PROBLEM OF THE MONTH, NOVEMBER 2019

An infinite sequence of quadruples begins with the five quadruples $(1, 3, 8, 120)$, $(2, 4, 12, 420)$, $(3, 5, 16, 1008)$, $(4, 6, 20, 1980)$, $(5, 7, 24, 3432)$. Each quadruple (a, b, c, d) in this sequence has the property that the six numbers $ab + 1, ac + 1, bc + 1, ad + 1, bd + 1$, and $cd + 1$ are all perfect squares. Derive a formula for the n-th quadruple in the sequence and demonstrate that the property holds for every quadruple generated by the formula.

Submit your solutions to professor Dan Ismailescu, Mathematics Department via email at dan.p.ismailescu@hofstra.edu, or bring it in person at 103A Roosevelt Hall.