Step-1

Given that E adds row 1 to row 2 and F adds row2 to row1. We have to check whether $EF \neq FE$.

Step-2

Since E adds row 1 to row 2 hence for the 2 by 2 matrix

$$E = \begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$$

Since F adds row 2 to row 1 hence for the 2 by 2 matrix

$$F = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}.$$

Step-3

Now
$$EF = \begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} 1 & 1 \\ 1 & 2 \end{pmatrix}$$

The entries in EF are rows times by column the first entry is 1.1+1.0=1, vise versa.

Step-4

$$FE = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} 2 & 1 \\ 1 & 1 \end{pmatrix}$$

The entries in FE are rows times by column the first entry is 1.1+1.1=2, vise versa.

Here EF and FE are not equal so $\boxed{EF \neq FE}$.