Tutorial 3

Instructions: In each of the problems below, your task is to:

- 1. Find the closed form for the sum using strategies from class.
- 2. Prove by induction that your closed form is correct.
- 1. Linearity

Let
$$S_n = \sum_{i=1}^n (6+5i)$$
.

(a) Compute a closed form for S_n .

(b) Prove your closed form is correct by induction on n.

2. Change of Variable

Let
$$S_n = \sum_{j=1}^n (4j-2)(n-j+1)$$
.

(a) Compute a closed form by substituting i = n - j + 1

(b) Prove your closed form is correct by induction on n using the original definition of S_n .

3. Geometric Series

Let
$$T_n = \sum_{k=0}^n 2 \cdot 3^k$$
.

(a) Compute a closed form for T_n .

(b) Prove by induction that $T_n = 3^{n+1} - 1$.

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4. Double Sums

Let
$$U_n = \sum_{i=1}^n \sum_{j=1}^i (8j - 3)$$
.

Compute a closed form for U_n .