Homework # 9 due September 14.

- Read pp. 25-29.
- Need to know: Definitions of one-to-one and onto functions, when two sets have the same cardinality, proof of Theorem 1.5.6

Do the following problems:

1. Prove that if $f: A \to B$ and $g: B \to C$ are are one-to-one and onto functions, then $h = g \circ f: A \to C$ is also one-to-one and onto.

2. Find a one-to-one and onto functions

a) $f: [a,b] \to [c,d]$ (Hint: seek your function in the form $f(x) = mx + r$)

b) $g: (0,1) \to \mathbb{R}$.

Do not forget to prove that your functions are one-to-one and onto.

3. Prove that if A is countable and B is finite, then $A \cup B$ is countable.

4. Graduate problem (extra credit for undergraduates): #1.5.6 on p. 31.