CRITERIA FOR A 9X9 MAGIC SQUARE

With a 9x9 grid of squares, using a coordinate system of Rows (r) and Columns (c) that start at the upper left square with (r0,c0):

9x9 SQUARE:

• Main Columns (a string of 9 numbers that pass from top to bottom of the 9x9 grid = 369
The nine “Main Columns” of the full 9x9 grid are:

From Top Down: (r0,c0) to (r8,c0) = 369
From Top Down: (r0,c1) to (r8,c1), passing through three 3x3 center squares at (r1,c1) and (r4,c1) and (r7,c1) = 369
From Top Down: (r0,c2) to (r8,c2) = 369
From Top Down: (r0,c3) to (r8,c3) = 369
From Top Down: (r0,c4) to (r8,c4), passing through three 3x3 center squares at (r1,c4) and (r4,c4) and (r7,c4) = 369
From Top Down: (r0,c5) to (r8,c5) = 369
From Top Down: (r0,c6) to (r8,c6) = 369
From Top Down: (r0,c7) to (r8,c7), passing through three 3x3 center squares at (r1,c7) and (r4,c7) and (r7,c7) = 369
From Top Down: (r0,c8) to (r8,c8) = 369

• Main Rows (a string of 9 numbers that pass from Left to Right across the 9x9 grid = 369
The nine “Main Rows” of the full 9x9 grid are:

From Left to Right: (r0,c0) to (r0,c8) = 369
From Left to Right: (r1,c0) to (r1,c8), passing through three 3x3 center squares at (r1,c1) and (r1,c4) and (r1,c7) = 369
From Left to Right: (r2,c0) to (r2,c8) = 369
From Left to Right: (r3,c0) to (r3,c8) = 369
From Left to Right: (r4,c0) to (r4,c8), passing through three 3x3 center squares at (r4,c1) and (r4,c4) and (r4,c7) = 369
From Left to Right: (r5,c0) to (r5,c8) = 369
From Left to Right: (r6,c0) to (r6,c8) = 369
From Left to Right: (r7,c0) to (r7,c8), passing through three 3x3 center squares at (r7,c1) and (r7,c4) and (r7,c7) = 369
From Left to Right: (r8,c0) to (r8,c8) = 369

• Main Diagonals (a string of 9 numbers that pass from corner to corner of the 9x9 grid, through the center squares of the 3x3 blocks) = 369
The two “Main Diagonals” of the full 9x9 grid are:

From Upper Left: (r0,c0) to (r8,c8), passing through three 3x3 center squares at (r1,c1) and (r4,c4) and (r7,c7) = 369
From Lower Left: (r8,c0) to (r0,c8), passing through three 3x3 center squares at (r7,c1) and (r4,c4) and (r1,c7) = 369

• Secondary Pan Diagonals (a string of 6 numbers that pass through the center squares of the off center 3x3 blocks) = 246
The four “Secondary Pan Diagonals” of the full 9x9 grid are:

Upper Left: (r5,c0) to (r0,c5), passing through two 3x3 center squares at (r4,c1) and (r1,c4) = 246
Upper Right: (r0,c3) to (r5,c8), passing through two 3x3 center squares at (r1,c4) and (r4,c7) = 246
Lower Right: (r3,c8) to (r8,c3), passing through two 3x3 center squares at (r4,c7) and (r7,c4) = 246
Lower Left: (r8,c5) to (r3,c0), passing through two 3x3 center squares at (r7,c4) and (r4,c1) = 246

• Tertiary Pan Diagonals (a string of 3 numbers that pass through the center square of the corner 3x3 blocks) = 123
The four “Tertiary Pan Diagonals” of the full 9x9 grid are:

Upper Left: (r2,c0) to (r0,c2), passing through one 3x3 center square at (r1,c1) = 123
Upper Right: (r0,c6) to (r2,c8), passing through one 3x3 center square at (r1,c7) = 123
Lower Right: (r6,c8) to (r8,c6), passing through one 3x3 center square at (r7,c7) = 123
Lower Left: (r8,c2) to (r6,c0), passing through one 3x3 center square at (r7,c1) = 123

As an example: The Upper Left Tertiary Diagonal (123) can be combined with the Upper Right Secondary Diagonal (246) to be considered Pan Diagonal = 369.
That Tertiary Diagonal (123) could also be combined with the Lower Left Secondary Diagonal (246) to be considered Pan Diagonal = 369. They both “Wrap” either way.

3x3 SUB SQUARE:

• Sub Columns (a string of 3 numbers taken from the center of three 3x3 blocks) = 123
The three “Sub Columns” of the Sub Square are:

From Top Down: (r1,c1) and (r4,c1) and (r7,c1) = 123
From Top Down: (r1,c4) and (r4,c4) and (r7,c4) = 123
From Top Down: (r1,c7) and (r4,c7) and (r7,c7) = 123

• Sub Rows (a string of 3 numbers taken from the center of three 3x3 blocks) = 123
The three “Sub Rows” of the Sub Square are:

From Left to Right: (r1,c1) and (r1,c4) and (r1,c7) = 123
From Left to Right: (r4,c1) and (r4,c4) and (r4,c7) = 123
From Left to Right: (r7,c1) and (r7,c4) and (r7,c7) = 123

• Sub Diagonals (a string of 3 numbers taken from the center of three 3x3 blocks) = 123
The two “Sub Diagonals” of the Sub Square are:

From Upper Left: (r1,c1) and (r4,c4) and (r7,c7) = 123
From Lower Left: (r7,c1) and (r4,c4) and (r1,c7) = 123

Each of these individual locations is to be combined and considered as one 3x3 Magic Square within the larger 9x9 Magic Square.

3x3 BLOCKS:

• Middle Columns (a string of 3 numbers within a 3x3 block) = 123
The nine “Middle Columns” of the 3x3 blocks are:

From Top Down: (r0,c1) and (r1,c1) and (r2,c1) = 123
From Top Down: (r0,c4) and (r1,c4) and (r2,c4) = 123
From Top Down: (r0,c7) and (r1,c7) and (r2,c7) = 123

From Top Down: (r3,c1) and (r4,c1) and (r5,c1) = 123
From Top Down: (r3,c4) and (r4,c4) and (r5,c4) = 123
From Top Down: (r3,c7) and (r4,c7) and (r5,c7) = 123

From Top Down: (r6,c1) and (r7,c1) and (r8,c1) = 123
From Top Down: (r6,c4) and (r7,c4) and (r8,c4) = 123
From Top Down: (r6,c7) and (r7,c7) and (r8,c7) = 123

• Middle Rows (a string of 3 numbers within a 3x3 block) = 123
The nine “Middle Rows” of the 3x3 blocks are:

From Left to Right: (r1,c0) and (r1,c1) and (r1,c2) = 123
From Left to Right: (r1,c3) and (r1,c4) and (r1,c5) = 123
From Left to Right: (r1,c6) and (r1,c7) and (r1,c8) = 123

From Left to Right: (r4,c0) and (r4,c1) and (r4,c2) = 123
From Left to Right: (r4,c3) and (r4,c4) and (r4,c5) = 123
From Left to Right: (r4,c6) and (r4,c7) and (r4,c8) = 123

From Left to Right: (r7,c0) and (r7,c1) and (r7,c2) = 123
From Left to Right: (r7,c3) and (r7,c4) and (r7,c5) = 123
From Left to Right: (r7,c6) and (r7,c7) and (r7,c8) = 123

• Middle Diagonals (a string of 3 numbers that pass through the center square of a 3x3 block) = 123
The eighteen “Middle Diagonals” of the 3x3 blocks are:

From Upper Left: (r0,c0) and (r1,c1) and (r2,c2) = 123
From Lower Left: (r2,c0) and (r1,c1) and (r0,c2) = 123

From Upper Left: (r0,c3) and (r1,c4) and (r2,c5) = 123
From Lower Left: (r2,c3) and (r1,c4) and (r0,c5) = 123

From Upper Left: (r0,c6) and (r1,c7) and (r2,c8) = 123
From Lower Left: (r2,c6) and (r1,c7) and (r0,c8) = 123

From Upper Left: (r3,c0) and (r4,c1) and (r5,c2) = 123
From Lower Left: (r5,c0) and (r4,c1) and (r3,c2) = 123

From Upper Left: (r3,c3) and (r4,c4) and (r5,c5) = 123
From Lower Left: (r5,c3) and (r4,c4) and (r3,c5) = 123

From Upper Left: (r3,c6) and (r4,c7) and (r5,c8) = 123
From Lower Left: (r5,c6) and (r4,c7) and (r3,c8) = 123

From Upper Left: (r6,c0) and (r7,c1) and (r8,c2) = 123
From Lower Left: (r8,c0) and (r7,c1) and (r6,c2) = 123

From Upper Left: (r6,c3) and (r7,c4) and (r8,c5) = 123
From Lower Left: (r8,c3) and (r7,c4) and (r6,c5) = 123

From Upper Left: (r6,c6) and (r7,c7) and (r8,c8) = 123
From Lower Left: (r8,c6) and (r7,c7) and (r6,c8) = 123

• Hidden Rows, Columns and Diagonals (a string of 6 numbers between 3x3 center squares) = 246
From Left to Right: (r1,c0) + (r1,c2) + (r1,c3) + (r1,c5) + (r1,c6) + (r1,c8) = 246
From Left to Right: (r4,c0) + (r4,c2) + (r4,c3) + (r4,c5) + (r4,c6) + (r4,c8) = 246
From Left to Right: (r7,c0) + (r7,c2) + (r7,c3) + (r7,c5) + (r7,c6) + (r7,c8) = 246

From Top to Bottom: (r0,c1) + (r2,c1) + (r3,c1) + (r5,c1) + (r6,c1) + (r8,c1) = 246
From Top to Bottom: (r0,c4) + (r2,c4) + (r3,c4) + (r5,c4) + (r6,c4) + (r8,c4) = 246
From Top to Bottom: (r0,c7) + (r2,c7) + (r3,c7) + (r5,c7) + (r6,c7) + (r8,c7) = 246

From Upper Left: (r0,c0) + (r2,c2) + (r3,c3) + (r5,c5) + (r6,c6) + (r8,c8) = 246
From Lower Left: (r8,c0) + (r6,c2) + (r5,c3) + (r3,c5) + (r2,c6) + (r0,c8) = 246

• Columns and Rows of each 3x3 block that are adjacent to center of each 3x3 block produce totals
with digits that add together and reduce to 3 for one of them and 9 for the other.

As an optional requirement - not necessary but would make your square thee most awesome -
Columns and Rows of each 3x3 block that are adjacent to the center square of each 3x3 block would produce totals
that reduce to a 3 for one of them and a 9 for the other, when their digits are added together to a single digit, so that,
when combined with the 123 totals (6) from the Middle Columns and Middle Rows, an additional iteration of 3, 6, 9 is revealed!

Another option that might be completely impossible, would be to have the four 3x3 sub squares that we see in
The PalmPrints 9x9 Magic Square!