

# HW 3.5b

Thursday, February 17, 2022 11:00 PM

$$16. \begin{bmatrix} 1 & 1 & -3 \\ 0 & 2 & 1 \\ 1 & -1 & -4 \end{bmatrix} \cdot \begin{bmatrix} 7 \\ -1 \\ 2 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

(yes)

$$27. \begin{bmatrix} 1 & -1 & 0 \\ -1 & 0 & 1 \\ 0 & 1 & -1 \end{bmatrix} \xrightarrow[r_2]{r_2+r_1, -r_2} \begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & -1 \\ 0 & 1 & -1 \end{bmatrix}$$

$$\xrightarrow[r_3-r_2]{r_1+r_2} \begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & -1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\text{basis for Span} = \left\{ \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix} \right\}$$

$$18. \begin{bmatrix} 1 & 1 & -3 \\ 0 & 2 & 1 \\ 1 & -1 & -4 \end{bmatrix} \xrightarrow[r_3+r_2]{r_3-r_1, \frac{r_2}{2}} \begin{bmatrix} 1 & 1 & -3 \\ 0 & 2 & 1 \\ 0 & 0 & 0 \end{bmatrix} \xrightarrow[r_1-\frac{1}{2}r_2]{-\frac{1}{2}r_2} \begin{bmatrix} 1 & 0 & -\frac{7}{2} \\ 0 & 1 & \frac{1}{2} \\ 0 & 0 & 0 \end{bmatrix}$$

$$\text{basis row}(A) = \left\{ \begin{bmatrix} 1 & 0 & -\frac{7}{2} \end{bmatrix}, \begin{bmatrix} 0 & 1 & \frac{1}{2} \end{bmatrix} \right\}$$

$$\text{col}(A) = \left\{ \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} \right\}$$

$$\text{null}(A) = X = \begin{bmatrix} 7/2 \\ -1/2 \\ 1 \end{bmatrix}$$

33. Non-zero rows = linearly independent = they span  
therefore, they form a basis for Row(R)