

2 En cas d'existence trouvez les matrices inverses de les matrices suivants:

$$(a) A = \begin{pmatrix} 1 & 1 & 2 \\ 2 & 1 & 2 \\ 0 & 1 & 1 \end{pmatrix} \Rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 2 & 1 & 0 & 0 \\ 2 & 1 & 2 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 2 & 1 & 0 & 0 \\ 0 & -1 & -2 & -2 & 1 & 0 \\ 0 & 1 & 1 & 0 & 0 & 1 \end{array} \right) \rightarrow$$

$$\rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 2 & 1 & 0 & 0 \\ 0 & -1 & -2 & -2 & 1 & 0 \\ 0 & 0 & -1 & -2 & 1 & 1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 2 & 1 & 0 & 0 \\ 0 & 1 & 2 & 2 & -1 & 0 \\ 0 & 0 & 1 & 2 & -1 & -1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 0 & -3 & 2 & 2 \\ 0 & 1 & 0 & -2 & 1 & 2 \\ 0 & 0 & 1 & 2 & -1 & -1 \end{array} \right) \rightarrow$$

$$\rightarrow \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & -1 & 1 & 0 \\ 0 & 1 & 0 & -2 & 1 & 2 \\ 0 & 0 & 1 & 2 & -1 & -1 \end{array} \right) \Rightarrow \boxed{A^{-1} = \begin{pmatrix} -1 & 1 & 0 \\ -2 & 1 & 2 \\ 2 & -1 & -1 \end{pmatrix}}$$

$$(b) B = \begin{pmatrix} 1 & 1 & 0 \\ 0 & 1 & 2 \\ 1 & 0 & -1 \end{pmatrix} \Rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 2 & 0 & 1 & 0 \\ 1 & 0 & -1 & 0 & 0 & 1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 2 & 0 & 1 & 0 \\ 0 & -1 & -1 & -1 & 0 & 1 \end{array} \right) \rightarrow$$

$$\rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 2 & 0 & 1 & 0 \\ 0 & 0 & 1 & -1 & 1 & 1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 2 & -1 & -2 \\ 0 & 0 & 1 & -1 & 1 & 1 \end{array} \right) \rightarrow \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & -1 & 1 & 2 \\ 0 & 1 & 0 & 2 & -1 & -2 \\ 0 & 0 & 1 & -1 & 1 & 1 \end{array} \right)$$

$$\Rightarrow \boxed{B^{-1} = \begin{pmatrix} -1 & 1 & 2 \\ 2 & -1 & -2 \\ -1 & 1 & 1 \end{pmatrix}}$$