Intro to Proofs Day 14 Outline (This class meets for 110 minutes.)

**Need: Cards, Quizzes, Proof Portfolio Problem 7**

PART 1: Synthesis Trading (0-15 minutes)

**Proof by induction that 2^0+2^1+2^2+…+2^n = 2^(n+1)-1**

* Trade with their neighbor, take 5 minutes to read, then discuss.
* Have someone show their proof.

PART 2: Induction example together (15-30 minutes)

**Example as a class:**

* For each natural number n with n>=4, n!>2^n
* Steps for induction
  + Base case (first one it’s true for!)
  + Inductive step, let k>= 4, show P(k)-> P(k+1).

PART 3: Section 4.1 Worksheet (30-50 minutes)

**Slides – Write down the steps. Which one can you not do by induction?**

**Theorem 2 (sum of first n integers)**

* Everyone write down what the two steps are in as much detail as you can. Share with neighbors. Share with class.
* Work your way through proof.

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

PART 4: Section 4.1 Worksheet (60-95minutes)

**Induction Workshop [70-110]**

* Just do as many induction problems as you can.
* For each problem on slide
  + Can we do induction here?
  + What is P(n)?
  + What is the base step (P(1))?
  + Is the base step true? (Just substitute 1, be careful not to assume your conclusion)
  + What is the inductive step (P(k)-> P(k+1))?
  + Is the inductive step true? (Assume hypothesis of conditional statement show conclusion?

PART 5: Quiz

* L3 (last attempt), L4 (last attempt), L5 (second attempt), P1 (first attempt)