

MAT385 Quiz 06, Spring 2023

Name:

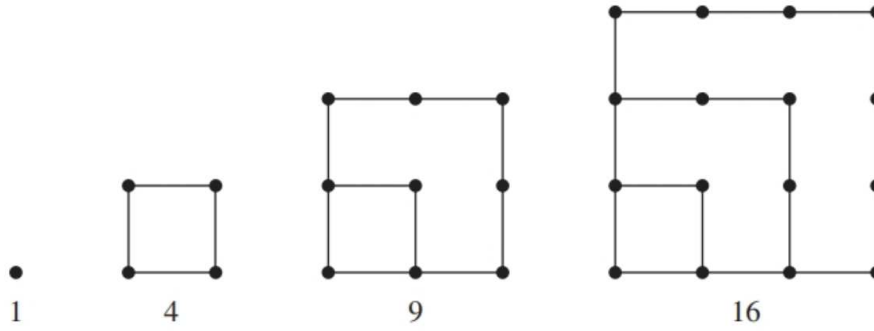
1. (6 pts) Someone conjectured the following property of Fibonacci numbers for $n \geq 3$:

$$F(n+1) + F(n-2) = 2F(n)$$

- a. Verify that it works for $n = 3$, $n = 4$, and $n = 5$.

- b. Prove that it works for all $n \geq 3$.

2. (4 pts) Consider the first four in a sequence of dot diagrams, $S(1)$ through $S(4)$, each building off the previous dot diagram:



Write and solve a recurrence relation for $S(n)$, the number of dots in the n^{th} diagram.

Reminder: here's the formula that gives the general solution for a first-order, linear, non-homogeneous recurrence relation:

$$S(n) = c^{n-1}S(1) + \sum_{i=2}^n c^{n-i}g(i)$$