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HW #1

Problem #1

Based on the question asked, the amount of females born at time n is reliant on the probability of a female giving birth multiplied by the amount of females that can give birth. Since females can give birth at years 1, 2 & 3, the formula would require 3 different calculations for females born each year.

The formula is

$$F(n) = p_1 F(n-1) + p_2 F(n-2) + p_3 F(n-3)$$

if at $n=0$ $n=1$ $n=2$
 $F(0) = c_0$ $F(1) = c_1$ $F(2) = c_2$

$$F(4) = p_0(F(3)) + p_1(F(2)) + p_2(F(1))$$

$$F(3) = p_0(F(2)) + p_1(F(1)) + p_2(F(0))$$

$$F(4) = p_0(p_0(c_2) + p_1(c_1) + p_2(c_0)) + p_1 c_2 + p_2 c_1$$

$$F(4) = (p_0)^2 c_2 + p_0 p_1 c_1 + p_0 p_2 c_0 + p_1 c_2 + p_2 c_1$$