$$w - x - y + 2z = 1$$
$$y - z = 1$$

w, y; leading variables

x, z; free variables

$$y = z + 1$$
$$w = 1 + x + y - 2z$$
$$= 2 + x - z$$

$$\begin{bmatrix} w \\ x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 + x - z \\ x \\ z + 1 \\ z \end{bmatrix}$$

$$= \begin{bmatrix} 2 \\ 0 \\ 1 \\ 0 \end{bmatrix} + x \begin{bmatrix} 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} + z \begin{bmatrix} -1 \\ 0 \\ 1 \\ 1 \end{bmatrix}$$

Def. The rank of a matrix is # of nonzero rows in