A2$_Q$3

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$$a_n = 3a_{n-1} - 3a_{n-2} + a_{n-3}$$

We hypothesize that this linear equation has a solution of the form:

$$z^3 = 3z^2 - 3z + 1$$

which solving, gives the solution:

$$(1 - z)^3 = 0$$

thus z = 1 with multiplicity 3, so the solution has the form:

$$(a + bn + cn^2)z = a + bn + cn^2$$

which, if we plug in the two different sets of initial conditions, we get (for $a_2 = 1$) a = 0, b = -1/2, c = 1/2, and for ($a_1$1 as well) a = 0, b = 3/2, c = -1/2. (Worked with Maryam B).

In the future I'd prefer if you were a bit more explicit as to why the solution must take this form.

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