$$= \sum_{i=k-h}^{\infty} \binom{n - h + (k-1)(2-i)}{i}$$

$$= v_n \;, \quad \text{as required.}$$

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A NEW IMPORTANT FORMULA FOR LUCAS NUMBERS

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The formula

$$\frac{L_{10n}}{L_{2n}} = (L_{4n} - 3)^2 + (5F_{2n})^2 \tag{1}$$

may be easily verified putting $L_n = \alpha^n + \beta^n$,

$$F_n = \frac{\alpha^n - \beta^n}{\sqrt{5}} \;, \qquad \alpha\beta = -1 \;,$$

Since for $n > 0$, (1) gives a decomposition of L_{10n}/L_{2n} into a sum of 2 squares, and since any divisor of a sum of 2 squares is -1 (mod 4), it follows that any primitive divisor of L_{10n}, $n > 0$, is -1 (mod 4).

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