2. Dimension $n(n+1)/2$. One basis is all symmetric 0–1 matrices that are zero everywhere except for either one 1 on the diagonal or two 1’s off the diagonal.

3. a) No. (It is not self-adjoint.)
   b) Yes.
   \[
   \begin{pmatrix}
   \sqrt{2} & 0 \\
   \frac{1}{1+\sqrt{2}} & 1 
   \end{pmatrix}
   \]
   c) No.
   d) Okay, this question is impossible. According to Maple, answer is $(\sqrt{10} \pm \sqrt{2})/2$. 