For each of the following, factor the matrix A into a product QDQ^T where Q is orthogonal and D is diagonal.

(a) $A = \begin{bmatrix} -1 & 1 & 1 \\ 1 & -4 & 2 \\ 1 & 2 & -4 \end{bmatrix}$

$Q = \begin{bmatrix} \square & \square & \square \\ \square & \square & \square \\ \square & \square & \square \end{bmatrix}$, $D = \begin{bmatrix} \square & 0 & 0 \\ 0 & \square & 0 \\ 0 & 0 & \square \end{bmatrix}$.

(b) $A = \begin{bmatrix} -6 & -2 & 2 \\ -2 & -4 & 4 \\ 2 & 4 & -4 \end{bmatrix}$

$Q = \begin{bmatrix} \square & \square & \square \\ \square & \square & \square \\ \square & \square & \square \end{bmatrix}$, $D = \begin{bmatrix} \square & 0 & 0 \\ 0 & \square & 0 \\ 0 & 0 & \square \end{bmatrix}$.

For each of the following, factor the matrix A into a product QDQ^T where Q is orthogonal and D is diagonal.

(a) $A = \begin{bmatrix} -1 & 1 & 1 \\ 1 & -4 & 2 \\ 1 & 2 & -4 \end{bmatrix}$

$Q = \begin{bmatrix} 0 & -\sqrt{3}/3 & \sqrt{6}/3 \\ -\sqrt{2}/2 & \sqrt{3}/3 & \sqrt{6}/6 \\ \sqrt{2}/2 & \sqrt{3}/3 & \sqrt{6}/6 \end{bmatrix}$, $D = \begin{bmatrix} -6 & 0 & 0 \\ 0 & -3 & 0 \\ 0 & 0 & 0 \end{bmatrix}$.

(b) $A = \begin{bmatrix} -6 & -2 & 2 \\ -2 & -4 & 4 \\ 2 & 4 & -4 \end{bmatrix}$

$Q = \begin{bmatrix} 0 & -\sqrt{3}/3 & \sqrt{6}/3 \\ \sqrt{2}/2 & \text{-}\sqrt{3}/3 & -\sqrt{6}/6 \\ \sqrt{2}/2 & \sqrt{3}/3 & \sqrt{6}/6 \end{bmatrix}$, $D = \begin{bmatrix} 0 & 0 & 0 \\ 0 & -10 & 0 \\ 0 & 0 & -4 \end{bmatrix}$.