Proof of Fermat's last theorem (Part II of III) $a^n + b^n = c^n$ (n > 1 and odd)

Objet: Proof of Fermat's last theorem with conventional means.

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Another way to approach research proof

$a^n + b^n = c^n$

$(a+b)^n = (c+d)^n$

$a^n + b^n + \sum_{k=1}^{n-1} \binom{n-1}{k} a^k b^{n-k} = c^n + d^n + \sum_{k=1}^{n-1} \binom{n-1}{k} c^k d^{n-k}$

$a^n + b^n + \sum_{k=1}^{n-1} \binom{n-1}{k} a^k b^{n-k} = c^n + d^n + \sum_{k=1}^{n-1} \binom{n-1}{k} c^k d^{n-k}$

$\sum_{k=1}^{n-1} \binom{n-1}{k} a^k b^{n-k} = d^n + \sum_{k=1}^{n-1} \binom{n-1}{k} c^k d^{n-k}$

$d^n = \sum_{k=1}^{n-1} \binom{n-1}{k} a^k b^{n-k} - \sum_{k=1}^{n-1} \binom{n-1}{k} c^k d^{n-k}$

$d^n = \sum_{k=1}^{n-1} \binom{n-1}{k} (a^k b^{n-k} - c^k d^{n-k})$

I prove that ab - cd = (a - d) (b - d)

$c = a + b - d$

$ab - cd = ab - (a + b - d)d$

$ab - cd = ab - ad - bd + d^n$

$ab - cd = a(b - d) - d(b - d)$

$$ab - cd = (a - d)(b - d)$$

For n = 1, 2 or 3

n = 1	$(c+d)^1 = (a+b)^1$ $d^1 = a^1 + b^1 - c^1$ $\mathbf{d^1 = 0}$.
n = 2	$(c+d)^2 = (a+b)^2$ $c^2 + 2cd + d^2 = a^2 + 2ab + b^2$ $d^2 = a^2 + b^2 - c^2 + 2ab - 2cd$ $d^2 = 2ab - 2cd$ $\mathbf{d^2 = 2(a-d)(b-d)}$
n = 3	$(c+d)^3 = (a+b)^3$ $c^3 + 3c^2d + 3cd^2 + d^3 = a^3 + 3a^2b + 3ab^2 + b^3$ $d^3 = a^3 + b^3 - c^3 + 3a^2b + 3ab^2 - 3c^2d - 3cd^2$ $d^3 = 3(a^2b + ab^2 - c^2d - cd^2)$ $d^3 = 3(ab(a+b) - cd(c+d))$ $d^3 = 3(a+b)(ab-cd)$ $d^3 = 3(a+b)(a-d)(b-d)$