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

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Abstract. We find all integer solutions to $x^2 + 3^a \cdot 5^b \cdot 7^c \cdot 19^d = 4y^n$ under the condition $n \geq 3$, $a, b, c, d \geq 0$, 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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