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

**Synthesis to hand back, 4.2/4.3 worksheet, quizzes, proof portfolio problem 7, snacks/pens**

**Synthesis Activity** [0-10 minutes]

* Section 4.1 #3b
  + 1+5+9+….+(4n-3) = n(2n-1)
  + Base case: 1 = 1(2(1)-1)
  + Let k\in\N. Assume 1+5+9+…+(4k -3) = k(2k-1). Show 1+5+9+…+(4(k+1)-3)=(k+1)(2(k+1)-1)=(k+1)(2k+1)=2k^2+3k+1
  + 1+5+9+…+(4k+1) = 1+5+9+…+(4k-3)+(4k+1) = k(2k-1)+(4k+1) = 2k^2-k+4k+1 = 2k^2+3k+1 = (k+1)(2k+1)= (k+1)(2(k+1)-1)

**How do we write an induction proof [10-20 minutes]**

* Show them Theorem 2 solution. Key parts:
  + Say what P(n) is
  + Don’t write P(n) =
  + Don’t assume your conclusion in the basis step
  + In the inductive step make sure you are fixing a k in N

*Theorems 4 and 5 are challenge questions*

**Preview Activity** [20-30 minutes]

* Fibonacci number stuff – they seem to get it.
* Some questions I don’t understand so if you want to ask again.
* F\_{k+1}+f\_k = f\_{k+2}
* Which of the following are true?
  + F\_1+f\_2 = f\_3
  + F\_3+f\_4 = f\_7
  + F\_3+f\_4 = f\_5
  + F\_{k}+f\_{k+1} = f\_{k+2}
  + F\_{k-2}+f\_{k-1}=f\_k

**Section 4.2/4.3 worksheet** [30-50 minutes]

* Fibonacci number problem
* Starting somewhere else problem (plus inequality!)

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

**Section 4.2/4.3 Worksheet** [60-80minutes]

* Discuss solutions

**Chapter 5 – Sets**

* Subset: We say A is a subset of B (notation) provided that if x in A then x in B.
  + Which of the following are subsets of {1,2,3,4}?
    - {1}
    - {2,4}
    - {1,2,3,4}
    - {1,2,3,4,5}
    - {}
    - {5}
  + How many subsets are there of the set {1,2}?
* Element: We say x is an element of A if x is one of the objects in A
  + For the set {1,2,3,4,cat} use the symbol \in and \notin

**Quiz: [100-110 minutes]**

For next time:

Synthesis #14: Do Section 4.1 #8a on page 181 – write up formally (but don’t need to type). Section 4.1 #18a on page 184 – what’s wrong with this proof.

Preview Activity #10: Section 5.1 (unions/intersections/etc.)