Please work only one problem per page, starting with the pages provided, and identify all continuations clearly.

[1] Find an orthogonal basis for the subspace $V$ of $\mathbb{R}^4$ spanned by the vectors $(1, 0, 0, 1)$, $(0, 1, 0, 1)$, $(0, 0, 1, 1)$.

answer:

work:
[2] By least squares, find the equation of the form $y = ax + b$ which best fits the data
$(x_1, y_1) = (-1, 0), (x_2, y_2) = (0, 0), (x_3, y_3) = (1, 1), (x_4, y_4) = (2, 0)$.

answer:

work:
[3] Find \((s, t)\) so \[
\begin{bmatrix}
1 & 0 \\
0 & 1 \\
1 & 1 \\
1 & 1
\end{bmatrix}
\begin{bmatrix}
s \\
t
\end{bmatrix}
\] is as close as possible to \[
\begin{bmatrix}
0 \\
0 \\
0 \\
1
\end{bmatrix}.
\]

\[answer:\]

\[work:\]
Let $A = \begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}$. Write $A$ as $CDC^{-1}$ for a diagonal matrix $D$.

answer:

work:
Let \( A = \begin{bmatrix} 2 & 1 & -2 \\ 2 & 1 & -2 \\ 3 & 1 & -3 \end{bmatrix} \). Write \( A \) as \( CDC^{-1} \) for a diagonal matrix \( D \).

answer:

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work:
[6] Let \( A = \begin{bmatrix} -2 & 1 \\ -1 & 0 \end{bmatrix} \). Find the matrix exponential \( e^{At} \).

\[
\text{answer: }
\]

\[
\text{work: }
\]
[7] Let \( A = \begin{bmatrix} 2 & 1 & -1 \\ -1 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix} \). Find the matrix exponential \( e^{At} \).

answer:

work:
Problem: _____