



**Exercise 8.12:** Let  $\mathbf{D}(a, b)$  be the  $2 \times 2$  diagonal matrix having  $a$  and  $b$  on its diagonal. Let  $a_1 = -(a_{11} + a_{22})$  and  $a_2 = a_{11}a_{22} - a_{12}a_{21}$ . Let  $\mathbf{A} = \mathbf{B}\mathbf{D}(a, b)\mathbf{B}^{-1}$ . Then  $p(\mathbf{D}(a, b)) = \mathbf{D}^2 + a_1\mathbf{D} + a_2\mathbf{I} = \mathbf{O}$ , and it follows that  $p(\mathbf{A}) = \mathbf{B}p(\mathbf{D})\mathbf{B}^{-1} = \mathbf{O}$ .