Math 2534  Homework 11 on Functions  Spring 2016
Show all work and staple multiple sheets

Problem 1: Theorem: If the A and B are finite sets such that the \( n(A) = n(B) \), then any function mapping A to B is one to one if and only if it is onto. (two part proof)

Problem 2: Explain the mistake in the following proof:
Theorem: If \( f(x) = 2x - 6 \) for all integers, Then \( f(x) \) is one to one.
Proof: Suppose any integer \( x \) is given. Then by definition of \( f \), there is only one possible value for \( f(x) \), namely \( 2x - 6 \). Hence \( f(x) \) is one to one.

Problem 3: If \( f: (\text{zmod}5) \to (\text{zmod}5) \) when \( f[x] = [x + 3] \), Show the mapping and determine if \( f \) is a bijection.

Problem 4: How many people must be in a room to guarantee that at least 6 people have the same birth month?

Problem 5: If \( f : A \to B \), \( g : B \to C \) and \( (f^{-1} \circ g^{-1})(4) = f^{-1}(2) \) and \( g(b) = 4 \), then find the value of \( b \).

Problem 6: Prove that if \( F^{-1} \) exist then \( F \) must be onto where \( F : A \to B \). Assume no previous theorems. Use only definitions.

Problem 7: If \( A = \{a, b, c\} \), then define the function \( F : P(A) \to \{0, 1, 2, 3\} \) as follows:
For all subsets \( S \) in \( P(A) \), \( F(S) = n(S) \) (ie. the number of elements in \( S \)).
a) Show the mapping
b) Is \( F \) one to one?
c) Is \( F \) onto?
Justify your answers