Linear Algebra

Instructions Please write your name in the upper right-hand corner of the page. Use complete sentences, along with any necessary supporting calculations, to answer the following questions.

1. Find all values of t for which

$$\det \begin{pmatrix} 0 & 0 & 0 & t \\ 1 & 0 & t & * \\ 0 & 2 & 0 & * \\ 1 & * & 3 & * \end{pmatrix} = 0.$$

(The asterisks represent unspecified numbers that you do not need to know to solve the problem.)

Linear Algebra

2. Fill in the three indicated matrix entries in the following equation that expresses a certain matrix as the product of a lower triangular matrix times an upper triangular matrix:

$$\begin{pmatrix} 1 & 7 & * \\ 3 & 23 & * \\ 0 & 8 & * \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 \\ \square & 1 & 0 \\ \square & \square & 1 \end{pmatrix} \begin{pmatrix} * & * & * \\ 0 & * & * \\ 0 & 0 & * \end{pmatrix}$$

(The asterisks represent unspecified numbers that you do not need to know to solve the problem.)