CS 173, Fa Examlet 7,	ll 2015 Part A	NETID:										
FIRST:						AST:						
Discussion:	Thursday	<b>2</b>	3	4	5	Friday	9	10	11	12	1	2

Claim: (4n)! is divisible by  $8^n$ , for all positive integers n.

Proof by induction on n.

Base case(s):

Inductive Hypothesis [Be specific, don't just refer to "the claim"]:

## CS 173, Fall 2015 NETID: Examlet 7, Part A LAST: FIRST: **Discussion:** Thursday $\mathbf{2}$ 3 $\mathbf{4}$ $\mathbf{5}$ Friday 9 1011 121 $\mathbf{2}$

Use (strong) induction to prove the following claim:

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

Proof by induction on n.

Base case(s):

Inductive Hypothesis [Be specific, don't just refer to "the claim"]:

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Claim:  $\sum_{p=0}^{n} (p \cdot p!) = (n+1)! - 1$ , for all natural numbers n.

Recall that 0! is defined to be 1.

Proof by induction on n.

Base case(s):

Inductive Hypothesis [Be specific, don't just refer to "the claim"]:

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Claim: for all natural numbers n,  $\sum_{j=0}^{n} 2(-7)^j = \frac{1 - (-7)^{n+1}}{4}$ 

Proof by induction on n.

Base case(s):

Inductive Hypothesis [Be specific, don't just refer to "the claim"]:

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Use (strong) induction and the fact that  $\sum_{i=0}^{n} i = \frac{n(n+1)}{2}$  to prove the following claim:

For all natural numbers n,  $(\sum_{i=0}^{n} i)^2 = \sum_{i=0}^{n} i^3$ 

Proof by induction on n.

Base case(s):

Inductive Hypothesis [Be specific, don't just refer to "the claim"]:

Rest of the inductive step: (Start by removing the top term from the sum on the lefthand side.)

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For all positive integers n,  $\sum_{p=1}^{n} (-1)^{p-1} p^2 = \frac{(-1)^{n-1} n(n+1)}{2}$ 

Proof by induction on n.

Base case(s):

Inductive Hypothesis [Be specific, don't just refer to "the claim"]: