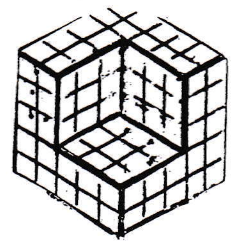
Fermat's Last Theorem with Algebra

To avoid superfluous calculation, the Theorem is herein defined as an even number raised to cube or higher power, which never equals the sum or difference of two odd numbers raised to the same power.

Algebra for the even number is the formula for the Pythagorean Theorem recorded in Euclid, which requires that any power of an even number be the product of the sum times the difference of its binomial roots, which are the sum and difference of squares of whatever two numbers, multiplied, equal half of the even number. For example, when 4 is the even number, the result of this arithmetic is the familiar "three-four-five" right triangle known as the "Cornerstone of Mathematics."

Algebra for the two odd numbers is derived from the geometry of 5 cubed minus 3 cubed, as shown below:

that's two 5by5 bottom squares plus three L-shaped top layers, each 5by5 minus 3by3. The algebra generalizes 5 as a, 3 as b, and the power of cubes (3) as ^{n}



$$a^n - b^n = (a-b)\left(a^{n-1} + b \cdot \frac{a^{n-1} - b^{n-1}}{a-b}\right)$$

reversible to

$$a^n + b^n = (a+b)\left(a^{n-1} - b \cdot \frac{a^{n-1} - b^{n-1}}{a+b}\right)$$

Both equations serve as general-rules (a, b & ^{n} can be any numbers) but all that's needed here is proof that the sum or difference of the cubes is a product of the sum or difference of binomial roots a & b.

Since any power of an even number must be the product of both the sum and difference of the binomial roots, it will never equal the sum or difference of the odd numbers raised to the same power.

Moreover, the sum or difference of the roots is the only even factor of the odd-number equations, but not the only even factor of any power of an even number.

Below, the general rules are upscaled to resemble Special Products listed in factorization sections of reference and algebra books where they might provide information not otherwise available.

$$a^n + b^n = (a+b)\left(a^{n-1} - ab \cdot \frac{a^{n-2} + b^{n-2}}{a+b} + b^{n-1}\right)$$

$$a^n - b^n = (a-b)\left(a^{n-1} + ab \cdot \frac{a^{n-2} - b^{n-2}}{a-b} + b^{n-1}\right)$$

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