1. a. Convert the recurrence
6
into standard form where 6
b.

$$6a(n-1) + a(n+3) + 5a(n+1) = 0$$
,

into **standard form** where a(n + 4) is expressed in terms of a(n + 3), a(n + 2), a(n + 1), a(n).

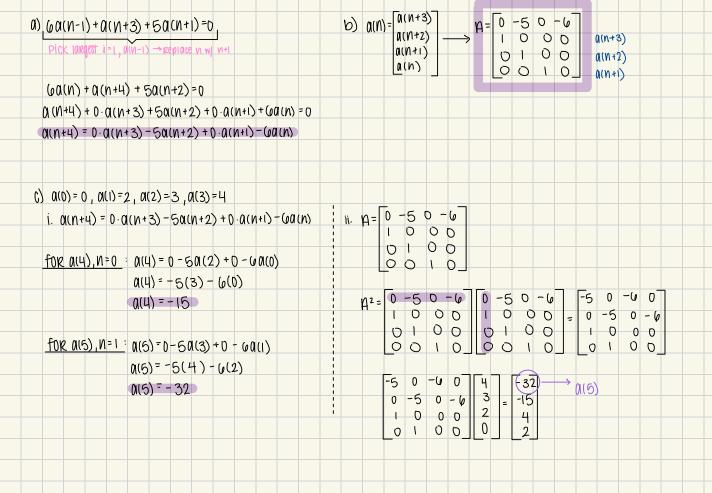
Abbreviating

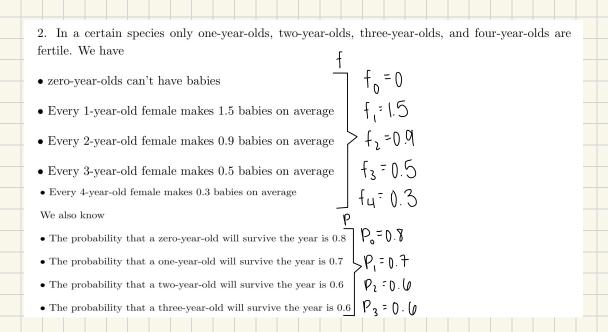
$$\mathbf{a}(n) = \begin{bmatrix} a(n+3) \\ a(n+2) \\ a(n+1) \\ a(n) \end{bmatrix} .$$

Find the 4×4 matrix, let's call it A such that

$$\mathbf{a}(n+1) = A\mathbf{a}(n)$$

- **c** Assuming that a(0) = 0, a(1) = 2, a(2) = 3, a(3) = 4 Find a(5) in two ways:
- (i) Straight from the standard form, by first finding a(4), and then a(5)
- (ii) Using the matrix version by first finding A^2 and then multiplying it by the column vector $[4,3,2,0]^T$ and extracting the first component.





a. Set up the Leslie matrix

b. If right now there are 100 zero-year-olds, 90 one-year-olds, 80 two-year-olds, 70 three-year-olds, and 60 four-year-old, what is the expected number of 3-year-olds after two years?

