Intro to Proofs Day 10 Outline (This class meets for 1 hour and 50 minutes.)

**Need 3.3 worksheets, synthesis to hand back, snacks/pens/cards**

**Go over Feedback** [0-5 minutes]

**Questions about Exam 1**  [5-10 minutes]

* If time: hat video starting at 1 minute.

**Synthesis Activities** [10-20 minutes]

* BRING UP BOOK!!! Questions on the reading
  + Anything surprising or that you are going to do?
  + What do you need to know how to do in TeX?
* Section 3.2 #9
  + For each positive real number x, if x is irrational then sqrt{x} is irrational
  + They look over each other’s proofs.

**Section 3.3 Worksheet- Page 1**[20-30]

* They negate statements and compare their answers
* Think carefully about what it means for that statement to be false.

**Discuss Preview Activity/Do Example** [30-50 minutes]

* Preview Activity Questions:
  + Slide 3: Show first 3 answers and find errors.
  + Slide 4: Note “For each” is the same as “for all”
  + Slide 5: The and/or in the conclusion
  + Slide 8: A contradiction is anything that is obviously false.
  + Question – how to write:
  + Question – why not just prove directly?
* Example: For all integers a and b, 18a+6b \neq 1. (Divide by 6, left side is an integer, right side is not.

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

**Section 3.3 Page 2** [60-90 minutes]

* They work on Theorem 1 and Theorem 2

**Section 3.3 – Example [90-110 minutes]**

* If r is a real number such that r^2 =2 then r is irrational.
* Say sqrt{2} is rational. Then sqrt{2} =p/q where p,q \in Z and q\neq 0. In addition, assume p and q have no comman factors. 2 = p^2/q^2. Then 2q^2 = p^2. So 2 divides p^2, that is, p^2 is even. Thus p is even (lemma). So p = 2x. So 2q^2 = (2x)^2 or 2q^2 = 4x^2 or q^2 = 2x^2. So q^2 is even so q is even, or 2 divides q. Thus p and q have a common factor, a contradiction.

**Section 3.3 – Page 3**

* Supposed to be “If r is a real number such that r^3 = 2 then r is irrational.

For next time: just study for exam