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Quiz for August 23, 2005

Solve

$$x_1 + 2x_2 - x_3 = 2$$

$$x_1 + x_2 + x_3 = 3$$

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

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

$$\begin{array}{r} x_1 + 2x_2 - x_3 = 2 \\ -x_2 + 2x_3 = 1 \end{array}$$

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

$$\begin{array}{r} x_1 + 2x_2 - x_3 = 2 \\ x_2 - 2x_3 = -1 \end{array}$$

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

$$\begin{array}{r} x_1 + 3x_3 = 4 \\ x_2 - 2x_3 = -1 \end{array}$$

The general solution of the system of equations is:

$x_1 = 4 - 3x_3$
$x_2 = -1 + 2x_3$
$x_3 = x_3$

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

$$4 - 2 = 2$$

$$4 - 1 = 3$$

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

$$1 + 2 - 1 = 2$$

$$1 + 1 + 1 = 3$$