Step-1

Given

B_n is still the same as A_n except for $b_{11} = 1$

Using linearity in 1st row of determinants we get

$$|B_n| = \begin{vmatrix} 1 & -1 & 0 \\ -1 & & \\ & & A_{n-1} \\ 0 & & \end{vmatrix} = \begin{vmatrix} 2 & -1 & 0 \\ -1 & & \\ & & A_{n-1} \\ 0 & & \end{vmatrix} - \begin{vmatrix} 1 & 0 & 0 \\ -1 & & \\ & & A_{n-1} \\ 0 & & \end{vmatrix}$$

Step-2

On solving

$= |A_n| - |A_{n-1}|$ expanding 2nd determinant by 1st row

$= (n+1) - n$

$= 1$ For all $n \in N$

Thus

$|B_n| = \boxed{1}$