\ &= 0 + 0 + 0 - 0 - 0 - 1 \\ &= -1 \end{aligned}$$

Since $|C| \neq 0$, therefore **rows are independent.**