

Let  $A$  be a real  $n \times n$  matrix such that  $A^3 = 0$ .

- (a) Prove that there is a unique real  $n \times n$  matrix  $X$  that satisfies the equation

$$X + AX + XA^2 = A.$$

- (b) Express  $X$  in terms of  $A$ .