

Worksheet 2

1. Consider the sequence defined recursively as

$$a_0 = 1$$

$$a_n = a_{n-1} + a_{n-2} + \dots + a_0 + 1$$

Show $a_n = 2^n$ for all positive integers n .

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2. Prove that $1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$ for all positive integers n .

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3. Prove that for any positive integer n that $n^3 + 2n$ is divisible by 3.