

Discrete Mathematics, 2016 Fall - Worksheet 13

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Instructor: Zsolt Pajor-Gyulai, CIMS

In all of the above problems explain your answer in full English sentences.

1. Prove the following proposition.

Proposition 1. *Let a, b , and c be sequences of numbers and let s be a number.*

- *If, for all n , $c_n = a_n + b_n$ then $\Delta c_n = \Delta a_n + \Delta b_n$.*
- *If, for all n , $b_n = sa_n$, then $\Delta b_n = s\Delta a_n$*

2. Each of the following sequences is generated by a polynomial expression. For each, find the polynomial expression that gives a_n .

- 1, 6, 17, 34, 57, 86, 121, 162, 209, 262, ...
- 6, 5, 6, 9, 14, 21, 30, 41, 54, 69, ...

3. Find a polynomial formula for $1^4 + 2^4 + 3^4 + \dots n^4$.