1. **B**

2. **D**

3. **E**

4. **D**

5. **A**

6. **C**

7. **B**

8. (1) $r = 0$

   (2) $[\mathbf{b}]_{\mathcal{B}} = \begin{bmatrix} -3 \\ 2 \end{bmatrix}$.

9. (1) The REDUCED row echelon form for the matrix A is $\begin{bmatrix} 1 & 2 & 0 & 0 \\ 0 & 0 & 1 & 2 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$.

   (2) A basis for the null space of A is $\left\{ \begin{bmatrix} -2 \\ 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ -2 \\ 1 \end{bmatrix} \right\}$. Answer may vary!

10. (1) The determinant of A is 6.

    (2) $b_{14} = \dfrac{4}{3}$.