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**Title:** The Diophantine equation  $x^2 + 3^a \cdot 5^b \cdot 7^c \cdot 19^d = 4y^n$

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We find all integer solutions to  $x^2 + 3^a \cdot 5^b \cdot 7^c \cdot 19^d = 4y^n$  under the condition  $n \geq 3, ab, c, d \geq 0, x, y > 0$ , and  $\gcd(x, y) = 1$ . Our proof uses a deep result about primitive divisors of Lucas sequences in combination with elementary number theory and computer search.

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