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THE BEAL's CONJECTURE SOLVING

ENUNCIATION CONJECTURE

If, $A^x + B^y = C^z$, *wnere* A, B, C, x, y *and* z, *are positive integers, and* x, y *and* z, *are all greater than* 2, *then* A, B *and* C, *must have a common prime factor*.

RATIONALE OF CALCULATION

The equation $A^x + B^y = C^z$. *may take form*: $A^x + B^y - C^z = 0$ (*zero*).

If, $A^x = B^y$, *or* $2A^x = 2B^y = C^z$, *then* $A^x + A^x = 2A^x = C^z$;

If, $C^z - A^x = B^y$, *or* $2A^x - A^x = B^y$, *then* $A^x + 2A^x - A^x = 2A^x$;

$A'x \div B^y = 1$, *or* $A^x \div (2A^x - A^x) = 1$;

$C^z \div A^x = 2$, *or* $2A^x \div A^x = 2$; $C^z \div B^y = 2$, *or* $2A^x \div (2A^x - A^x) = 2$.

Sample result from calculations with positive integers numbers:

If, $A = 2$; $x = 8$; $A^x + 2A^x - A^x = 2A^x$, *and* $2^8 + 2 \cdot 2^8 - 2^8 = 2 \cdot 2^8$, *then* $256 + 512 - 256 = 512$, *or* $512 = 512$.

FORMULA FOR SOLVING BEAL's CONJECTURE

Starting from the equation conjecture, $A^x + B^y = C^z$, *the author proposes to solve, following FORMULA*: $(N^n)^x + (N^n \cdot N^n)^{x/2} = N^{nx+1}$, *where*:

$N = 2$, *as basic number*; $N^n = A$;

$n = 1,2,3,...6$, *as number power – assistant*;

$x > 2$, *practical* ≥ 8, *as exponent*;

$(N^n)^x = A^x; (N^n \cdot N^n)^{x/2} = B^y; N^{nx+1} = C^z$.

APPLICATIONS:

$\underline{EXAMPLE}$ # 1. If, $\underline{N = 2; n = 2; x = 8;}$

$(2^1)^8 + (2^1 \cdot 2^1)^{x/2} = 2^{1 \cdot 8+1}$, *or* $2^8 + (2^2)^4 = 2^{8+1}$, *and* $2^8 + 2^8 = 2^9$;

$(N^n)^x = (2^1)^8 = 2^8 = 256,$ *for* A^x;

$(N^n \cdot N^n)^{x/2} = (2^1 \cdot 2^1)^{8/2} = (2^2)^4 = 2^8 = (2 \cdot 2)^{8/2} = 4^4 = 256,$ *for* B^y;

$N^{nx+1} = 2^{1 \cdot 8+1} = 2^{8+1} = 2^9 = (2 \cdot 2 \cdot 2)^{9/3} = 8^3 = 512,$ *for* C^z;

$A^x + B^y = C^z$, *or* $2^8 + 4^4 = 8^3$, *that* $256 + 256 = 512$;

For, $B^y = 2^8 = (2 \cdot 2)^{8/2} = 4^4$, *and for* $C^z = 2^9 = (2 \cdot 2 \cdot 2)^{9/3} = 8^3$, *after applyind the inverse proportionality rule.*

The sample is based on radicals and log*arithms*:

$a)$ *The base of as* $\underline{radical:}$ $A^x = p; \sqrt[x]{p} = A; \sqrt[8]{256} = 2; A = 2;$

$$B^y = p; \sqrt[y]{p} = B; \sqrt[4]{256} = 4; B = 4;$$

$$C^z = p; \sqrt[z]{2p} = C; \sqrt[3]{512} = 8; C = 8.$$

$b)$*The* exp*onent of as* $\underline{\log arithm}$: $\log\_A^{-} p = x; \log\_2^{-} 256 = 8; x = 8;$

$$\log\_B^{-} p = y;\ \log\_4^{-} 256 = 4; y = 4;$$

$$\log\_C^{-} 2P = z;\ \log\_8^{-} 512 = 3; z = 3;$$

$a, b)$ *Combination*: $A^x = 2^8 = 256; B^y = 4^4 = 256; C^z = 8^3 = 512;$

$$A^x + B^y = C^z, \text{ and } 2^8 + 4^4 = 8^3, \text{ that } 256 + 256 = 512.$$

$\underline{EXAMPLE}$ # 2. If, $\underline{N = 2; n = 2; x = 8;}$

$(2^2)^8 + (2^2 \cdot 2^2)^{8/2} = 2^{2 \cdot 8+1}$, *or* $2^{16} + (2^4)^4 = 2^{16+1}$, *and* $2^{16} + 2^{16} = 2^{17}$;

$(N^n)^x = (2^2)^8 = 2^{16} = (2 \cdot 2)^{16/2} = 4^8 = 65{,}536$ *for* A^x;

$(N^n \cdot N^n)^{x/2} = (2^2 \cdot 2^2)^{8/2} = (2^4)^4 = 2^{16} = (2 \cdot 2 \cdot 2 \cdot 2)^{16/4} = 16^4 = 65{,}536$ *for* B^y;

$N^{nx+1} = 2^{2 \cdot 8+1} = 2^{16+1} = 2^{17} = 131{,}072$ *for* C^z.

$A^x + B^y = C^z$, *or* $4^8 + 16^4 = 2^{17}$, *that* $65{,}536 + 65{,}536 = 131{,}072$;

For, $A^x = 2^{16} = (2 \cdot 2)^{16/2} = 4^8$, *and for* $B^y = (2 \cdot 2 \cdot 2 \cdot 2)^{16} / 4 = 16^4$, *after applying the inverse proportionality rule.*

The sample is based on radicals and thus logarithms:

a)The base of as <u>*radical*</u>: $A^x = p; \sqrt[x]{p} = A; \sqrt[8]{65{,}536} = 4; A = 4;$

$$B^y = p; \sqrt[y]{p} = B; \sqrt[4]{65{,}536} = 16; B = 16;$$

$$C^z = 2p; \sqrt[z]{2p} = C; \sqrt[17]{131{,}072} = 2; C = 2;$$

b)The exponent of as <u>*logarithm*</u>: $\log\_A^{-}p = x;\ \log\_4^{-}65{,}536 = 8; x = 8;$

$$\log\_B^{-}p = y;\ \log\_16^{-}65{,}536 = 4; y = 4;$$

$$\log\_C^{-}2p = z;\ \log\_2^{-}131{,}072 = 17;$$

a, b), Combination: $A^x = 4^8 = 65{,}536; B^y = 16^4 = 65{,}536; C^z = 2^{17} = 131{,}072;$

$$A^x + B^y = C^z, \textit{or } 4^8 + 16^4 = 2^{17}, \textit{that } 65{,}536 + 65{,}536 = 131{,}072 .$$

<u>*CONCLUSION AND COMMENTS*</u>

Consequently, the formula presented is valid, when: $n = 1$ $(2^8 + 4^4 = 8^3)$, *that* $(256 + 256 = 512)$, *and* $n = 2$ $(4^8 + 16^4 = 2^{17})$, *that* $(65{,}536 + 65536 = 131{,}072)$, *and confirm the Beal's Conjecture..The sample is based on combination of radicals and logarithms.*

For A^x, B^y *or,* C^z, *as the case, it was applied inverse proportionality rule*:
"*If, increases base by a number of times, exponent decreases by the same number of times, and vice – versa*" *because* $A \neq B \neq C$, *and* $x \neq y \neq z$.

If, $n = 3,4,5,6,$ *as variation for application of basic formula, check the conjecture.*

The formula for solving Beal's Conjecture, it is generally available when when A, B, C, x, y *and* z, *are positive integers*, A, B *and* C, *have common prime factor* $(2), x, y$ *and* $z \geq 8, n = 1,2,3,4,5,6$ *as number power – assistant and factor calculating openwork.*

The Beal's Conjecture, for solving has in mind of condition imposed, namely: A, B, C, x, y *and* z, *are positive integers* A, B *and* C, *have a common prime factor, and* x, y *and* $z > 2$.

This paper has been prepared to participate the competition BPC.