$$3.5.\{12,\ 18,\ 20,\ 46,\ 48,\ 58\}$$

3.5.12 Determine whether **b** is in $col(A)$ and whether **w** is in $row(A)$, as in Example 3.41.

$$A = \begin{bmatrix} 1 & 1 & -3 \\ 0 & 2 & 1 \\ 1 & -1 & -4 \end{bmatrix}, \mathbf{b} = \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \mathbf{w} = \begin{bmatrix} 2 & 4 & -5 \end{bmatrix}$$

■

3.5.18 Give bases for $row(A)$, $col(A)$, and $null(A)$.

$$A = \begin{bmatrix} 1 & 1 & -3 \\ 0 & 2 & 1 \\ 1 & -1 & -4 \end{bmatrix}$$

∎

3.5.20 Give bases for $row(A)$, $col(A)$, and $null(A)$.

$$A = \begin{bmatrix} 2 & -4 & 0 & 2 & 1 \\ -1 & 2 & 1 & 2 & 3 \\ 1 & -2 & 1 & 4 & 4 \end{bmatrix}$$

3.5.46 Answer Exercises 45 - 48 by considering the matrix with the given vectors as its columns. Do $\begin{bmatrix} 1 \\ -1 \\ 3 \end{bmatrix}$, $\begin{bmatrix} -1 \\ 5 \\ 1 \end{bmatrix}$, $\begin{bmatrix} 1 \\ -3 \\ 1 \end{bmatrix}$ form a basis for $\mathbb{R}^3$?

■

3.4.48 Answer Exercises 45 - 48 by considering the matrix with the given vectors as its columns. Do $\begin{bmatrix} 1 \\ -1 \\ 0 \\ 0 \end{bmatrix}$, $\begin{bmatrix} 0 \\ 1 \\ 0 \\ -1 \end{bmatrix}$, $\begin{bmatrix} 0 \\ 0 \\ -1 \\ 1 \end{bmatrix}$, $\begin{bmatrix} -1 \\ 0 \\ 1 \\ 0 \end{bmatrix}$ form a basis for $\mathbb{R}^4$?

3.5.58 If A and B are $n \times n$ matrices of rank n, prove that AB has rank n.

■