CSC 300: Assignment 8

Total: 40 points

1. (10 pts) Prove by induction that $\sum_{k=1}^{n} k = n(n+1)/2$, $\forall n \geq 1$

2. (10 pts) Prove that $2n+3 \leq 2^n$, $\forall n \geq 4$, by induction

3. (10 pts) Prove that 3 divides $n^3 + 2n$ exactly, for all positive integers $n \geq 1$ using the principle of induction. *Hint:* $(n+1)^3 = n^3 + 3n^2 + 3n + 1$

4. (10 pts) Use the principle of *strong induction* to prove that postage of $n$ cents can be formed using just 4 cent and 7 cent stamps, for all $n \geq 18$. *Hint:* Look up Example 4, page 287 (Example 4 on page 337-338 in the 7th edition), to see how a similar problem is solved using strong induction (the second proof)