

**NAME:** \_\_\_\_\_  
(Last, First)

2. Find the system of equations with the augmented matrix  $\begin{bmatrix} 1 & 0 & 3 & -2 \\ 0 & 1 & -2 & 1 \end{bmatrix}$ .

(New instructions: **Do solve** the system!)

This matrix is a “reduced row echelon” matrix. We’re supposed to be able to solve by “just write out the equations,” with no computation. The system is

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

- . We identify  $z$  as the **free variable** (as will be explained) and use  $z = t$  as our parameter. We solve the first equation for the **leading variable**, which is  $x$  in this case, and get  $x = -2 - 3t$ . In the second equation the leading variable is  $y$ , and we get  $y = 1 + 2t$ . We recognize these as parametric equations of a line, with vector form  $[x, y, z] = [-2, 1, 0] + t[-3, 2, 1]$ , which is our solution of this linear system.

1. For the system

$$\begin{aligned}2x_1 + 2x_2 - 3x_4 &= 0 \\ -x_1 - x_2 + x_3 + x_4 - x_5 &= 2 \\ x_1 + x_2 + x_3 - 2x_4 - x_5 &= 2\end{aligned}$$

the augmented matrix is

$$\left[ \begin{array}{cccccc} 2 & 2 & 0 & -3 & 0 & 0 \\ -1 & -1 & 1 & 1 & -1 & 2 \\ 1 & 1 & 1 & -2 & -1 & 2 \end{array} \right]$$

Solution: