CSCI 1900 - Homework 11-B

**Section 5.1: Mathematical Induction**  *(20)*

1. Given the expression F(n) = 1 + 8 + 27 + 64 + … + n3
	1. What is the 5th term in the expression? (1)
	2. What is the kth term in the expression? (1)
	3. What is the value of F(4)? (1)
	4. Write F(n) using summation notation. (1)
	5. What is (1)

$$\sum\_{i=1}^{122347}i - \sum\_{i=4}^{122347}i$$

By using mathematical induction, prove that the statements in the following problems are true. To receive credit, you **must** use the formal procedure shown in class.

1. $1+1+1+…+1 =n $ for all$ n\geq 1$.
(Hint: The number of terms on the left side is *n*. (3)
2. $1+2+3+…+\left(n+1\right)= \frac{\left(n+1\right)\left(n+2\right)}{2}$ for all $n\geq 1$ (3)
3. $1+2+4+8+…+ 2^{n}= 2^{n+1}-1$ for all $n\geq 0$ (3)
4. $2n+1 <2^{n}$ for all $n\geq 3$ (3)
5. $6+24+54+96+…+ 6n^{2}= n \left(n+1\right)\left(2n+1\right)$ for all $n\geq 1$ (3)