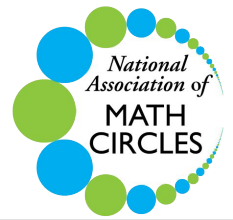


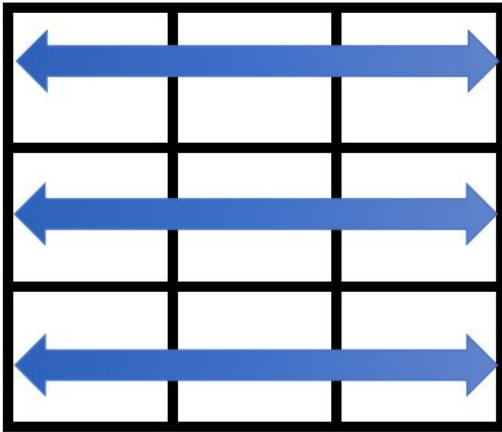


# Magic Squares

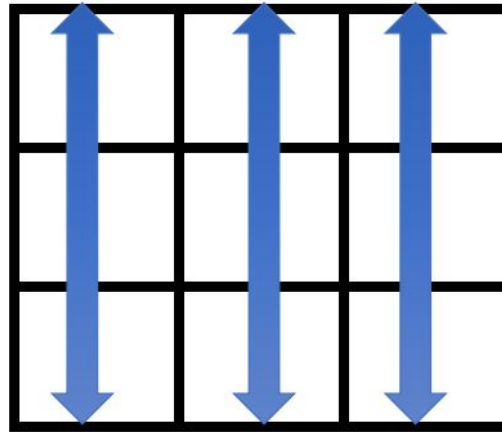


Can you arrange the cards 1, 2, 3, 4, 5, 6, 7, 8, 9 in a 3 by 3 square so that:

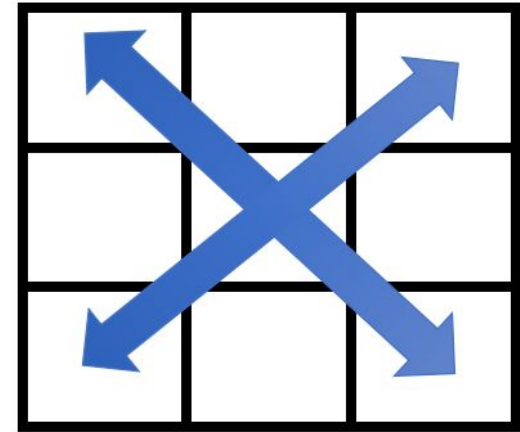
Every Row



Every Column



Every Diagonal



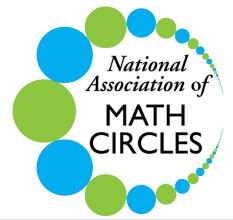
Add up to the same *magic number*.

## Challenges

1. Are there multiple ways to solve this puzzle? Does anything stay the same for each solution? Can you find multiple *magic numbers* that all the rows, columns, and diagonals can sum up to?
2. Now replace your number 1 card with a 10. Can you make a magic square with these numbers? Can you predict what the *magic number* is for these cards before you attempt to build your square?
3. Use cards to represent the numbers 3 through 11. Can you make a magic square with these cards?



# Magic Squares




## Extra Challenges

1. Choose a set of 9 consecutive numbers. Can you make a magic square with these numbers?
2. Can you find a rule for finding the *magic number* for any set of 9 consecutive numbers?
3. Can you create a magic square for the even numbers 2, 4, 6, ..., 16, 18.
4. Can you create a magic square for the numbers -4, -3, -2, -1, 0, 1, 2, 3, 4?
5. For any set of 9 integers  $n, n+1, \dots, n+8$ , can you find their *magic number* and create a magic square using those 9 numbers?
6. Can you find sets of non-consecutive numbers that make a magic square? Does your answer from question 5 generalize to any other sets?

To help answer the questions above, write your numbers on cards or scraps of paper to construct your magic squares in the 3 by 3 grid on the left.