Name:

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1. Find the exponential, e^{At}, of this matrix: $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ -2 & -2 & -2 \end{bmatrix}$.

   Hint: A is nilpotent, i.e., $A^k = 0$ for a k that you should find.

2. Find the eigenvalues and eigevectors of $\boldsymbol{A} = \begin{bmatrix} 1 & 2 \\ 0 & -5 \end{bmatrix}$ and then write A as $A = TDT^{-1}$ (the diagonal transformation).