PRINT Your Name:______________________________________

Quiz for August 23, 2005

Solve

$$\begin{aligned} x_1 + 2x_2 - x_3 &= 2 \\ x_1 + x_2 + x_3 &= 3 \end{aligned}$$

Express your answer in the form $x = at + b$, $y = ct + d$, and $z = et + f$.

ANSWER: Replace $E2$ with $E2 - E1$ to obtain:

$$\begin{aligned} x_1 + 2x_2 - x_3 &= 2 \\ -x_2 + 2x_3 &= 1 \end{aligned}.$$

Replace $E2$ with $-E2$ to obtain:

$$\begin{aligned} x_1 + 2x_2 - x_3 &= 2 \\ x_2 - 2x_3 &= -1 \end{aligned}.$$

Replace $E1$ with $E1 - 2E2$ to obtain:

$$\begin{aligned} x_1 \quad + 3x_3 &= 4 \\ x_2 - 2x_3 &= -1 \end{aligned}.$$

The general solution of the system of equations is:

$$\boxed{\begin{aligned} x_1 &= 4 - 3x_3 \\ x_2 &= -1 + 2x_3 \\ x_3 &= x_3 \end{aligned}}$$

Check When $x_3 = 0$, the solution is $x_1 = 4$, $x_2 = -1$, and $x_3 = 0$. This works because:

$$\begin{aligned} 4 - 2 &= 2 \\ 4 - 1 &= 3 \end{aligned}$$

Also, when $x_3 = 1$, the solution is $x_1 = 1$, $x_2 = 1$, and $x_3 = 1$. This works because:

$$\begin{aligned} 1 + 2 - 1 &= 2 \\ 1 + 1 + 1 &= 3 \end{aligned}$$