

"On my honor, I have neither given nor received any unauthorized and inappropriate assistance for all sessions of this exam. The work done on this exam is totally my own. I understand that by the school code, violation of these principles will lead to a zero grade and is subject to harsh disciplinary measures."

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~~Answer~~

$$1) \quad A = \begin{bmatrix} 10 & -7 & 0 \\ -3 & 2 & 6 \\ 5 & -1 & 5 \end{bmatrix} = LU = \underbrace{\begin{bmatrix} 1 & 0 & 0 \\ * & 1 & 0 \\ * & * & 1 \end{bmatrix}}_L \underbrace{\begin{bmatrix} * & * & * \\ 0 & * & * \\ 0 & 0 & * \end{bmatrix}}_U$$

$$= \begin{bmatrix} 1 & 0 & 0 \\ -3/10 & 1 & 0 \\ 5/10 & 1 & 1 \end{bmatrix} \begin{bmatrix} 10 & -7 & 0 \\ 0 & -1/10 & 6 \\ 0 & 0 & 1 \end{bmatrix}$$

$$-3 = f_{21} \cdot 10 \quad -\frac{3}{10}$$

$$2 = -\frac{3}{10} \cdot -7 + a_{22}$$

$$2 - \frac{21}{10} = -\frac{1}{10} = a_{22}$$