ICS 6B **Friday, December 6, 2013**

Quiz 8

Instructor: Sandy Irani

1. For each of the functions below answer the following questions:

   - Is the function onto?
   - Is the function one-to-one?

   (a) $f : \mathbb{R} \to \mathbb{R}$. $f(x) = x^3$.

   (b) $f : \mathbb{Z} \to \mathbb{Z}$. $g(x) = \lfloor x/3 \rfloor$.

   (c) $f : \mathbb{Z} \to \mathbb{Z}$. $g(x) = 3x$.

   (d) A is a finite set. $f : P(A) \to P(A)$. For $X \subseteq A$, $f(X) = A - X$.

   (e) Let $B = \{0, 1\}$. $f : B \times B \to B \times B$. $f(x, y) = (1 - x, 1 - y)$.

2. Consider the following sum:

$$5 + 5(2.1) + 5(2.1)^2 + 5(2.1)^3 + 5(2.1)^4 + 5(2.1)^5 + 5(2.1)^6 + 5(2.1)^7 + 5(2.1)^8$$

   (a) Give an expression for the sum using summation notation.

   (b) Give a closed form expression for the value of the sum. You do not have to solve for an actual number. Just give a closed form mathematical expression for the sum.