Name: _____

Directions: Show all work.

1. **[5 points]** Prove for $n \geq 0$, we have $\displaystyle\sum_{k=1}^{n} k(k+2) = \frac{1}{6}[n(n+1)(2n+7)]$.

2. **[5 points]** Let t be a real number, let $a_0 = 0$, let $a_1 = t$, and let $a_n = 3a_{n-1} - 2a_{n-2}$ for $n \geq 2$. Prove that for $n \geq 0$, we have that $a_n = t(2^n - 1)$.