“I’m sorry but you can’t add this course” the Professor said to the student. “Even though there are an infinite numbers of desks in this class room, all of the desks are filled.” Indeed as the Student looked out over the classroom he saw row upon row of desks each numbered in order, 1, 2, 3, ... etc. stretching out as far as he could see, disappearing into the distance. Behind each desk sat a student. “So you see”, said the Professor, “with all of the desks filled, there is no room for you”. The Student turned away but suddenly a thought occurred to him. “Wait”, he said to the Professor. “I think I know a way to find an empty desk”.

Can you see how to do this?
To Infinity and Beyond: What does that *really* mean?
Who Am I?

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What’s this course about?
- Text Books –

*The Infinite Book* by John D. Barrow

*To Infinity and Beyond: A Cultural History of the Infinite* by Eli Maor

- On Reserve -

*The Shape of Space* by Jeffrey Weeks

*The Pea and the Sun* by Leonard Wapner
Class WebPages:
http://www4.wittenberg.edu/academics/mathcomp/shelburne/Infinity/index.html

From Wittenberg’s Main Website
Academics: Majors & Minors
Mathematics
Resources in Mathematics: Course Websites
Witt Sem 100
The Infinite Lottery

Set Up

1. Given: An infinite number of bags numbered 1, 2, 3, ... each containing an infinite number of lottery balls.

2. The lottery balls in each bag are marked with the number on the bag (e.g. all bag 1 balls are marked with a “1” etc).

3. You have a box. Select any number (finite) of lottery balls from any number (finite) of bags and place them in the box.
The Infinite Lottery

The Play

5. Remove any lottery ball from the box and replace it with any number (finite) of balls marked with a lower number.

6. Note: Removing a “1” lottery ball allows no replacements (why)

7. If you can play the game forever – you win; if the play terminates because the box is empty you lose.

Question: Do you win or lose?
Prove it!
(i.e. gave a plausible argument for the correctness of your answer)
Assignment for Tuesday (8/25/10)

Read Preface and Chapter 1 of *The Infinite Book* by John Barrow & Preface of *To Infinity and Beyond* by Eli Maor

Come prepared to discuss the question – “Where do our ideas of the infinite come from?”

Where did $\infty$ as a symbol for infinity come from?
Be sure to check out *Dramatis Personae* links on the course website.
Respond (by Monday at 5:00 PM) to the e-mail that will be sent later today
“OK”, said the Professor. “Class is over – but none of you are able to leave this room!”

“What do you mean?” asked the Student.

“Well” said the Professor, “to leave you must travel half the distance to the door. But then when you get half way there, you must again travel half the distance to the door. And when you get half way there, you must again travel half the distance to the door and so on and so on ad infinitum ∞! So you can never leave since you must first always travel half the remaining distance to the door” so said the Professor as he calmly walked out of the classroom.
Sort of like the Hotel California – “You can check out any time you like but you can never leave”

The *moral* of the story is: You can’t get into this class but once you do, you can’t get out of it.