Solution (#935) Let

$$B = \begin{pmatrix} 7 & -2 \\ 2 & 2 \end{pmatrix}.$$

Show that there exists an invertible matrix P such that $P^{-1}BP = \mathrm{diag}(3, 6)$ so that

$$p(B) = Pp(P^{-1}BP)P^{-1} = P \begin{pmatrix} p(3) & 0 \\ 0 & p(6) \end{pmatrix} P^{-1}.$$

for any polynomial $p(x)$.