# Magic square

In a magic square (3x3 as the case is below), the sum of all rows, columns, and the two main diagonals, is the same.   Find the missing numbers in the following two magic squares  (the missing numbers can be positive, negative, or zero):

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Sum = 9

|   |   |   |
|---|---|---|
|   | 3 |   |
| 1 |   | 5 |

===

Sum = 6

|   |   |   |
|---|---|---|
|   | 2 |   |
| 1 |   | 5 |

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However, some of these squares have no solution. For example, try this one:

Sum = 9

|   |   |   |
|---|---|---|
|   | 2 |   |
| 1 |   | 5 |

Question:

Given a Sum and the 3 elements at the location as described (but any values), can you immediately determine if there is a solution to the magic square?

Some specific guides and rules:
1. Show your work.
2. Submit your answers to hints 1 and 2 below:
   a. **Hint 1:** Create another 2 magic squares that have a solution. That is, decide on the sum, the first 3 elements as described, and see if you can solve it.
   b. **Hint 2:** Create another 2 magic squares that do not have solutions (you might already have these with your tries for the previous Hint!).

General rules for challenge questions:
1. You are allowed to work with a group and collaborate with up to 3 people.
2. If you work as a group (or collaborate), keep in mind:
   a. Each member should submit her/his own work.
   b. Each member needs to write the names of all group members on the work.
3. You are allowed to have external (adult, tutor, etc.) help, but please don't solicit for the full solution. The goal is for you yourself to try and solve it, and understand the subtleties of the problem. Again, please note that as well on the sheet. NO points will be taken off: I just want to have a real appreciation of how the class is doing on these.
4. Have fun solving it!!

=== End ====