

PS #0 — Induction

Due: 1/10/25, 11:59 PM

Instructor: Jonathan Lindbloom

Problem 1. Prove that

$$1 + 4 + 7 + \cdots + (3n - 2) = \frac{n(3n - 1)}{2} \quad (1)$$

for all $n \geq 1$.**Problem 2.** Prove that

$$\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6} \quad (2)$$

for all $n \geq 1$.**Problem 3.** Prove that

$$2 \cos(2x) + 2 \cos(4x) + \cdots + 2 \cos(2nx) = \frac{\sin((2n+1)x)}{\sin(x)} - 1 \quad (3)$$

for all $n \geq 1$.