

Let  $a_n$  be defined by the recurrence  $a_0 = 3$ ,  $a_1 = -1$ , and  $a_n = 2a_{n-1} + 15a_{n-2}$  for  $n \geq 2$ . Prove that  $a_n = 2 \cdot (-3)^n + 5^n$  for all nonnegative integers  $n$ .