12. En caso de ser posible, encontrar la matriz inversa de las siguientes matrices, aplicando definición. Verificar con el método de Gauss-Jordan

$$B=\begin{pmatrix}4 & 8\\ 3 & 5\end{pmatrix} \rightarrow B^{1}.B=I \rightarrow \begin{pmatrix}a_{11} & a_{12}\\ a_{21} & a_{22}\end{pmatrix}.\begin{pmatrix}4 & 8\\ 3 & 5\end{pmatrix}=\begin{pmatrix}1 & 0\\ 0 & 1\end{pmatrix}$$

$$\begin{cases}4a_{11}+3a_{12}=1\\ 4a_{21}+3a_{22}=0\\ 8a_{11}+5a_{12}=0\\ 8a_{21}+5a_{22}=1\end{cases} \rightarrow \begin{cases}4a_{11}+3a_{12}=1\\ 4a_{21}=-3a_{22}\\ 8a_{11}=-5a_{12}\\ 8a_{21}+5a_{22}=1\end{cases} \rightarrow \begin{cases}2(4a_{11}+3a_{12})=2.1\\ 4a_{21}=-3a_{22}\\ 8a_{11}=-5a_{12}\\ \frac{1}{2}(8a_{21}+5a_{22})=\frac{1}{2}\end{cases} \rightarrow$$

$$\rightarrow \begin{cases}8a_{11}+6a_{12}=2\\ 4a_{21}=-3a_{22}\\ 8a_{11}=-5a_{12}\\ 4a_{21}+\frac{5}{2}a_{22}=\frac{1}{2}\end{cases}$$

$$4a_{21}+\frac{5}{2}a_{22}=\frac{1}{2} \rightarrow -3a_{22}+\frac{5}{2}a_{22}=\frac{1}{2} \rightarrow -1/2\,a_{22}=\frac{1}{2} \rightarrow a_{22}=-1$$

$$8a_{11}+6a_{12}=2 \rightarrow -5a_{12}+6a_{12}=2 \rightarrow a_{12}=2$$

$$4a_{21}+\frac{5}{2}a_{22}=\frac{1}{2} \rightarrow 4a_{21}+\frac{5}{2}(-1)=\frac{1}{2} \rightarrow 4a_{21}-\frac{5}{2}=\frac{1}{2} \rightarrow 4a_{21}=\frac{5}{2}+\frac{1}{2}=3 \rightarrow a_{21}=\frac{3}{4}$$

$$8a_{11}=-5a_{12} \rightarrow 8a_{11}=-5.2=-10 \rightarrow a_{11}=\frac{-10}{8}=\frac{-5}{2}$$

$$B^{1}=\begin{pmatrix}a_{11} & a_{12}\\ a_{21} & a_{22}\end{pmatrix}=\begin{pmatrix}\frac{-5}{2} & 2\\ \frac{3}{4} & -1\end{pmatrix}$$

Por Gauss Jordan

$$\begin{pmatrix}4 & 8 & 1 & 0\\ 3 & 5 & 0 & 1\end{pmatrix} \begin{pmatrix}1 & 2 & 1/4 & 0\\ 3 & 5 & 0 & 1\end{pmatrix} \begin{pmatrix}1 & 2 & 1/4 & 0\\ 0 & -1 & -3/4 & 1\end{pmatrix} \begin{pmatrix}1 & 2 & 1/4 & 0\\ 0 & 1 & 3/4 & -1\end{pmatrix} \begin{pmatrix}1 & 0 & -5/4 & 2\\ 0 & 1 & 3/4 & -1\end{pmatrix}$$