Induction – Q13 [Practice/E] (18/6/23)

If $u_n = 3u_{n-1} + 4$, where $u_1 = 2$, then $u_n = 4(3^{n-1}) - 2$

Solution

[Show that the result is true for $n = 1$]

Now assume that the result is true for $n = k$, so that

$u_k = 4(3^{k-1}) - 2$

Then $u_{k+1} = 3u_k + 4 = 12(3^{k-1}) - 6 + 4$

$= 4\left(3^{(k+1)-1}\right) - 2$

[Standard wording]