Fall 2014, Math 302.504 - Homework Set 6
Due: Wednesday, October 22, 2014
Sigma Notation and Induction

Name: _____

Given below are the required problems for this assignment. Please submit your answers on a printed copy of this sheet.

(1) Let $S = \{1, 3, 5, 7\}$. Find the values of these sums.

(a) $\sum_{j \in S} j$

(b) $\sum_{j \in S} j^2$

(c) $\sum_{j \in S} 1$

(2) Compute each of these sums.

(a) $\sum_{i=1}^{2} \sum_{j=1}^{3} (i + j)$

(b) $\sum_{i=1}^{3} \sum_{j=0}^{2} i$

(c) $\sum_{i=0}^{2} \sum_{j=1}^{3} ij$

(3) Use summation properties to write the following sum without using sigmas or "$\cdots$".

$$\sum_{i=1}^{100} \left((i+1)^2 - (i-1)^2\right)$$

(4) Use induction to prove the following equality.

$$1^2 + 3^2 + \cdots + (2n+1)^2 = \frac{(n+1)(2n+1)(2n+3)}{3}$$

(5) Use induction to prove the following equality.

$$1 \cdot 2 + 2 \cdot 3 + 3 \cdot 4 + \cdots + n(n+1) = \frac{n(n+1)(n+2)}{3}$$