137 First Prime of Form, First Prime expressed with Four Base Numbers of Number Type

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Abstract

Where N is a counting number, one hundred and thirty-seven is the first prime number to take the form of 2 [(2N+2) (2N+2)] + NN , if N equals 3 then prime number is one hundred and thirty-seven.

Main text

$2(2N+2)^2 + N^2$= prime number, N is a counting number.

All solutions to the above equation are Pythagorean primes[1] therefore all solutions may be expressed: $X^2 + Y^2 = 2(2N+2)^2 + N^2$ = prime number, (X & Y counting numbers). When expressed as such, four base variables are related to any solution prime number (X, Y, 2N+2, N). Let any number equal to any prime number raised to any counting number be a "counting prime" type number. Of the first 14 solutions: solutions with 4 base variables that are counting primes; 137, solutions with 3 base variables that are counting primes; 881,2273, solutions with 2 base variables that are counting primes; 313,10337,60353, solutions with 1 base variable that is a counting prime; 7001,11593, 14321, 20641,30161, 54601, 63337, solutions with no base variable that is a counting prime; 43961.

prime $2(2N+2)^2 + N^2$	X	Y	2N+2	N
137	11	4	8	3
*	11^1	2^2	2^3	3^1
313	13	12	12	5
*	13^1	*	*	5^1
881	25	16	20	9
*	5^2	2^4	*	3^2
2273	47	8	32	15
*	47^1	2^3	2^5	*
7001	76	35	56	27
*	*	*	*	3^3
10337	79	64	68	33
*	79^1	2^6	*	*
11593	107	12	72	35
*	107^1	*	*	*
14321	89	80	80	39
*	89^1	*	*	*
20641	120	79	96	47
*	*	*	*	47^1

30161	169	40	116	57
*	13^2	*	*	*
43961	205	44	140	69
*	*	*	*	*
54601	180	149	156	77
*	*	149^1	*	*
60353	193	152	164	81
*	193^1	*	*	3^4
63337	219	124	168	83
*	*	*	*	83^1

[2]

Conclusion

137 is the first prime number of the form $2(2N+2)^2$+N^2

137 is the first prime number expressed as $2(2N+2)^2 + N^2 = X^2 + Y^2$ with four base numbers that are of the "counting prime" number type. If a second example exists, it is unknown.

[1]Pythagorean prime, Prime Numbers Library, https://prime-numbers.info

[2] List of prime numbers up to 1000000000000, http://compoasso.free.fr