Covering a Triangular Number with Pentagonal Numbers

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PROPOSITION. For $n \in \mathbb{N}$, the following identity holds:

$$T_{6n-1} = 12P_n + 3n,$$

where T_n is the n th triangular number, and P_n is the n th pentagonal number.

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PROOF. The proof is demonstrated for $n = 5$. □

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