

# Magic Square Of Squares Search

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We have determined that, for the following central squares, there are no  $3 \times 3$  magic squares with distinct entries with at least 7 squares (besides symmetries and  $k^2$  multiples of the known one). All primes factors considered are of the form  $p \equiv 1(4)$ . Note if there is no such magic square with central square  $x^2$  then no square factor of  $x^2$  is the central square of such a square (e.g. since  $(13*17)^{100}$  is not the central square of such a square, neither is  $13^2 17^{80}$  or  $13^{92} 17^{40}$ , etc.).

The search continues. Software (including source) for performing such a search is available for download (get it at <http://london314.brinkster.net/MagicSearcher.zip> – it is currently Windows-only since Mono does not support mixed mode assemblies) and a distributed computing project is in the works. The actual computational engine has been partitioned out into a .NET Assembly called MagicLibrary that can be easily used in other search applications. Please improve the code and send it back!

## Two Distinct Prime Factors

- $(p_1 p_2)^4$  with  $13 \leq p_1 < p_2 \leq 99989$ .
- $(p_1 p_2)^8$  with  $5 \leq p_1 \leq 89$  and  $5 \leq p_2 \leq 10,000,000$
- $(p_1 p_2)^{10}$  with  $13 \leq p_1 < p_2 \leq 9949$ .
- $(p_1 p_2)^{14}$  with  $13 \leq p_1 < p_2 \leq 1993$ .
- $(p_1 p_2)^{24}$  with  $13 \leq p_1 < p_2 \leq 977$ .
- $(p_1 p_2)^{50}$  with  $13 \leq p_1 < p_2 \leq 89$ .
- $(p_1 p_2)^{100}$  with  $13 \leq p_1 < p_2 \leq 17$ .

## Three Distinct Prime Factors

- $(p_1 p_2 p_3)^4$  with  $13 \leq p_1 < p_2 < p_3 \leq 4973$ .
- $(p_1 p_2 p_3)^6$  with  $13 \leq p_1 < p_2 < p_3 \leq 1993$ .
- $(p_1 p_2 p_3)^{10}$  with  $13 \leq p_1 < p_2 < p_3 \leq 457$ .
- $(p_1 p_2 p_3)^{16}$  with  $13 \leq p_1 < p_2 < p_3 \leq 89$ .

## Four Distinct Prime Factors

- $(p_1 p_2 p_3 p_4)^4$  with  $13 \leq p_1 < p_2 < p_3 < p_4 \leq 457$ .
- $(p_1 p_2 p_3 p_4)^6$  with  $13 \leq p_1 < p_2 < p_3 < p_4 \leq 89$ .

## Five Distinct Prime Factors

$(p_1 p_2 p_3 p_4 p_5)^2$  with  $13 \leq p_1 < p_2 < p_3 < p_4 < p_5 \leq 457$ .

$(p_1 p_2 p_3 p_4 p_5)^4$  with  $13 \leq p_1 < p_2 < p_3 < p_4 < p_5 \leq 89$ .

## Six Distinct Prime Factors

$(p_1 p_2 p_3 p_4 p_5 p_6)^2$  with  $5 \leq p_1 < p_2 < p_3 < p_4 < p_5 < p_6 \leq 89$ .

## Seven Distinct Prime Factors

$(p_1 p_2 p_3 p_4 p_5 p_6 p_7)^2$  with  $5 \leq p_1 < p_2 < p_3 < p_4 < p_5 < p_6 < p_7 \leq 53$ .