A Numerical Experiment on Fermat's Theorem
(not intended as formal proof or disproof)

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Fermat's "Last Theorem" asserts that if n > 2, the equation
x^n + y^n = z^n cannot be solved in integers x, y, z, with xyz <> 0:
http://www.fortunecity.com/emachines/e11/86/mathex5.html.

Theorem:
For any triplets of numbers (a,b,c) obeying Pythagorean theorem
we have a^2+b^2=c^2.

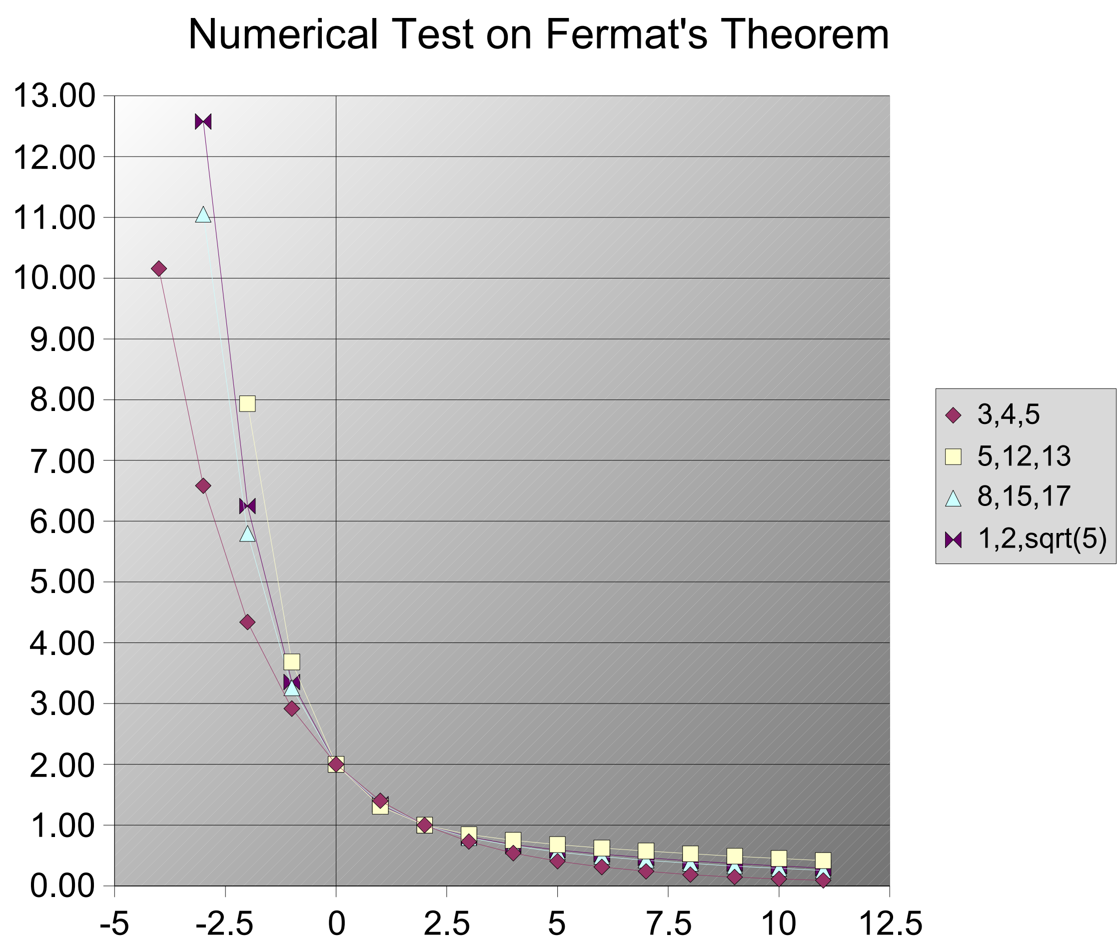
It perhaps could be shown (numerically) that :
a^n+b^n=c^n,
or:
(a^n+b^n)/c^n=k =1 (Fermat's Surface)
holds true if and only if n=2. (Generalized Fermat's Last Theorem)

First try: 3, 4, 5 (3^2 + 4^2 = 5^2)
Second try: 5,12,13 (5^2+12^2=13^2)
Third try: 6, 8,10 (6^2 + 8^2 = 10^2)
Fourth try: 1, 2, sqrt (1^2 + 2^2 = 2.236^2)

N	K First try	K Second try	K Third try	K Fourth try
	3,4,5	5,12,13	8,15,17	1,2,sqrt(5)
-5				
-4	10.16			
-3	6.58		11.05	12.58
-2	4.34	7.93	5.80	6.25
-1	2.92	3.68	3.26	3.35
0	**2.00**	**2.00**	2.00	**2.00**
1	1.40	1.31	1.35	1.34
2	**1.00**	**1.00**	**1.00**	**1.00**
3	0.73	0.84	0.79	0.81
4	0.54	0.75	0.66	0.68
5	0.41	0.68	0.56	0.59
6	0.31	0.62	0.48	0.52
7	0.24	0.57	0.42	0.46
8	0.18	0.53	0.37	0.41
9	0.14	0.49	0.33	0.37
10	0.11	0.45	0.29	0.33
11	0.09	0.41	0.25	0.29

Conclusions:

(i) It is clear from the diagram that for the triplets (3,4,5) and (5,12,13) k=1 only at n=2.
(ii) For other triplets of numbers it perhaps does not obey the same formula.
(iii) But generally speaking, from the Chart given below it appears that:
=> **For n < 2 --> k tends > 1;**
=> **For n > 2 --> k tends < 1.**
(iv) For triplets of numbers (a,b,c), which do not follow the Pythagorean Triangle (> 180 degrees or < 180 degrees), i.e. when the triangle is on curved-surface, then Fermat theorem could be broken.
(v) We can make an 'associated condition': for the same triplets of (a,b,c) following Pythagorean theorem a^2+b^2=c^2, it follows that for n=0 then (a^n+b^n)/c^n=k will yield k=2 (of course).



References (for similar simplified proof of Fermat's Theorem):

[1] http://www.fortunecity.com/emachines/e11/86/mathex5.html
[2] http://www.economics.ox.ac.uk/Members/giuseppe.mazzarino/Fermat_March_2003.pdf
[3] http://www.skidmore.edu/academics/theater/productions/arcadia/math.html
[4] http://www.fermatproof.com/
[5] http://www.itsoc.org/review/05pl1.pdf
[6] http://yacas.sourceforge.net/Algochapter3.html
[7] http://www.blackdouglas.com.au/webpapr/workmath/workmath.htm

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