Geometric and Arithmetic Induction Problems

CSE 1400 Applied Discrete Mathematics

Spring 2013

The purpose of this exercise is to test your understanding of geometric and arithmetic sums and induction proofs they equal certain functions.

1. Use mathematical induction to show that

$$\sum_{k=0}^{n-1} 2 \cdot 5^k = 2 + 10 + 50 + \cdots + 2 \cdot 5^{n-1} = \frac{5^n - 1}{2}$$

2. Use mathematical induction to show that

$$\sum_{k=-3}^{n} 3k + 2 = -7 - 4 - 1 + \cdots + (3n + 2) = \frac{n(3n - 5)}{2}$$