

Assignment #3

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1. Use induction to prove that  $1 + 5 + 9 + 13 + \dots + (4n+1) = (n+1)(2n+1)$  for all integers  $n \geq 0$ .
2. Find a simple formula for the sum  $S = 1 \cdot 3^0 + 2 \cdot 3^1 + 3 \cdot 3^2 + \dots + n \cdot 3^{n-1}$  for all integers  $n \geq 1$ .  
**Hint:** Find some connection between  $S$  and  $3S$  that can lead to some useful grouping of the terms in the sum (and use GP formula).
3. Use induction to prove the formula found in problem #2.
4. Use strong induction to prove that any amount  $\geq 21$  cents can be formed using 4-cent and 7-cent stamps.

**Submission:** Tuesday (class time) Oct. 20, 2015. You must submit your solution as a typed printed paper (i.e., printed from MS Word)