10. Let $A$ be a particular vector in $R^{2x2}$. Determine whether the following are subspaces of $R^{2x2}$:

 (a) $S\_{1}=\left\{BA=0\right\}$

 (b) $S\_{2}=\left\{AB\ne BA\right\}$

 (c) $S\_{3}=\left\{AB + B=0\right\}$