

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 3 (A)

Question 1. (4 marks) Use the given information to find A:

$$(2I + 3A^T)^{-1} = \begin{bmatrix} 2 & 4 \\ 1 & 4 \end{bmatrix}$$

$$((2I + 3A^T)^{-1})^{-1} = \begin{bmatrix} 2 & 4 \\ 1 & 4 \end{bmatrix}^{-1}$$

$$2I + 3A^T = \frac{1}{8-4} \begin{bmatrix} 4 & -4 \\ -1 & 2 \end{bmatrix}$$

$$2I + 3A^T = \begin{bmatrix} 1 & -1 \\ -1/4 & 1/2 \end{bmatrix}$$

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

$$3A^T = \begin{bmatrix} -1 & -1 \\ -1/4 & -3/2 \end{bmatrix}$$

$$A^T = \frac{1}{3} \begin{bmatrix} -1 & -1 \\ -1/4 & -3/2 \end{bmatrix}$$

$$A^T = \begin{bmatrix} -1/3 & -1/3 \\ -1/12 & -1/2 \end{bmatrix}$$

$$(A^T)^T = \begin{bmatrix} -1/3 & -1/3 \\ -1/12 & -1/2 \end{bmatrix}^T$$

$$A = \begin{bmatrix} -1/3 & -1/12 \\ -1/3 & -1/2 \end{bmatrix}$$

Question 2. (2 marks) Find a nonzero 3×3 matrix such that $A^T = -A$.

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

ANY MATRIX
OF THE TYPE

$$\begin{bmatrix} 0 & x & y \\ -x & 0 & z \\ -y & -z & 0 \end{bmatrix}$$

Question 3. (4 marks) Circle the elementary matrices. For each elementary matrix state the corresponding operation.

$$\begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 5 \\ 0 & 0 & 1 \end{bmatrix}$$

$R_2 + 5R_3$

$$\begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$$

$R_1 \leftrightarrow R_2$

$$\begin{bmatrix} 3 & 0 & 0 & 3 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$