

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. Fill in the four blanks in the following matrix product:

$$\begin{pmatrix} \square & 0 & \square \\ \square & 0 & \square \end{pmatrix} \begin{pmatrix} 0 & 1 \\ 2 & 3 \\ 4 & 5 \end{pmatrix} = \begin{pmatrix} 16 & 23 \\ 0 & 1 \end{pmatrix}.$$

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2. Write the vector $\begin{pmatrix} -4 \\ 6 \end{pmatrix}$ as a linear combination of the two vectors $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$. In other words, find numbers x_1 and x_2 such that

$$x_1 \begin{pmatrix} 1 \\ 2 \end{pmatrix} + x_2 \begin{pmatrix} 3 \\ 4 \end{pmatrix} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}.$$