Math 215. Homework 6

due 02/25/08

1. Determine if the functions $f_i : \mathbf{R} \to \mathbf{R}$ below are injective, surjective or bijective.
a) $f_1(x) = 7x - 3$
b) $f_2(x) = x^2 - 2x + 1$
c) $f_3(x) = x^2 - 5x + 6$.
d) $f(x) = x^3 - x$

2. For the cases when the the above functions are not bijective find smaller domains and codomains for which the functions given by the same formula are bijective.

3. Prove that compostion of two surjections is a surjection.

4. Prove that if G_f is the graph of a function $f : X \to Y$ then

$$\forall y \in Y \Rightarrow (X \times \{y\}) \cap G_f \neq \emptyset$$

implies that f is surjective.

5. Use Peano axioms to define $n + 5$ i.e. describe $n + 5$ in terms of successor function.

Reminder: Midterm 1 will take place on Feb 25