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Fermat's Last Theorem is True

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Abstract: ***According to Fermat's Last Theorem there would be integer number a, b & z such that, $a^n + b^n = z^n$ Where n is a integer. In this topic we are going to show that such assumption as Fermat's Last Theorem is true.***

Proof

We know that $(a+b)^n = \sum_{k=0}^{n} \binom{n}{k} a^k b^{(n-k)} = a^n + b^n + \sum_{k=1}^{(n-1)} \binom{n}{k} a^k b^{(n-k)}$

$(a+b)^n = a^n + b^n + abn(n-1) \sum_{k=1}^{(n-1)} \frac{1}{k(n-k)} \sum_{k=0}^{(n-2)} \binom{n-2}{k} a^k b^{(n-2-k)}$

$(a+b)^n = a^n + b^n + abn(n-1)(a+b)^{(n-2)} \left[\frac{1}{k(n-k)}\right]_{k=1 \text{ to } (n-1)}$

$1 = \frac{z^n}{(a+b)^n} + \frac{abn(n-1)}{(a+b)^2} \left[\frac{1}{k(n-k)}\right]_{k=1 \text{ to } (n-1)}$

$\left(\frac{z}{a+b}\right)^n = 1 - \frac{abn(n-1)}{(a+b)^2} \left[\frac{1}{k(n-k)}\right]_{k=1 \text{ to } (n-1)}$

$Z = (a+b)\left\{1 - \frac{abn(n-1)}{(a+b)^2} \left[\frac{1}{k(n-k)}\right]_{k=1 \text{ to } (n-1)}\right\}^{1/n}$

Where matrix $\left[\frac{1}{k(n-k)}\right]_{k=1 \text{ to } (n-1)} = f(n)$

Now if a:b =A:B and k is factor then, a= kA and b= kB and $Z = k(A+B)\left\{1 - \frac{ABn(n-1)}{(A+B)^2} f(n)\right\}^{1/n}$

So, this is the criteria to fulfill Fermat's Last Theorem for two given number a, b choose a suitable constant "k" such that Z will be an integer.

Now, for n = 3 f(n)= ½ thus $Z = k(A+B)\left\{1 - \frac{ABn(n-1)}{(A+B)^2} f(n)\right\}^{1/n} = k(A+B)\left\{1 - \frac{3AB}{(A+B)^2}\right\}^{1/3}$

Example: 1

For, A=2 and B=3 $Z = k(2+3)\left\{1 - \frac{3.2.3}{(2+3)^2}\right\}^{1/3} = k \times 5\left(1 - \frac{18}{25}\right)^{1/3} = 3.27106631\, k$

Suppose k = 100000000 then Z = 327106631 and a = 200000000 and b = 300000000

Thus $(200000000)^3 + (300000000)^3 = (327106631)^3$

Example: 2

Let us assume (A+B) = 8 And Z= 6

Thus $6 = 8\left\{1 - \frac{3AB}{(8)^2}\right\}^{1/3}$ or $\left(\frac{3}{4}\right)^3 = 1 - \frac{3AB}{64}$ or 3AB = 64 – 27 = 37 or AB = 37/3 or B = 37/3A

So, A + 37/3A = 8 or $3A^2 - 24A + 37 = 0$ Thus by the formula of quadratic equation,

$A = (4 + \sqrt{11/3})$ and $B = (4 - \sqrt{11/3})$

Thus, $(4 + \sqrt{11/3})^3 + (4 - \sqrt{11/3})^3 = 6^3$ or $(5914854216)^3 + (2085145784)^3 = (6000000000)^3$

Hence $a^3 + b^3 = z^3$ is proved.

Conclusion

Thus the conclusion is Fermat's Last Theorem is true for which

" $Z = k(A+B)\left\{1 - \frac{ABn(n-1)}{(A+B)^2} f(n)\right\}^{1/n}$ "*is the criteria to fulfill*

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