Solution (#947) Let A be a diagonalizable $n \times n$ matrix and let $k \geqslant 0$ be an integer. This then means that there is an invertible P such that

$$P^{-1}AP = D$$

is diagonal. So

$$P^{-1}A^k P = \left(P^{-1}AP\right)^k = D^k$$

which is also diagonal. Hence A^k is diagonalizable.

We have already seen in #925 that

$$B = \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}$$

is not diagonalizable, yet $B^2 = 0_{22}$ is diagonal and hence diagonalizable.