CSCI 301, Winter 2018
Math Exercises # 4

YOUR NAME HERE

Due date: Thursday, February 8, midnight.

Prove each of the following by induction, for all $n \in \mathbb{N}$. You may use SymPy or other symbolic algebra package to simplify algebraic expressions.

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

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

3. $$\sum_{i=1}^{n} (8i - 5) = 4n^2 - n$$

4. $$3 \mid (5^{2n} - 1)$$

5. $$9 \mid (4^{3n} + 8)$$