**Problem 1:** In the RSA, suppose that Bob chooses $p = 3$ and $q = 43$. (a) Determine three correct values of the public exponent $e$. Justify briefly their correctness (at most 20 words.)

(b) For one of the $e$’s you selected, compute the secret exponent $d$. Show your work.
Problem 2: Grabbits are genetically modified rabbits that live forever and reproduce asexually on a precise schedule: each grabbit gives birth to three grabbits every Wednesday starting two weeks after birth. So if you start with 1 newly born grabbit, after one week you will still only have 1 grabbit. After two weeks you will have 4 grabbits, namely your first grabbit plus its 3 offspring. In general, how many grabbits will you have after \( n \) weeks if you start with one newly born grabbit? Set up a recurrence relation for this problem and solve it.

(a) Recurrence relation:

(b) Characteristic polynomial and its roots:

(c) General form of the solution:

(d) Initial condition equations and their solution:

(e) Final answer: