

# Gaussian Elimination (Alternative Strategy for Inverses)

$$(A \mid I)$$

↓

$$(I \mid A^{-1})$$

- Whatever we do to one, we do to the other.

- We can...

• Swap rows

• add a multiple of one row to another

• multiply a row by a constant

$$\textcircled{1} \begin{pmatrix} 1 & 2 & 0 & | & 1 & 0 & 0 \\ 1 & 0 & 0 & | & 0 & 1 & 0 \\ 0 & 0 & -1 & | & 0 & 0 & 1 \end{pmatrix}$$

(Look for a good starting point)

$$\textcircled{2} \begin{pmatrix} 1 & 0 & 0 & | & 0 & 1 & 0 \\ 1 & 2 & 0 & | & 1 & 0 & 0 \\ 0 & 0 & -1 & | & 0 & 0 & 1 \end{pmatrix}$$

x -1

$$\textcircled{3} \begin{pmatrix} 1 & 0 & 0 & | & 0 & 1 & 0 \\ 1 & 2 & 0 & | & 1 & 0 & 0 \\ 0 & 0 & 1 & | & 0 & 0 & -1 \end{pmatrix}$$

$$\textcircled{4} \begin{pmatrix} 1 & 0 & 0 & | & 0 & 1 & 0 \\ 0 & 2 & 0 & | & 1 & -1 & 0 \\ 0 & 0 & 1 & | & 0 & 0 & -1 \end{pmatrix}$$

Take row 1 from 2

x 0.5

$$\textcircled{5} \begin{pmatrix} 1 & 0 & 0 & | & 0 & 1 & 0 \\ 0 & 1 & 0 & | & 0.5 & -0.5 & 0 \\ 0 & 0 & 1 & | & 0 & 0 & -1 \end{pmatrix}$$

x

Can do the columns instead but if you do then you have to be consistent. Cannot do both rows & columns for the same problem.