1. A 3 × 3 matrix is called a magic square if the sum of the entries in each row, each column and the two main diagonals are all the same.
   a. Show that the set $M$ of magic squares is a subspace of $\mathbb{R}^{3\times3}$.
   b. Find a basis $B$ for $M$.
   c. What is the dimension of $M$.

   Hint: You need to solve a fairly large system of equations. You may want to use the Linear Algebra Toolkit available on the course web site.