

problems

Section 7.8

$$\left( \begin{array}{ccc|ccc} -2 & 1 & -5 & 1 & 0 & 0 \\ 1 & 1 & 4 & 0 & 1 & 0 \\ 0 & 3 & 3 & 0 & 0 & 1 \end{array} \right) \xrightarrow{R_1 \leftrightarrow R_2} \left( \begin{array}{ccc|ccc} 1 & 1 & 4 & 0 & 1 & 0 \\ -2 & 1 & -5 & 1 & 0 & 0 \\ 0 & 3 & 3 & 0 & 0 & 1 \end{array} \right) \xrightarrow{R_2+2R_1}$$

$$\left( \begin{array}{ccc|ccc} 1 & 1 & 4 & 0 & 1 & 0 \\ 0 & 3 & 3 & 1 & 2 & 0 \\ 0 & 3 & 3 & 0 & 0 & 1 \end{array} \right) \xrightarrow{\substack{R_2/3 \\ R_3-R_2}} \left( \begin{array}{ccc|ccc} 1 & 1 & 4 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1/3 & 2/3 & 0 \\ 0 & 0 & 0 & -1 & -2 & 1 \end{array} \right)$$

It is clear that  $A_R$  has a zero row  $\Rightarrow$  Rank  $A =$

$\Rightarrow$   $A$  is singular. So  $A^{-1}$  does not exist.

Moreover  $\det A = 0$

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$BA = I \Rightarrow B$  is a left inverse

$AC = I \Rightarrow C$  is a right inverse

$BA = AC$ . multiply by  $B$  from the right

$$B \underbrace{BA} = \underbrace{BAC} \Rightarrow$$

$$B \cdot I = I \cdot C \Rightarrow B = C.$$