Intro to Proofs Day 15 Outline (This class meets for 1 hour and 50 minutes.)

**Synthesi/quizzes to hand back, snacks/pens**

**Synthesis Activity** [0-15 minutes]

* Section 3.3 #20c (on slide)
  + Finding one integer that doesn’t work does NOT contradict a there exists statement.
* Cases – If n is an integer then n^3 = 0 (mod 9), n^3 = 1 (mod 9), or n^3 = 8 (mod 9)
  + What cases and why?
  + Do one case.
* Section 4.1 #3a on page 180 – just write down the steps. 2+5+8+…+(3n-1) = n(3n+1)/2
  + P(1): 2 = 1(3(1)+1)/2
  + For k \in \N, if P(k) then P(k+1): if 2+5+8+…+(3k-1) = k(3k+1)/2 then 2+5+8+…+(3(k+1)-1) = (k+1)(3(k+1)+1))/2

**Induction Example** [15-30 minutes]

* The sum of the first n odd integers is n^2
* Sigma notation?

**Theorem 2/Synthesis Activity** [30-50 minutes]

* Work on Theorem 2: Write down your steps, confirm them with your group, when you are sure about them ask me to double check.
* Do the synthesis one if you finish Theorem 2

---------------------------------BREAK--------------------------------------------

**More induction!** [60-95 minutes]

* They work on Theorems 3, 4, and 5
* Go over things as needed

**Play, Conjecture, Prove – chicken nuggets [95-110 minutes]**

  When you go to McDonald’s you can order chicken nuggets in boxes of 3 and 5. How many chicken nuggets can you order? For example, you can order 8 because you can order a box of 3 and a box of 5. You can't order 1 because the smallest box you can order is 3. What other numbers can you order or not order?

For next time:

Synthesis #14: Section 4.1 #3b on page 180 (an outline is okay)

Preview Activity #10: Section 4.2 (Fibonacci numbers)

Quiz: New skill P2