HW6 Solutions

3.3

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

The cofactors are

$$C_{11} = (+1)\begin{vmatrix} 0 & 0 \\ 1 & 1 \end{vmatrix} = 0 \qquad C_{21} = (-1)\begin{vmatrix} -2 & -1 \\ 1 & 1 \end{vmatrix} = 1$$

$$C_{12} = (-1)\begin{vmatrix} 3 & 0 \\ -1 & 1 \end{vmatrix} = -3 \qquad C_{22} = (+1)\begin{vmatrix} 0 & -1 \\ -1 & 1 \end{vmatrix} = -1$$

$$C_{13} = (+1)\begin{vmatrix} 3 & 0 \\ -1 & 1 \end{vmatrix} = 3 \qquad C_{23} = (-1)\begin{vmatrix} 0 & -2 \\ -1 & 1 \end{vmatrix} = 2$$

$$C_{31} = (+1)\begin{vmatrix} -2 & -1 \\ 0 & 0 \end{vmatrix} = 0, \qquad C_{32} = (-1)\begin{vmatrix} 0 & -1 \\ 3 & 0 \end{vmatrix} = -3$$

$$C_{33} = (+1)\begin{vmatrix} 0 & -2 \\ 3 & 0 \end{vmatrix} = 6.$$

$$\therefore \operatorname{adj}(A) = C^T = \begin{bmatrix} 0 & -3 & 3 \\ 1 & -1 & 2 \\ 0 & -3 & 6 \end{bmatrix}^T = \begin{bmatrix} 0 & 1 & 0 \\ -3 & -1 & -3 \\ 3 & 2 & 6 \end{bmatrix}$$

$$|A| = (-1)(3)\begin{vmatrix} -2 & -1 \\ 1 & 1 \end{vmatrix} = -3(-1) = 3$$

$$\therefore A^{-1} = \frac{1}{|A|}\operatorname{adj}(A) = \begin{bmatrix} 0 & 1/3 & 0 \\ -1 & -1/3 & -1 \\ 1 & 2/3 & 2 \end{bmatrix}.$$