#Jenny

Finally I get this ebook, thanks for all these I can get now!

#Rio

Cool! I'am really happy

#Markus Jensen

I did not think that this would work, my best friend showed me this website, and it does! I get my most wanted eBook

#Hun Tsu

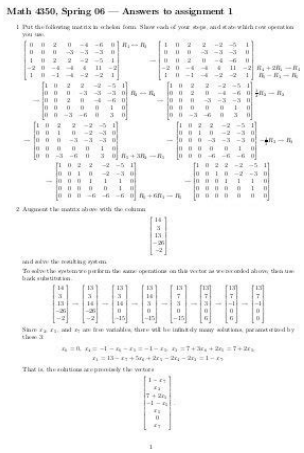
wtf this great ebook for free?!

#Che Salsa

My friends are so mad that they do not know how I have all the high quality ebook which they do not!

#Diego Butler

so many fake sites. this is the first one which worked! Many thanks



Math 4350, Spring 06 — Answers to assignment 1

1 Put the following matrix in echelon form. Show each of your steps, and state which row operation you use.

$$\begin{bmatrix} 0 & 0 & 2 & 0 & -4 & -6 & 0 \\ 0 & 0 & 0 & -3 & -3 & -3 & 0 \\ 1 & 0 & 2 & 2 & -2 & -5 & 1 \\ -2 & 0 & -4 & -4 & 4 & 11 & -2 \\ 1 & 0 & -1 & -4 & -2 & -2 & 1 \end{bmatrix} R_1 \leftrightarrow R_5 \rightarrow \begin{bmatrix} 1 & 0 & 2 & 2 & -2 & -5 & 1 \\ 0 & 0 & 0 & -3 & -3 & -3 & 0 \\ 0 & 0 & 2 & 0 & -4 & -6 & 0 \\ -2 & 0 & -4 & -4 & 4 & 11 & -2 \\ 1 & 0 & -1 & -4 & -2 & -2 & 1 \end{bmatrix} \begin{matrix} \\ \\ \\ R_4+2R_1 \to R_4 \\ R_5-R_1 \to R_5 \end{matrix}$$

$$\rightarrow \begin{bmatrix} 1 & 0 & 2 & 2 & -2 & -5 & 1 \\ 0 & 0 & 0 & -3 & -3 & -3 & 0 \\ 0 & 0 & 2 & 0 & -4 & -6 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -3 & -6 & 0 & 3 & 0 \end{bmatrix} R_2 \leftrightarrow R_4 \rightarrow \begin{bmatrix} 1 & 0 & 2 & 2 & -2 & -5 & 1 \\ 0 & 0 & 2 & 0 & -4 & -6 & 0 \\ 0 & 0 & 0 & -3 & -3 & -3 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -3 & -6 & 0 & 3 & 0 \end{bmatrix} \begin{matrix} \\ \frac{1}{2}R_2 \to R_2 \\ \\ \\ \end{matrix}$$

$$\rightarrow \begin{bmatrix} 1 & 0 & 2 & 2 & -2 & -5 & 1 \\ 0 & 0 & 1 & 0 & -2 & -3 & 0 \\ 0 & 0 & 0 & -3 & -3 & -3 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -3 & -6 & 0 & 3 & 0 \end{bmatrix} R_3 + 3R_2 \to R_3 \rightarrow \begin{bmatrix} 1 & 0 & 2 & 2 & -2 & -5 & 1 \\ 0 & 0 & 1 & 0 & -2 & -3 & 0 \\ 0 & 0 & 0 & -3 & -3 & -3 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -6 & -6 & -6 & 0 \end{bmatrix} -\frac{1}{3}R_3 \to R_3$$

$$\rightarrow \begin{bmatrix} 1 & 0 & 2 & 2 & -2 & -5 & 1 \\ 0 & 0 & 1 & 0 & -2 & -3 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -6 & -6 & -6 & 0 \end{bmatrix} R_4 + 6R_3 \to R_4 \rightarrow \begin{bmatrix} 1 & 0 & 2 & 2 & -2 & -5 & 1 \\ 0 & 0 & 1 & 0 & -2 & -3 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

2 Augment the matrix above with the column

$$\begin{bmatrix} 14 \\ 3 \\ 13 \\ -20 \\ -2 \end{bmatrix}$$

and solve the resulting system.

To solve the system we perform the same operations on this vector as we recorded above, then use back substitution.

$$\begin{bmatrix} 14 \\ 3 \\ 13 \\ -20 \\ -2 \end{bmatrix} \rightarrow \begin{bmatrix} 13 \\ 3 \\ 14 \\ -26 \\ -2 \end{bmatrix} \rightarrow \begin{bmatrix} 13 \\ 3 \\ 14 \\ 0 \\ -15 \end{bmatrix} \rightarrow \begin{bmatrix} 13 \\ 14 \\ 3 \\ 0 \\ -15 \end{bmatrix} \rightarrow \begin{bmatrix} 13 \\ 7 \\ 3 \\ 0 \\ -15 \end{bmatrix} \rightarrow \begin{bmatrix} 13 \\ 7 \\ -3 \\ 0 \\ 6 \end{bmatrix} \rightarrow \begin{bmatrix} 13 \\ 7 \\ -1 \\ 0 \\ 6 \end{bmatrix} \rightarrow \begin{bmatrix} 13 \\ 7 \\ -1 \\ 0 \\ 0 \end{bmatrix}$$

Since x_2, x_5, and x_7 are free variables, there will be infinitely many solutions, parametrized by these 3:

$$x_6 = 0,\ x_4 = -1 - x_5 - x_7 = -1 - x_5,\ x_3 = 7 + 3x_4 + 2x_5 = 7 + 2x_5,$$
$$x_1 = 13 - x_7 + 5x_5 + 2x_4 - 2x_5 - 2x_7 = 1 - x_7$$

That is, the solutions are precisely the vectors

$$\begin{bmatrix} 1 - x_7 \\ x_2 \\ 7 + 2x_5 \\ -1 - x_5 \\ x_5 \\ 0 \\ x_7 \end{bmatrix}$$

1

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