A ***Non****-Abstract Algebraic* Proof of Fermat's Last Theorem

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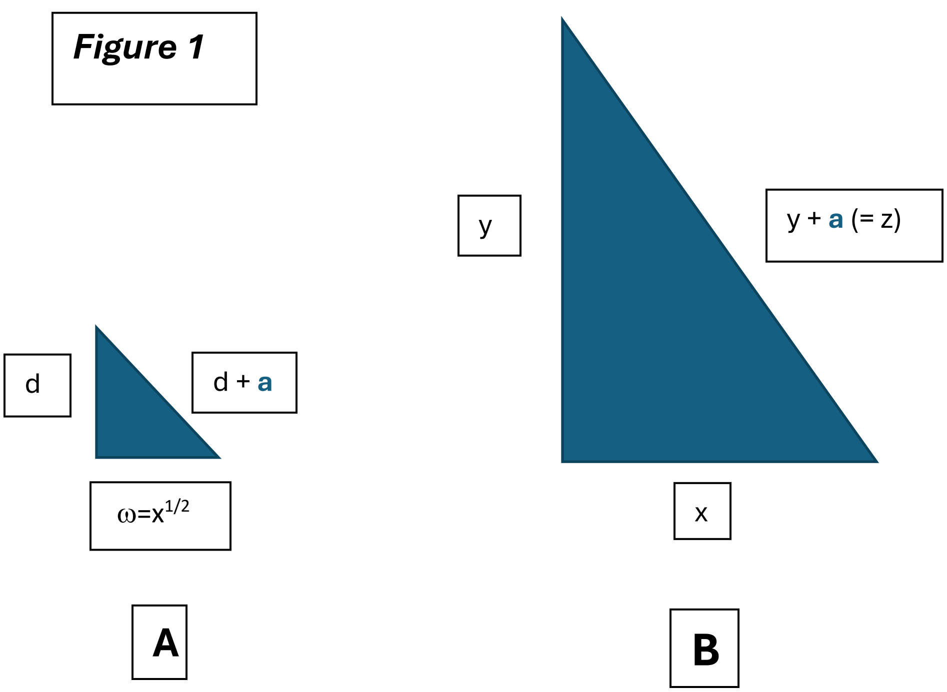
The *only* ***universal*** restriction to the set forming *Pythagorean Triples* (of the (n=2) second order) can be represented by the following equivalent identities labeled as **(#1)** and **(#2)** respectively:-

For any base **x** where $\mathbf{X_0^2+Y_0^2=Z_0^{\,2}}$ and $\mathbf{a=Z_0-Y_0}$

#1) $\mathbf{(2ax_0+a^2)^2 + (2ax_0^2+2a^2\,x_0+(a^3 - a)/2)^2 = (2ax_0^2+2a^2\,x_0+(a^3 - a)/2)^2}$

Consider two right-triangles, **A** and **B** (*Figure 1*) which are related in that



a) the base of the larger triangle (**B**) is the square of the base of the smaller triangle (**A**)

b) the difference between the hypotenuse and the vertical arms of both triangles is the same and equal to some measure, "**a**"

c) we will be interested in framing the vertical arms, "***x***" and "***y***", of the both triangles, (**A**) and (**B**), as functions of the vertical arm, "***d***", of the smaller triangle, (**A**), as well as of the difference, "**a**".

$$x = (\square = x^{1/2})^2 = (d + \mathbf{a})^2 - d^2 = (2\mathbf{a}d + \mathbf{a}^2) = \underline{2a \bullet a^2{}_d}$$

$$x^2 = (y + \mathbf{a})^2 - y^2 = (2\mathbf{a}y + \mathbf{a}^2) = (2\mathbf{a}d + \mathbf{a}^2)^2 = 4\,\mathbf{a}^2d^2 + 4\mathbf{a}^3d + \underline{a^4}$$

$$2\mathbf{a}y = 4\,\mathbf{a}^2d^2 + 4\mathbf{a}^3d + \mathbf{a}^4 - \mathbf{a}^2$$

$$y = 2\mathbf{a}d^2 + 2\mathbf{a}^2d + (\mathbf{a}^3 - \mathbf{a})/2 = \underline{2a \bullet 2a^2 \bullet (a^3 - a)/2_d}$$

$$z = y + \mathbf{a} = \underline{2a \bullet 2a^2 \bullet (a^3 + a)/2_d}$$

And if $\mathbf{Z_1 - Y_1 = 1}$, substituting $\mathbf{k=a^{-1}}$ and $\mathbf{x_1=x_0+(a-1)/2}$, then :-

#2) $$\mathbf{k[(2x_1+1)^2 + (2x_1^2+2x_1)^2 = (2x_1^2+2x_1+1)^2]}$$

or where subscripts represent the base variable "$\mathbf{x_1}$" and "**·**" separates its powers,

#2a) $$\mathbf{k[(2\cdot1_{x1})^2 + (2\cdot2\cdot0_{x1})^2 = (2\cdot2\cdot1_{x1})^2]}$$

Then, if some $\mathbf{X_1^n + Y_1^n = Z_1^n}$ were to represent another true identity, it would of necessity map to any other true identity including, but not limited to, $\mathbf{X_0^2 + Y_0^2 = Z_0^2}$**.** So, dividing both sides of $\mathbf{X_1^n + Y_1^n = Z_1^n}$ by $\mathbf{k=(Z_1-Y_1)}$, and letting $\mathbf{A= X_1/k}$, $\mathbf{B= Y_1/k}$, and $\mathbf{C= Z_1/k}$, then $\mathbf{(C-B) = 1}$, ***and :-***

$$\mathbf{k(A^n + B^n = C^n)}$$

Therefore via identity #2a

$$\mathbf{k[\,(\sqrt[n]{(2\cdot1_{x1})^2})^n + (\sqrt[n]{(2\cdot2\cdot0_{x1})^2})^n = (\sqrt[n]{(2\cdot2\cdot1_{x1})^2})^n]}$$

substituting **A**=$\sqrt[n]{(2\cdot 1_{x1})^2}$, **B**= $\sqrt[n]{(2\cdot 2\cdot 0_{x1})^2}$ and **C**= $\sqrt[n]{(2\cdot 2\cdot 0_{x1})^2}$,

then in order for **A**, **B**, and **C** to all be ***non-zero*** and rational with any odd n>2, all three would of necessity have to have rational **2n**th roots - which were which seems on its face to be absurd as B and C differ by 1. This is confirmed via a very nice proof offered by Professor A. Rosenbloom of the University of Toronto, **since B and C differ by 1, and B=Y^{2n}, and C=B+1=Z^{2n}, then 1 = Z^{2n} - Y^{2n} and 1=(Z^n+Y^n)(Z^n-Y^n). Therefore both (Z^n+Y^n) and (Z^n-Y^n) must divide and equal 1 implying either Z or Y =0 and the other =1.**

And, therefore, FLT must hold for non-zero rationals with any odd n>2.