Name: ________________________________ Quiz 1 - MAT345

Problem 1 (15 points; 3 points each)**.** Decide if each of the following is true or false.

(a) _____ If A and B are $n \times n$ symmetric matrices, then $AB + BT$ is symmetric.

(b) _____ Given a matrix A, there might be more than one reduced row echelon form of A.

(c) _____ If A is a 2×4 matrix, then $A\boldsymbol{x} = \mathbf{0}$ has at least two free variables.

(d) _____ $A^2 + 2AB + B^2 = (A + B)^2$ for all square $n \times n$ matrices A and B.

(e) _____ For A a 3×6 matrix, let E be the matrix so that EA is the result of the row op $R_2 - 3R_1 \to R_2$ applied to A. Then the second row of E is $\begin{bmatrix} -3 & 1 & 0 \end{bmatrix}$.

Problem 2 (25 points)**.** Solve $A\boldsymbol{x} = \mathbf{0}$ for

$$A = \begin{bmatrix} 5 & 5 & 15 & -3 \\ -3 & 0 & -3 & 0 \\ 5 & 4 & 13 & 5 \end{bmatrix}$$

Follow the procedure discussed in class

- (10 points) Use elementary row ops to reduce to an echelon matrix.
- (10 points) Write down the resulting triangular system and use back-substitution to solve.
- (5 points) Write out your solution as a linear combination of vectors.

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