1. Let $A = \begin{bmatrix} 1 & -18 \\ -3 & 4 \end{bmatrix}$
   (a) Find the eigenvectors and eigenvalues of A
   (b) Factor A into a product PDP^{-1}.
   (c) Use your factorization to compute A^{20}.

2. Construct a matrix A with eigenvalues $0, 2, 3$ and eigenvectors $(1, 3, -2)$, $(3, 2, 0)$, and $(-2, 1, 4)$, respectively.

3. Is $A = \begin{bmatrix} 3 & -1 \\ 1 & 1 \end{bmatrix}$ diagonalizable?

4. True or False
   (a) If A is diagonalizable, then A invertible.
   (b) If A is invertible, then A is diagonalizable.