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MTH317: Linear Algebra
Professor Sussan
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Homework #1 - 1.17

✓ **1.17** Use Gauss's Method to find the unique solution for each system.

(a) $\begin{aligned} 2x+3y &= 13 \\ x-y &= -1 \end{aligned}$ (b) $\begin{aligned} x \quad -z &= 0 \\ 3x+y \quad &= 1 \\ -x+y+z &= 4 \end{aligned}$

(a) $2x+3y=13$ $\xrightarrow{-\frac{1}{2}\rho_1+\rho_2}$ $2x+3y=13$
$x-y=-1$ $0x-\frac{5}{2}y=-\frac{15}{2}$

$\boxed{y=3}$

$2x+3y=13$
$2x+3(3)=13$
$2x+9=13$
$-9 \quad -9$
$2x=4$
$\boxed{x=2}$

(b) $x \quad -z=0$
$3x+y \quad =1$
$-x+y+z=4$

$\xrightarrow{-3\rho_1+\rho_2\to\rho_2}$
$\rho_1+\rho_3\to\rho_3$

$x \quad -z=0$
$y+3z=1$
$\boxed{y=4}$

$\xrightarrow{-\rho_2+\rho_3\to\rho_3}$

$x \quad -z=0$
$y+3z=1$
$-3z=3$
$\boxed{z=-1}$

$x-z=0$
$x-(-1)=0$
$x+1=0$
$\boxed{x=-1}$