CSC 344 **Spring 2017** **Dr. R. M. Siegfried**

Assignment #1 – Due Friday, January 27

1. Prove by mathematical induction that

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

2. Prove by mathematical induction that

$$\sum_{i=1}^{n} i^3 = \frac{n^2(n+1)^2}{4}$$

3. Prove by mathematical induction that

$$\sum_{i=1}^{n} \frac{1}{2^i} = 1 - \frac{1}{2^n}$$

4. Prove by mathematical induction that

$$\sum_{i=1}^{n} a^i \leq \frac{a^{n+1} - 1}{a - 1}$$

5. Prove by mathematical induction that $\sum$ i = 1 n 2 i ≤ 2 n + 1 - 1

$$\sum_{i=1}^{n} 2^i \leq 2^{n+1} - 1$$